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Question Paper
ENTHUSE_SEMI MAJOR TEST-1
13th NEET - Phase 1
KOTA

Duration: 3 Hours **Max Marks: 720**

INSTRUCTIONS

1. The Question paper is divided in to four parts botany, zoology, physics chemistry and each part is further divided into two sections
   Section A contains **35 Questions Section B** contains **15 Questions**. Please ensure that the Questions paper you have received contains ALL THE QUESTIONS in each Part.
2. In Section A all the **35 Questions** are **compulsory** and in **Section B** Contain **15 Questions, Out of these 15 Questions, candidates can choose to attempt any 10 Questions.**
   Each Question has four choices (A), (B), (C), (D) out of which **only one is correct** & carry **4 marks** each. **1 mark** will be deducted for each wrong answer.

GENERAL INSTRUCTION

1. Use only **blue/black pen (avoid gel pen)** for darkening the bubble.
2. Indicate the correct answer for each question by filling appropriate bubble in your OMR answer sheet.
3. The Answer sheet will be checked through computer hence, the answer of the question must be marked by shading the circles against the question by dark **blue/black pen**.
4. Blank papers, Clipboards, Log tables, Slide Rule, Calculators, Cellular Phones, Pagers and Electronic Gadgets in any form are **not** allowed to be carried inside the examination hall.

FACULTY CODE FOR FEEDBACK

NV Sir : **1** | AV Sir : **3** | AM Sir : **9** | ABP Sir : **17** | LV Sir : **18** | JC Sir : **19** | SG Sir : **13** | Bharat Sir : **15** | Harmeet Sir : **16** | KD Sir : **23** | RNS Maam : **26** | PL Sir : **46** | ZH Sir : **47** | DG Sir : **48** | PV Sir : **36** | SM Sir : **56** | Naveen Sir : **57** | Priyanshi Mam : **58** | DB Sir : **49** | SB Sir : **59** | Imran Sir : **124** | ML Sir : **125**

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SYLLABUS

Biology

Reproduction in Organism (1), Sexual Reproduction in Flowering plants (6),Reproduction in Organism (1), Sexual Reproduction in Flowering plants (4),Principle of Inheritance and Variation (14), Molecular Basis of Inheritance (14),Principle of Inheritance and Variation (5), Molecular Basis of Inheritance (5),Human Reproduction (15), Reproductive Health (5),Human Reproduction (5), Reproductive Health (5),Origin And Evolution (15),Origin And Evolution (5)

Physics

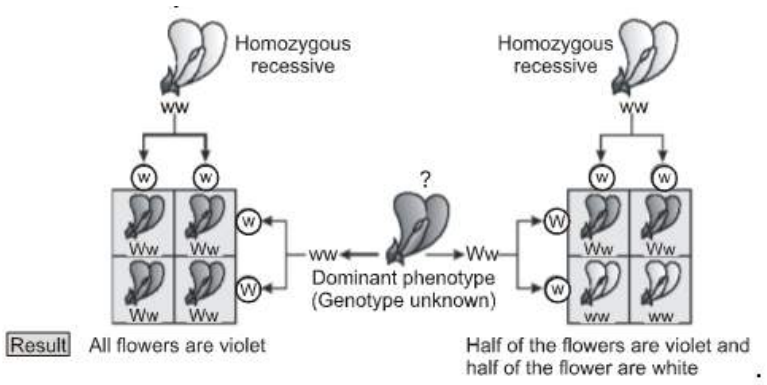
Electrostatics (6), Current Electricity (6), Capacitance (6), Magnetic Effects of Current and Magnetism (6), Electromagnetic Induction (6), Alternating Currents (5),Electrostatics (3), Current Electricity (3), Capacitance (3), Magnetic Effects of Current and Magnetism (3), Electromagnetic Induction (2), Alternating Currents (1)

Chemistry

Solid State (8), Solutions (8),Solid State (2), Solutions (3),p-Block Elements (5),p-Block Elements (3),Haloalkanes and Haloarenes (5), Alcohols, Phenols and Ethers (5), Biomolecules (4),Haloalkanes and Haloarenes (3), Alcohols, Phenols and Ethers (3), Biomolecules (1)

PART – I _ SECTION – A _ [BOTANY]

1. Observe the given diagram & Select the correct option :



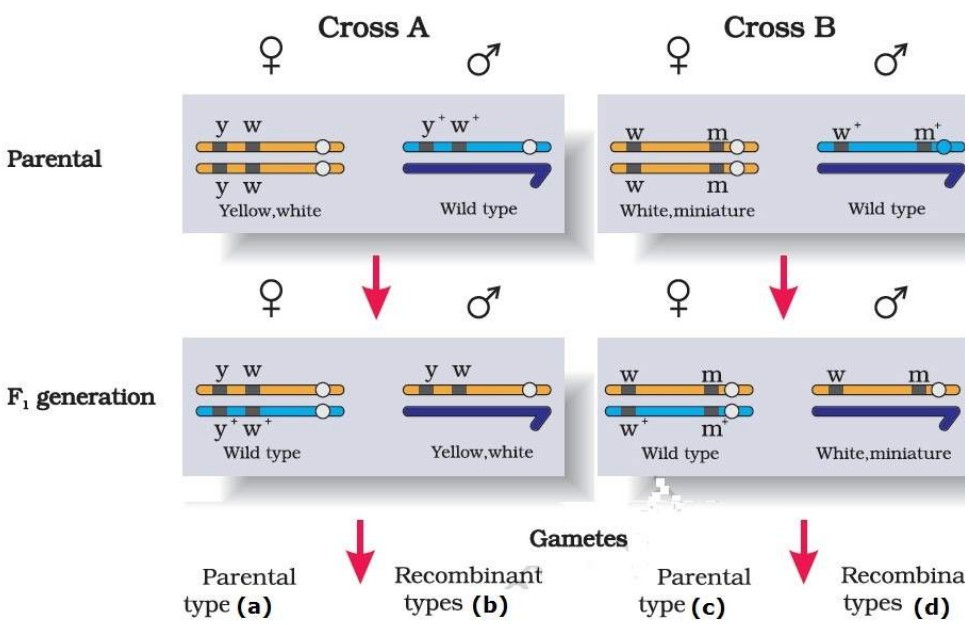
(A) It is the diagrammatic representation of a out cross

(B) It is the comparison of two monohybrid crosses, used to find out the phenotype of organisms

(C) It is the diagrammatic representation of reciprocal cross to find out the genotype of organism

(D) It is the diagrammatic representation of test cross to find out the genotype of organisms.

2. Recognise the figure and find out the correct matching.



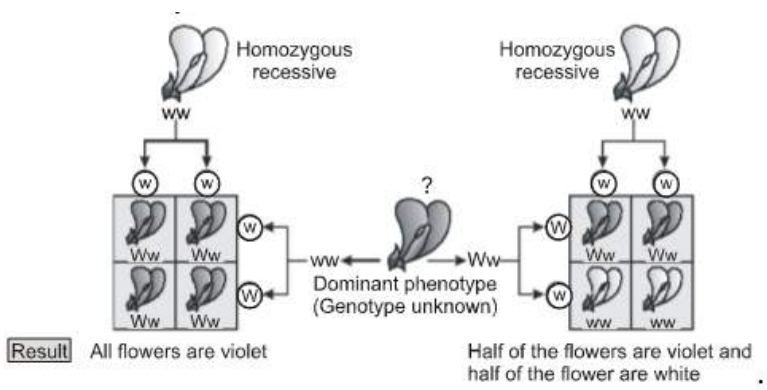
(A) a—37.2%, b—62.8%, c—1.3%, d—98.7%

(B) b—37.2%, a—62.8%, d—1.3%, c—98.7%

(C) c—37.2%, d—62.8%, a—1.3%, b—98.7%

(D) d—37.2%,c—62.8%, b—1.3%, a—98.7%

1. दिये गये चित्र का ध्यान से निरीक्षण कीजिए तथा सही विकल्प का चयन करे।



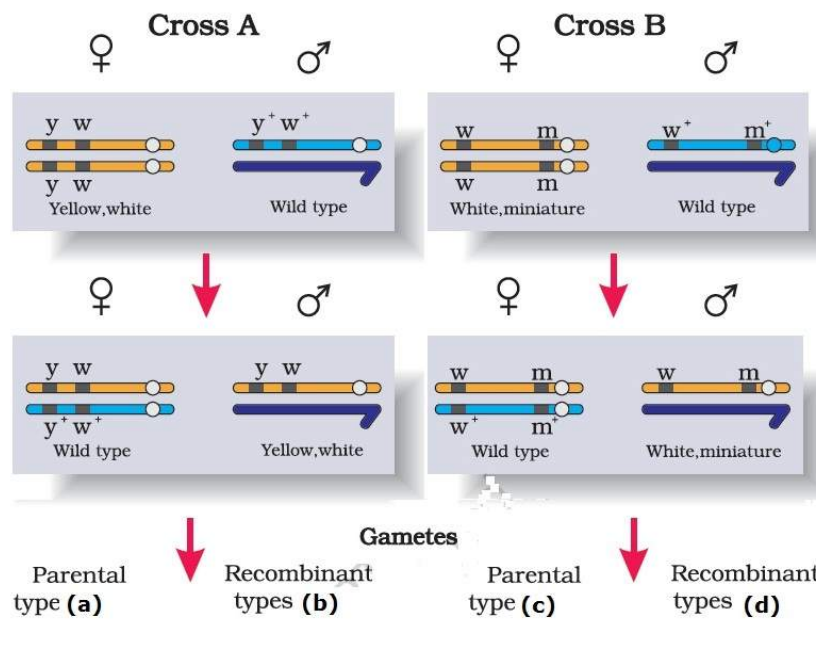
(A) यह आउट क्रॉस का एक आरेखीय निरूपण है।

(B) यह दो एकल संकर क्रॉस की तुलना है जिसका उपयोग जीवो के फीनोटाइप का पता लगाने के लिए किया जाता है।

(C) जीवो के जीनोटाइप का पता लगाने के लिए यह व्युक्रम क्रॉस का आरेखीय निरूपण है।

(D) जीवो के जीनोटाइप का पता लगाने के लिए यह परीक्षण क्रॉस का आरेखीय निरूपण है।

2. दिये गये चित्र को पहचानिए एवं सही मिलान का चयन कीजिए

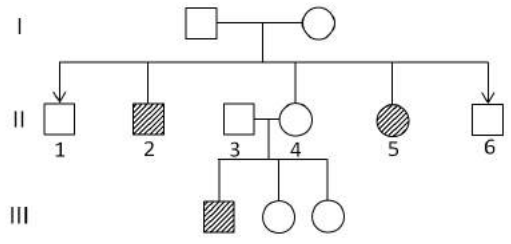


(A) a—37.2%, b—62.8%, c—1.3%, d—98.7%

(B) b—37.2%, a—62.8%, d—1.3%, c—98.7%

(C) c—37.2%, d—62.8%, a—1.3%, b—98.7%

(D) d—37.2%,c—62.8%, b—1.3%, a—98.7%

3. 

What is the genotype of II (3) ?

(A) AA

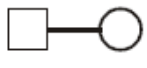
(B) aa

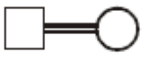
(C) x^o y

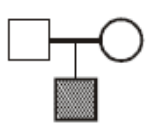
(D) Aa

4. Which of the following symbol is used for mating between relatives (Consangeineous mating)

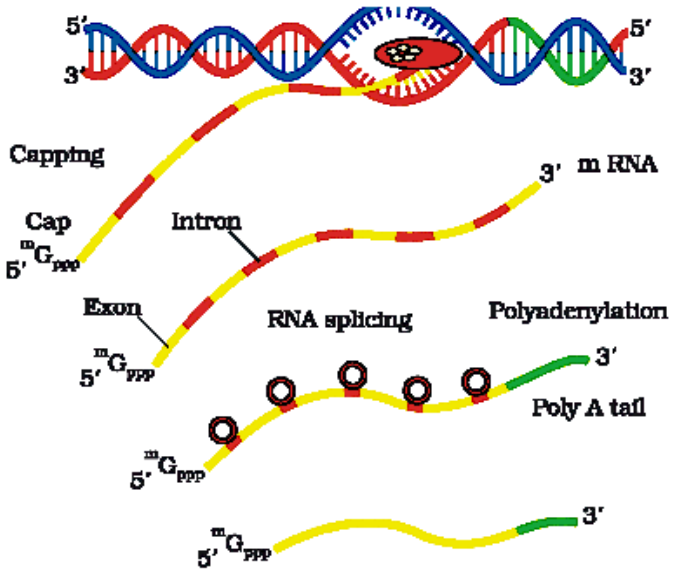
(A) 

(B) 

(C) 

(D) 

5. Refer the given diagram. What does it represent ?



(A) Transcription in prokaryotes

(B) Transcription in eukaryotes

(C) Translation in prokaryotes

(D) Translation in eukaryotes

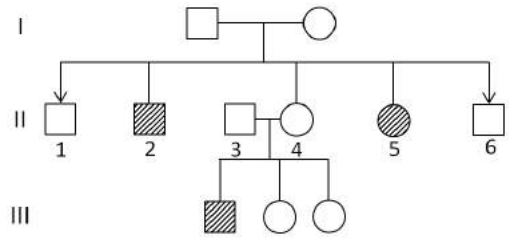
6. Gemmule formation in sponges is helpful in

(A) Parthenogenesis

(B) Sexual reproduction

(C) Only dissemination

(D) Asexual reproduction

3. 

II (3) का जीनप्रारूप क्या है?

(A) AA

(B) aa

(C) x^o y

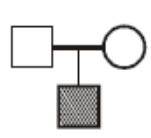
(D) Aa

4. निम्न में से कौनसा संकेत रक्त संबंधियों के मध्य विवाह के लिए प्रयोग किया जाता है-

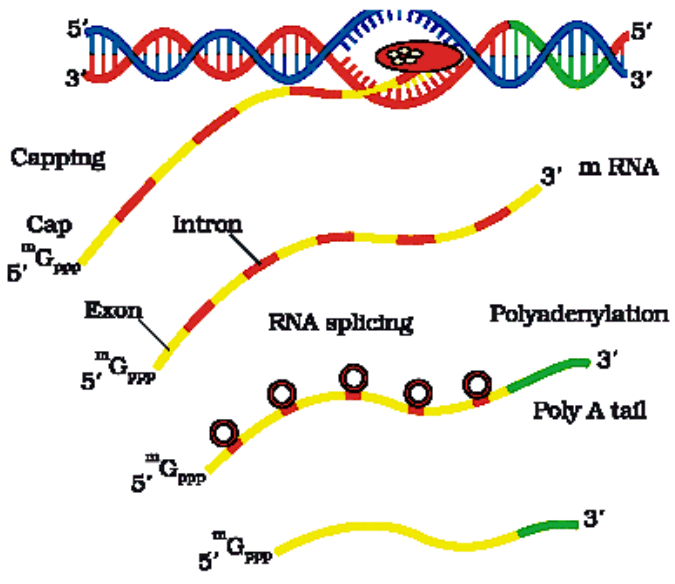
(A) 

(B) 

(C) 

(D) 

5. नीचे दिया गया चित्र क्या दर्शाता है ?



(A) प्रोकैरियोट्स में अनुलेखन

(B) यूकैरियोट्स में अनुलेखन

(C) प्रोकैरियोट्स में अनुवादन

(D) यूकैरियोट्स में अनुवादन

6. स्पंजों में जेम्यूल का निर्माण किसमें सहायता करता है

(A) अनिषेक जनन में

(B) लैंगिक प्रजनन में

(C) केवल प्रकीर्णन में

(D) अलैंगिक प्रजनन में

7. In Angiosperms, pollination of pollen grains generally takes place at :-

(A) One celled stage

(B) Two celled stage

(C) Three celled stage

(D) Four celled stage

8. Ovule is morphologically equivalent to

(A) Megaspore

(B) Megasporangium

(C) Microspore

(D) Megasporophyll

9. In double fertilization, one male gamete fuses with the _(i)_ to form zygote and the other male gamete fuses with _(ii)_ to form primary endosperm nucleus.

(A) synergids (n), antipodals (n)

(B) egg (n), antipodals

(C) egg (n), secondary nucleus (2n)

(D) egg (n), synergids (n)

10. Suspensor performs the function of

(A) Absorption of food

(B) Pushing embryo to nutrition zone

(C) Formation of secondary embryos

(D) All above

11. Seed formation without fertilization in flowering plants involves the process of:

(A) Sporulation

(B) Budding

(C) Somatic hybridization

(D) Apomixis

12. In a flowering plant, archesporium cell gives rise to

(A) Only the wall of the sporangium

(B) Both wall and the sporogenous cells

(C) Wall and the tapetum

(D) Only tapetum and sporogenous cells

13. When a pea plant with a round seed (Bb) is crossed with other plants having small-sized starch grain in seed, the total number of seeds obtained in the progeny is 630. What is correct for this progeny?

(A) 330 (large size), 330 (small size)

(B) 330 (small size), 330 (medium size)

(C) 315 (intermediate size), 315 (small size)

(D) 158 (large size), 158 (small size), 314 (intermediate size)

7. एन्जियोस्पर्म में सामान्यतः परागकणों का परागण होता है:-

(A) एक कोशिकीय अवस्था में

(B) दो कोशिकीय अवस्था में

(C) तीन कोशिकीय अवस्था में

(D) चार कोशिकीय अवस्था में

8. बीजाण्ड आकारिकी मे किसके तुल्य होते है

(A) गुरूबीजाणु

(B) गुरू बीजाणुधानी

(C) लघु बीाजाणु

(D) गुरू बीजाणुपर्ण

9. दोहरे निषेचन में, एक नर युग्मक _(i)_ के साथ संलियत होकर युग्मनज बनाता है तथा दूसरा नर युग्मक _(ii)_ के साथ संलयित होकर प्राथमिक भ्रूणपोष केन्द्रक बनाता है।

(A) सहायक कोशिकाए(n), प्रतिव्यासातं कोशिकाए(n)

(B) अण्ड (n), प्रतिव्यासांत कोशिकाए

(C) अण्ड (n), द्वितियक केन्द्रक (2n)

(D) अण्ड (n), सहायक कोशिकाए(n)

10. सस्पेंसर किस रूप में कार्य करता है -

(A) भोजन के अवशोषण में

(B) भूण्र को पोषण क्षेत्र में खिसकाने में

(C) द्वितीयक भ्रूण के निर्माण में

(D) उपरोक्त सभी

11. पुष्पीय पादपों में बिना निषेचन के बीज के निर्माण की प्रक्रिया है?

(A) बीजाणुजन

(B) मुकूलन

(C) कायिक संकरण

(D) असंगजनन

12. पुष्पीय पादपों में स्त्री बीजाणुधानी से किसकी उत्पत्ति होती है?

(A) केवल बीजाणुधानी की भित्ति की

(B) दोनों भित्त्यिां तथा बीजाणुजनन कोशिका की

(C) भित्ति तथा टेपीटम की

(D) केवल टेपीटम तथा बीजाणु जनन कोशिकाओं की

13. जब एक गोल बीज (Bb) वाले मटर के पादप को छोटे आकार के स्टार्च युक्त बीज वाले पादप से क्रॉस किया जाता है तो संततियों के 630 बीज प्राप्त होते है तो इन संततियों के लिए सही है

(A) 330 (बड़े आकार वाले) , 330 (छोटे आकार वाले)

(B) 330 (छोटे आकार वाले) , 330 (मध्यम आकार वाले)

(C) 315 (मध्यम आकार वाले) , 315 (छोटे आकार वाले)

(D) 158 (बड़े आकार वाले), 158 (छोटे आकार वाले) , 314 (मध्यम आकार वाले)

14. The gene which results in a non viable progeny in homozygous condition is called :-

(A) Duplicate gene

(B) Linked gene

(C) Lethal gene

(D) Epistatic gene

15. In the inheritance of flower colour in dog flower plant, the F_1 had a phenotype that

(A) resembles both of the parents

(B) did not resembles either of the two parents

(C) resembles with only one parent

(D) A and C both

16. In a genetic cross having recessive epistasis, F_2 phenotypic ratio would be :-

(A) 9:6:1

(B) 15:1

(C) 9:3:4

(D) 12:3:1

17. Which is the example of supplementary gene

(A) Cucurbitta pepo

(B) Skin colour of mice

(C) Comb shape of pouts

(D) Both (B) and (C)

18. In polygenic inheritance trait which controlled by three pairs of genes. Two individuals which are heterozygous for three alleles, crossed each other. Such type of cross produced phenotypic ratio in what ratio :-

(A) 1 : 2 : 1

(B) 9 : 3 : 3 : 1

(C) 1 : 4 : 6 : 4 : 1

(D) 1 : 6 : 15 : 20 : 15 : 6 : 1

19. In totmato, genotype aabbcc produces 100g tomatoes and AABBCC produces 160g tomatoes. What is contribution of each polygene in the production of tomatoes:-

(A) 10 g

(B) 20 g

(C) 30 g

(D) 40 g

14. जीन जिसके कारण समयुग्मजी अवस्था में सन्तति की मृत्यु हो जाती है, कहलाती है :-

(A) डुप्लीकेट जीन

(B) सहलग्न जीन

(C) घातक जीन

(D) प्रबल (एपीस्टेटिक) जीन

15. कुत्ता पुष्प पादप (Dog flower plant) में पुष्प रंग की वंशानुगति में F_1 लक्षण प्रारूप

(A) दोनों पैतृकों के समान होता है।

(B) दोनों में से किसी पैतृक के समान नहीं होता है।

(C) केवल एक पैतृक के समान होता है।

(D) A व C दोनों

16. अप्रभावी प्रबलता युक्त एक आनुवंशिक क्रॉस में F_2 लक्षण प्ररूप अनुपात होगा

(A) 9:6:1

(B) 15:1

(C) 9:3:4

(D) 12:3:1

17. पूरक जीन का उदाहरण है

(A) कुकरबिटा पेपो

(B) चूहे की त्वचा का रंग

(C) मुर्गे की कलंगी का आकार

(D) दोनों (B) और (C)

18. बहुजीनी वंशागति की स्थिति में एक लक्षण जो तीन जोड़ी जीन्स के द्वारा नियंत्रित होता है। दो सदस्य जो तीन एलिल्स के लिये विषमयुग्मजी हैं इनके मध्य क्रॉस करवाया जाता है। इस क्रास से लक्षण प्रारूप अनुपात क्या प्राप्त होगा

(A) 1 : 2 : 1

(B) 9 : 3 : 3 : 1

(C) 1 : 4 : 6 : 4 : 1

(D) 1 : 6 : 15 : 20 : 15 : 6 : 1

19. टमाटर में, जीन प्ररूप aabbcc100g टमाटर तथा AABBCC 160g टमाटर उत्पादित करता है, टमाटर के उत्पादन में प्रत्येक पॉलीजीन का योगदान है।

(A) 10 g

(B) 20 g

(C) 30 g

(D) 40 g

20. Which statement is not true for Drosophila melanogaster -

(A) They complete their life cycle about two weeks

(B) Single mating produce large number of progeny flies

(C) It has few hereditary variation that can be seen with high power microscope

(D) It has clear differentiation of the sex

21. A man known to be the victim of hemophilia marries a normal woman whose father was known to be bleeder, then it may be expected that

(A) All their children will be bleeders

(B) Half of their sons will be bleeders

(C) One fourth of their children will be bleeders

(D) All will be normal

22. In which organism female in homogametic & also have one chromosomes more than male.

(A) Birds

(B) Drosophila

(C) Chicks

(D) Grasshopper

23. The genetic material should be stable enough do not to change with

(A) Age

(B) Different stages of life cycle

(C) Change in physiology of the organism

(D) All of the above

24. The following ratio is generally constant for a given species :-

(A) T + C / G + A

(B) A + T / C + G

(C) A + C / T + G

(D) A + G / C + T

25. Which protein is called as 'Sealing-protein,, :-

(A) H_2A - Histone

(B) Nucleotide

(C) Ribotide

(D) H_1 – Histone

26. DNA replication occur in leading strand template in the direction

(A) 3'$\rightarrow$5'

(B) 5' $\rightarrow$3'

(C) Both (A) and (B)

(D) None of these

20. ड्रोसोफिला मिलेनोगेस्टर के लिए क्या सही नहीं है-

(A) ये अपना जीवन चक्र लगभग 2 सप्ताह में पूरा कर लेती है।

(B) एकल मैथुन से अधिक संख्या में सन्ततियाँ मक्खियां उत्पन्न होती है।

(C) इसमें बहुत कम वंशागत विभिन्नताएं होती है जिनको उच्च क्षमता वाले माइक्रोस्कोप से देखा जा सकता है।

(D) इसमें लिंग विभेदन स्पष्ट होता है

21. एक व्यक्ति जो कि हीमोफिलिया से ग्रसित है, एक सामान्य महिला से शादी करता है, जिसके पिता bleeder (रक्त) जाने जाते थे, तब यह अपेक्षा की जा सकती है, कि -

(A) उनके सभी बच्चे bleedeers होंगे

(B) उनके आधे पुत्र bleeders होगें

(C) उनके $1/4^{th}$ बच्चे bleeders होगें

(D) सभी सामान्य होगें

22. किस जीव में मादा समयुग्मकी (Homogametic) होती है तथा उसमें नर से एक गुणसूत्र अधिक होता है।

(A) पक्षी

(B) ड्रोसोफिला

(C) चुजे

(D) टिड्डे

23. आनुवांशिकी सामग्री को स्थायी होना चाहिए ताकि वह निम्न के साथ परिवर्तित ना हो

(A) आयु के साथ

(B) जीवन चक्र की विभिन्न अवस्थाओं के साथ

(C) जीव की कार्यिकी में परिवर्तन के साथ

(D) उपरोक्त सभी

24. किसी एक दी गई प्रजाति के लिये निम्नलिखित में से कौनसा अनुपात सामान्यतः स्थिर होता है?

(A) T + C / G + A

(B) A + T / C + G

(C) A + C / T + G

(D) A + G / C + T

25. निम्न में से कौनसी प्रोटीन को 'सीलिंग-प्रोटीन, कहा जाता है :-

(A) H_2A हिस्टोन

(B) न्यूक्लिओटाइड

(C) राइबोटाइड

(D) हिस्टोन -H_1

26. DNA प्रतिकृतिकरण अग्रगामी रज्जुक पर दिशा में होता है

(A) 3'$\rightarrow$5'

(B) 5' $\rightarrow$3'

(C) (A) व (B) दोनों

(D) इनमें से कोई नही

27. Read the following steps of DNA replication and arrange them in sequence :-

I. Continuous strand and discontinuous strand synthesis

II. DNA polymerase action

III. Primers bind against the 3' ends of each strand of separated dsDNA

IV. Action of single stranded binding (SSB) protein

V. Action of helicase (unwindase) and gyrase

(A) I $\rightarrow$ II $\rightarrow$ IV $\rightarrow$ III$\rightarrow$ V

(B) V $\rightarrow$ III $\rightarrow$ IV $\rightarrow$ I$\rightarrow$ II

(C) V $\rightarrow$ IV $\rightarrow$ III $\rightarrow$ II$\rightarrow$ I

(D) I $\rightarrow$ V $\rightarrow$ IV $\rightarrow$ III$\rightarrow$ II

28. Select the correct options.

(A) Direction of RNA synthesis 3'--------5', Direction of reading of the template DNA strand 3'--------5'

(B) Direction of RNA synthesis 5'--------3', Direction of reading of the template DNA strand 3'--------5'

(C) Direction of RNA synthesis 3'--------5', Direction of reading of the template DNA strand 5'--------3'

(D) Direction of RNA synthesis 5'--------3', Direction of reading of the template DNA strand 5'--------3'

29. How many ATP and GTP molecules are required respectively for incorporation of 25 amino acids in peptide chain ?

(A) 20 ATP, 20 GTP

(B) 25 ATP, 25 GTP

(C) 50 ATP, 50 GTP

(D) 25 ATP, 50 GTP

30. UTRs are the untranslated regions present on

(A) rRNA

(B) tRNA

(C) mRNA

(D) hnRNA

31. Choose the correct option w.r.t. RNA.

(A) Presence of thymine in place of uracil

(B) Absence of free 2'OH in sugar

(C) Mutates at faster rate

(D) Is non-catalytic

27. DNA प्रतिकृति के निम्नलिखित चरणों को पढें एवं उन्हे सही क्रम में व्यवस्थित करें:-

I. सतत् स्ट्रैण्ड एवं असतत् स्ट्रैण्ड का संश्लेषण

II. DNA पॉलीमरेज अभिक्रिया

III. प्राइमर पृथक dsDNA के प्रत्येक स्ट्रैण्ड के 3' सिरे किनारे के विरूद्ध बन्धते है

IV. एकल स्ट्रैण्डेड बन्धित (SSB) प्रोटीन की अभिक्रिया

V. हेलीकेज (unwindase) एवं गाइरेज की अभिक्रिया

(A) I $\rightarrow$ II $\rightarrow$ IV $\rightarrow$ III$\rightarrow$ V

(B) V $\rightarrow$ III $\rightarrow$ IV $\rightarrow$ I$\rightarrow$ II

(C) V $\rightarrow$ IV $\rightarrow$ III $\rightarrow$ II$\rightarrow$ I

(D) I $\rightarrow$ V $\rightarrow$ IV $\rightarrow$ III$\rightarrow$ II

28. सही विकल्प का चयन करें।

(A) RNA के संश्लेषण की दिशा 3'--------5', टेम्पलेट DNA लड़ी के रीडिंग की दिशा - 3'--------5',

(B) RNA के संश्लेषण की दिशा 5'--------3', टेम्पलेट DNA लड़ी के रीडिंग की दिशा 3'--------5'

(C) RNA के संश्लेषण की दिशा 3'--------5', टेम्पलेट DNA लड़ी के रीडिंग की दिशा - 5'--------3',

(D) RNA के संश्लेषण की दिशा 5'--------3', म्पलेट DNA लड़ी के रीडिंग की दिशा 5'--------3',

29. पेप्टाइड श्रृंखला में 25 अमीनो अम्लों को जोडने हेतु क्रमशः कितने ATP व GTP अणुओं की आवश्यकता होगी

(A) 20 ATP, 20 GTP

(B) 25 ATP, 25 GTP

(C) 50 ATP, 50 GTP

(D) 25 ATP, 50 GTP

30. UTRs अनट्रान्सलेटेड क्षेत्र है, जो उपस्थित होते है

(A) rRNA

(B) tRNA

(C) mRNA

(D) hnRNA

31. RNA के सन्दर्भ में सही विकल्प का चयन कीजिये।

(A) यूरेसिल के स्थान पर थायमीन की उपस्थिति

(B) शर्करा में स्वतंत्र 2'OH की अनुपस्थिति

(C) तीव्र गति से उत्परिवर्तन करता है

(D) अनुत्प्रेरकीय है

32. Out of 64 codons only 61 codes for the 20 different amino acids.. This character of genetic code is called

(A) Degeneracy

(B) Non ambiguous nature

(C) Redundancy

(D) Overlapping

33. Select the incorrect statement :

(A) In the absence of lactose inducer lac operon will be off

(B) Positive regulation of lac operson in E-coli is due to negative effect of glucose for production of cAMP

(C) Positive regulation of lac operon in E-coli is due to positive effect of glucose for production of cAMP

(D) y-gene codes for permease, which helps in entry of β-galactoside in E. coli

34. In sickle cell anaemia, then substitution of amino acid in the globin protein results due to

(A) Single base substitution

(B) Polymerisation

(C) Aberration in chromosome number

(D) Aberration in the number of amino acids

35. Select the incorrect statement.

(A) DNA from a single cell is enough to perform DNA fingerprinting analysis

(B) DNA fingerprinting has much wider applications in determining population & genetic diversities

(C) The VNTR belongs to a class of satellite DNA referred as minisatellite

(D)
DNA fingerprint differs from individual to individual in a population even in case of monozygotic twins

32. 64 कोडोन में से केवल 61 कोडोन 20 अमीनों अम्लो को कोड करते हैं। यह कहलाता है :-

(A) अपहासिता

(B) असंदिग्धता

(C) रेडून्डेसी

(D) अतिव्यापन

33. असत्य कथन का चयन कीजिए :

(A) लेक्टोज प्रेरक की अनुपस्थिति में, लैक ओपेरोन रूक जाता है।

(B) E-coli में लैक आपेरोन का धनात्मक नियंत्रण ग्लूकोज के cAMP उत्पादन पर नकारात्मक प्रभाव के कारण होता है।

(C) E-coli में लैक ओपेरोन का धनात्मक नियंत्रण, ग्लूकोज के cAMP उत्पादन पर धनात्मक प्रभाव के कारण होता है।

(D) y- जीन permease, को कोड करता है जो β-galactoside को E. coli में प्रविष्ट कराने में मदद करती है।

34. सिकल सेल एनिमिया में, ग्लोबिन प्रोटीन में अमीनो अम्ल का प्रतिस्थापन किसके परिणाम स्वरूप होता है।

(A) एकल क्षार प्रतिस्थापन

(B) बहुलकीकरण

(C) गुणसूत्रो की संख्या में परिवर्तन से

(D) अमीनो अम्लों की संख्या में परिवर्तन से

35. गलत कथन का चयन करे

(A) एक कोशिका का DNA , DNA अंगुलिछापी विश्लेषण के लिए पर्याप्त होता है

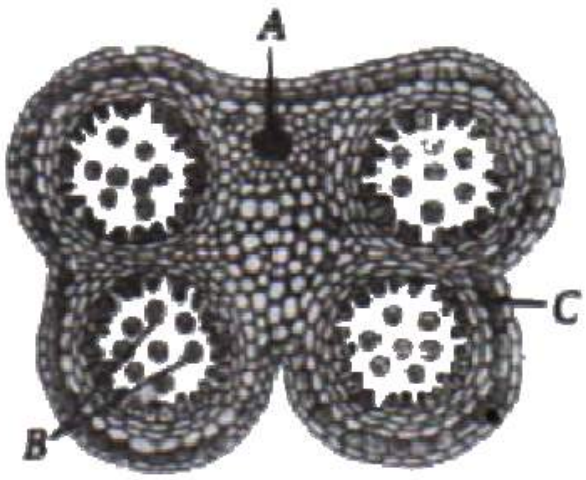
(B) DNA अंगुलिछापी का जनसंख्या तथा आनुवंशिकी की विविधता के निर्धारण में अधिक व्यापक रूप से अनुप्रयोग होता है

(C) VNTR सेटेलाइट DNA के एक वर्ग से संबंधित है जिसे मिनी सेटेलाइट कहा जाता है

(D)
मोनोजाइटिक जुडवॉ के मामले में भी DNA अंगुलिछापी जनसंख्या में अलग-अलग व्यक्तियो मे अलग अलग होता है

PART – I _ SECTION – B _ [BOTANY]

36. The following is the diagram of T.S of anther. Identify the parts labeled A,B and C.



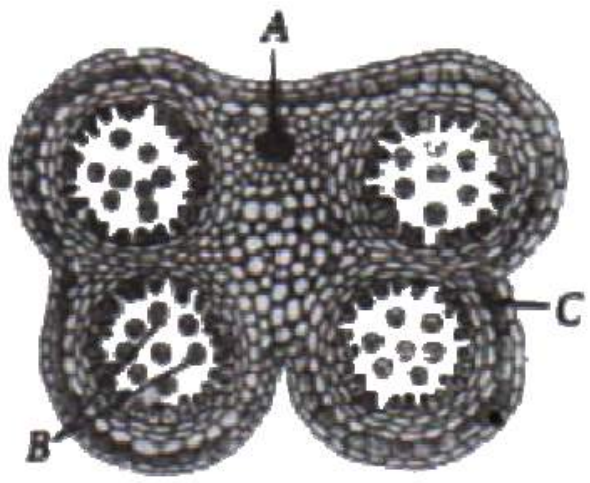
(A) A-Connective tissue, B-Pollen grains, C-Endothecium

(B) A-Endothecium, B-Connective tissue, C-Pollen grains

(C) A-Pollen grains, B-Connective tissue, C-Endothecium

(D) A - Endothecium, B-pollen grains, C-Connective tissue

36. नीचे दिया गया चित्र परागकोष के अनुप्रस्थ काट को दर्शाता है। नामांकित भाग A,B तथा C की पहचान कीजिये।



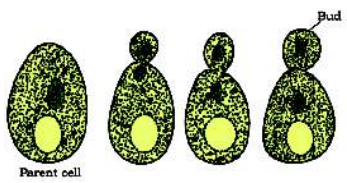
(A) A–संयोजी ऊतक, B– परागकण, C– एण्डोथीसीयम

(B) A–एण्डोथीसीयम, B–संयोजी ऊतक, C–परागकण

(C) A–परागकण, B–संयोजी ऊतक C–एण्डोथीसीयम

(D) A–एण्डोथीसीयम, B–परागकण, C–संयोजी ऊतक

37. Refer the given figures and select the correct option.



(A) It is a type of budding in paramecium

(B) It is a type of asexual reproduction

(C) The offsprings can also be called as clones

(D) Both (B) and (C)

37. दिये गये चित्रों को देखें और सही विकल्प चुनें।

(A) यह पेरामिशियम में एक प्रकार का मुकुलन है।

(B) यह एक प्रकार अलैंगिक जनन है।

(C) संतति को क्लोन भी कह सकते है।

(D) (B) व (C) दोनों

38. Insect pollinated flowers are

(A) Small, producing nectar & with dry pollen grains.

(B) Large, producing fragrance, nectar & sticky pollen grains with pollen kitt.

(C) Large, bright coloured petals, feathery stigma & large no. of pollen grains.

(D) Small, producing fragrance, light coloured petals

38. कीट परागित पुष्प होते हैं?

(A) छोटे, मकरन्द उत्पन्न करने वाले तथा शुष्क परागकण युक्त

(B) बडें, मकरन्द तथा सुगन्ध उत्पन्न करने वाले तथा परागकिट से युक्त चिपचिपे परागकण

(C) बडे, चटकीले रंग के दल, पंख युक्त वर्तिका तथा अधिक संख्या में परागकण

(D) छोटे, सुगन्ध उत्पन्न करने वाले हल्के रंग के दल

39. Which of the following is incorrect about Xenogamy

(A) pollinators are required for it.

(B) it increases inbreeding depression

(C) Flowers may large, scented with nector

(D) It creates new variations in successive generations

39. जीनोगैमी के बारे में गलत कथन का चयन करे।

(A) इसके लिये परागणकों की आवश्यकता होंती है।

(B) यह अन्तः प्रजनन अवसादन को बढाता है।

(C) पुष्प बड़े सुगन्धित मकरन्द युक्त होते है।

(D) यह आगामी पीढ़ियों मे नयी विभिन्नताऐं लाता है।

40. Function of filiform apparatus is to

(A) Recognize the suitable pollen at stigma

(B) Stimulate division of generative cell

(C) Guide the entry of pollen tube

(D) Produce nectar

41. Many non-humans model organisms have also been sequenced along with the human genome, these are :

(A) Bacteria and yeast

(B) Plants (*rice* and *Arabidopsis*)

(C) Fruitfly and *Coenorhabditis* (nematode)

(D) All of the above

42. Select the incorrect statement :

(A) The ratio (A+G)/(T+C) in one strand of DNA is the inverse to its complementary strand.

(B) RNA is labile and easily degradable.

(C) Both RNA and DNA able to mutate

(D) Presence of "uracil" at the place of "Thymine" provide additional stability to DNA.

43. Select the incorrectly matched pair.

(A) Initiation codons - AUG, GUG

(B) Stop codons - UAA, UAG, UGA

(C) Methionine - AUG

(D) Anticodons- mRNA

44. Regulation of lac operon by repressor is referred to as :

(A) Positive regulation

(B) Negative regulation

(C) Feedback regulation

(D) None of these

45. Glycosidic bonds forms between

(A) 1'C of sugar and position 1-N in pyrimidine

(B) 1'C of sugar and position 1-N in purine

(C) 1'C of sugar and position 9-N in pyrimidine

(D) Both (B) and (C)

46. A diploid organism is heterozygous for five loci and homozygous for 2 loci, how many types of gametes can be produced ?

(A) 128

(B) 32

(C) 4

(D) 14

40. फीलिफोर्म उपकरण का कार्य है:

(A) वर्तिका पर उपयुक्त पराग की पहचान करना।

(B) जनन कोशिका के प्रभाग को उद्दीपित करना।

(C) पराग नली के प्रवेश का मार्गदर्शन करना।

(D) मकरन्द उत्पन्न करना।

41. कई गैर-मानव मॉडल जीवों को भी मानव जीनोम के साथ अनुक्रमित किया गया है, ये है :

(A) बैक्टीरिया एवं यीस्ट

(B) पादप (चावल एवं एरेबीडाप्सीस)

(C) फलमक्खी एवं सीनोरहेब्डीटीस (सूत्रकृमि)

(D) उपरोक्त सभी

42. गलत कथन को पहचाने :

(A) DNA के एक स्ट्रेण्ड में (A+G)/(T+C) का अनुपात इसके समपूरक स्ट्रेण्ड से उल्टा होता है।

(B) RNA अस्थाई और आसानी से अपघटित होता है।

(C) RNA तथा DNA दोनों उत्परिवर्तन के लिए सक्षम होते है।

(D) "Thymine" की जगह पर "uracil" की उपस्थिति DNA को अतिरिक्त स्थायित्व प्रदान करता है।

43. गलत मिलान के युग्म को चुनिये

(A) आरंभन प्रकूट - AUG, GUG

(B) समापन प्रकूट - UAA, UAG, UGA

(C) मीथियोनीन - AUG

(D) प्रति-प्रकूट (Anticodons) - mRNA

44. रिप्रेसर द्वारा लेक ऑपेरॉन का नियंत्रण कहलाता है।

(A) सकारात्मक नियंत्रण

(B) नकारात्मक नियत्रंण

(C) फीड़बैक नियंत्रण

(D) इनमें से कोई नहीं

45. किसके मध्य ग्लाइकोसिडिक बंध का निर्माण होता है

(A) शर्करा के 1'C तथा पिरीमिडीन में 1-N स्थल पर

(B) शर्करा के 1'C तथा प्यूरीन में 1-N स्थल पर

(C) शर्करा के 1'C तथा पिरीमिडीन में 9-N स्थल पर

(D) (B) तथा (C) दोनों

46. एक द्विगुणित जीव पांच बिन्दुओं के लिए विषमयुग्मनजी है तथा 2 बिन्दुओं के लिए समयुग्मनजी तो कितने प्रकार के युग्मकों का उत्पादन होगा ?

(A) 128

(B) 32

(C) 4

(D) 14

47. Two organism with a genotype AaBb (A – height, B = colour) are mated with each other, which is the probability for the offspring to carry both of the dominant characters ?

(A) $\frac{1}{16}$

(B) $\frac{4}{16}$

(C) $\frac{1}{4}$

(D) $\frac{9}{16}$

48. Haemophilia is a sex linked disease due to presence of a recessive gene h on X-chromosome. A carrier woman (XX^h) marries a normal man (XY). What are the chances that they will have a haemophilic boy

(A) 100 %

(B) 75 %

(C) 50 %

(D) 25 %

49. In order to find out the different types of gametes produced by a pea plant having the genotype AaBb, it should be crossed to a plant with the genotype

(A) AaBb

(B) aabb

(C) AABB

(D) aaBB

50. Probability of four son to a couple is :–

(A) $\frac{1}{4}$

(B) $\frac{1}{8}$

(C) $\frac{1}{16}$

(D) $\frac{1}{32}$

47. जीनोटाइप AaBb (A – ऊँचाई, B = रंग) वाले दो सजीवो का एक दूसरे से संगम कराने पर, ऐसी संततियो की प्रायिकता (संभावना) क्या होगी जिनमे दोनो प्रभावी लक्षण उपस्थित होगे

(A) $\frac{1}{16}$

(B) $\frac{4}{16}$

(C) $\frac{1}{4}$

(D) $\frac{9}{16}$

48. हीमोफिलिया एक लिंग सहलग्न रोग है जो X-गुणसूत्र पर उपस्थित अप्रभावी जीन h के कारण होता है। एक वाहक महिला $\left(XX^h\right)$ का विवाह सामान्य पुरूष (XY) से होता है। इनके हीमोफिलिया से ग्रसित नर बच्चे की क्या सम्भावनाऐं हैं:-

(A) 100%

(B) 75%

(C) 50%

(D) 25%

49. मटर के एक पौधे का जीन प्ररूप AaBb है। उसमें किस किस प्रकार के भिन्न युग्मक बनेंगे, यह पता लगाने के लिए उसका किस प्रकार के जीन प्ररूप वाले पौधे के साथ संकरण किया जाना चाहिए-

(A) AaBb

(B) aabb

(C) aaBB

(D) AABB

50. एक दम्पत्ति के चारों लड़के होने की प्रायिकता क्या होगी –

(A) $\frac{1}{4}$

(B) $\frac{1}{8}$

(C) $\frac{1}{16}$

(D) $\frac{1}{32}$

PART – II _ SECTION – A _ [ZOOLOGY]

51. Match the items given in Column I with those in Column II and select the **correct** option given below:

	Column-I		Column-II
a.	Proliferative Phase	i.	Breakdown of endometrial lining
b.	Secretory Phase	ii.	Follicular Phase
c.	Menstruation	iii.	Luteal Phase

(A) a–iii, b–i, c–ii

(B) a–i, b–iii, c–ii

(C) a–ii, b–iii, c–i

(D) a–iii, b–ii, c–i

51. स्तम्भ.I में दी गई मदों का स्तम्भ.II की मदों से मिलान कीजिए और नीचे दिए गए विकल्पों में से **सही** विकल्प का चयन कीजिए :

	स्तम्भ-I		स्तम्भ-II
a.	प्रचुरोद्भवन प्रावस्था (Proliferative phase)	i.	गर्भाशय अंतःस्तर का विघटन (Breakdown of endometrial lining)
b.	स्त्रावी प्रावस्था (Secretory Phase)	ii.	पुटकीय प्रावस्था (Follicular Phase)
c.	ऋतुस्त्राव (Menstruation)	iii.	पीतपिण्ड प्रावस्था (Luteal Phase)

(A) a–iii, b–i, c–ii

(B) a–i, b–iii, c–ii

(C) a–ii, b–iii, c–i

(D) a–iii, b–ii, c–i

52. How many spermatozoa are produced by a secondary spermatocyte

(A) 4

(B) 8

(C) 1

(D) 2

52. द्वितीयक स्पर्मेटोसाइट से कितने स्पर्मेटोजोआ बनते हैं

(A) 4

(B) 8

(C) 1

(D) 2

53. The first life evolved in/on :-

(A) Atmosphere

(B) Water

(C) Mountains

(D) All of these

53. प्रथम जीवन कहाँ उत्पन्न हुआ:-

(A) वायुमण्डल में

(B) जल में

(C) पर्वत पर

(D) उपरोक्त सभी

54. Most of the mutations are :-

(A) Dominant

(B) Lethal

(C) Recessive

(D) Useful

54. अधिकांश उत्परिवर्तन होते हैं :-

(A) प्रभावी

(B) घातक

(C) अप्रभावी

(D) उपयोगी

55. Which of the following contraceptive devices make uterus unsuitable for implantation ?

(A) Cervical cap

(B) Progestasert

(C) Implant

(D) Multiload-375

55. निम्न में से कौनसी गर्भनिरोधक युक्ति आरोपण (implantation) के लिए गर्भाशय को अनुपयुक्त बनाती हैं?

(A) गर्भाशय ग्रीवा टोपी (cervical cap)

(B) प्रोजेस्टासर्ट

(C) अन्तर्रोप Implant)

(D) मल्टीलोड-375

56. Choose the statement which is not incorrect

(A) Each primary Oocyte gets surrounded by layer of granulosa cells and is called secondary follicle

(B) Secondary follicle is characterized by fluid filled cavity antrum.

(C) Spermatids are transformed into sperms by a process called spermiation

(D) Tertiary follicle changes into mature follicle grraffian follicle

56. निम्नलिखित में उस कथन का चयन कीजिए जो गलत नही है

(A) प्रत्येक प्राथमिक पुटिका कणिकामय कोशिकाओं (ग्रनुलोसा सेल) की परत से आवृत होती है और इन्हें प्राथमिक अण्डक कहा जाता है

(B) द्वितीयक पुटक में तरल से भरी गुहा को एट्रम कहा जाता है

(C) शुक्राणुप्रसू रूपान्तरित होकर शुक्राणु बनाते है तथा इस प्रक्रिया को स्पर्मिएशन कहते है।

(D) तृतीयक पुटिका परिपक्व ग्राफियन पुटिका में परिवर्तित हो जाती है

57. Peak secretion of estrogen occurs :-

(A) Just before ovulation

(B) Mid luteal phase

(C) In the beginning of Proliferative phase

(D) Secretion at the same rate during all phases of menstrual cycle

57. एस्ट्रोजन का उच्चतम स्त्रवण होता है -

(A) अण्डोत्सर्ग के ठीक पहले (Just before ovulation)

(B) मध्य ल्यूटियल प्रावस्था में (Mid luteal phase)

(C) प्रचुरोदभवन प्रवस्था (Proliferative phase) के आरम्भ में

(D) आर्तव चक्र (menstrual cycle) की सभी प्रावस्थाओं के दौरान समान दर पर स्त्रवण में

58. What would not happen if the formation of Corpus Luteum in the mid of menstrual cycle does not occur:-

(A) Ovulation

(B) Formation of graffian follicle

(C) Increase in progesterone level of blood

(D) Capacitation

58. यदि मासिक चक्र के मध्य में कॉर्पस ल्यूटियम का निर्माण न हो, तो क्या नहीं होगा: -

(A) अण्डोत्सर्ग

(B) ग्रेफियन पुटिका का निर्माण

(C) रक्त में प्रोजेस्ट्रान स्तर का बढ़ना

(D) योग्यताअर्जन

59. Progestasert and LNG-20 are

(A) Implants

(B) Copper releasing IUDs

(C) Non-medicated IUDs

(D) Hormone releasing IUDs

59. प्रोजेस्टासर्ट तथा LNG-20 है

(A) अन्तर्रोपण

(B) कॉपर मोचक IUDs

(C) गैर औषधिय IUDs

(D) हार्मोन मोचक IUDs

60. The contraceptive method with almost no side effects is

(A) Periodic abstinence

(B) Implants

(C) IUD's

(D) Pills

60. वह गर्भनिरोधक विधि जिसका लगभग कोई दुष्प्रभाव नहीं होता है

(A) आवधिक संयम (Periodic abstinence)

(B) रोपण (Implants)

(C) IUD's

(D) गोलियाँ (Pills)

61. Which one is the most widely accepted method of contraception presently in India ?

(A) Diaphragm

(B) Cervical caps

(C) IUDs

(D) Tubectomy

61. वर्तमान में भारत में गर्भनिरोधक की सबसे व्यापक रूप से स्वीकृत (मान्य) विधि कौनसी है -

(A) डायाफ्रॉम

(B) गर्भाशय ग्रीवा

(C) IUDs

(D) नलिका उच्छेदन

62. Artificial Insemination (AI) means :

(A) Transfer of sperm of a healthy donor to test tube containing ova

(B) Transfer of sperms of husband to test containing ova

(C) Artificial introduction of sperms of a healthy donor into the vagina

(D) Introduction of sperms of a healthy donor directly into the ovary.

62. कृत्रिम वीर्यसेचन का अर्थ है

(A) स्वस्थदाता के शुक्राणु का अण्डाणु युक्त test tube में स्थानान्तरण।

(B) अण्डाणु युक्त test tube में पति के शुक्राणु का स्थानान्तरण।

(C) स्वस्थदाता के शुक्राणु का कृत्रिम रूप से योनि में प्रवेश कराना।

(D) स्वस्थदाता के शुक्राणु का कृत्रिम रूप से सीधे अण्डाशय में प्रवेश कराना।

63. First meiotic division of oocyte is completed in-

(A) Primary follicle

(B) Secondary follicle

(C) Tertiary follicle

(D) Graffian follicle

63. ऊसाईट का प्रथम अर्द्धसूत्री विभाजन पूर्ण होता है।

(A) प्राथमिक पुटिका में

(B) द्वितीयक पुटिका में

(C) तृतीयक पुटिका में

(D) ग्राफियन पुटिका में

64. Arrange the events of embryo formation sequentially and choose the correct option :
I. Blastocyst II. Mature embryo
III. Morula IV. Zygotic cleavage
V. Gastrulla

(A) IV→III→I→V→II

(B) V→II→I→III→IV

(C) IV→III→V→I→II

(D) IV→V→III→I→II

64. भ्रुण निर्माण की घटनाओं के क्रम को व्यस्थित कर सही विकल्प का चयन करे:
I. ब्लास्टोसिस्ट II. परिपक्व भ्रुण
III. मोरूला IV. युग्मनज विदलन
V. गैस्टला

(A) IV→III→I→V→II

(B) V→II→I→III→IV

(C) IV→III→V→I→II

(D) IV→V→III→I→II

65. During pregnancy only which hormones are secreted in women :-

(A) Progesterone

(B) hPL

(C) Estrogen

(D) Thyroxin

65. औरतो में केवल गर्भावस्था के दौरान कौनसे हार्मोन स्त्रावित होते है:-

(A) प्रोजेस्टीरॉन

(B) hPL

(C) एस्ट्रोजन

(D) थायरॉक्सीन

66. Which is **incorrect** statement ?

(A) Genital herpes is detected in early stage than is completely curable.

(B) Gonorhoea is detected in early stage than is completely curable.

(C) HIV can be transmitted from mother to foetus during pregnancy

(D) Hepetitis-B can be transmitted even after the use of condom.

66. कौनसा **गलत** कथन है ?

(A) जननिक परिसर्प (genital herpes) को शुरूआती अवस्था में पहचान लिया जाए तो पूरी तरह से उपचार योग्य है।

(B) सुजाक (gonorhoea) को शुरूआती अवस्था में पहचान लिया जाए तो पूरी तरह से उपचार योग्य है।

(C) गर्भावस्था के दौरान, HIV माता से गर्भ (foetus) में संचरित हो सकता है।

(D) हेपेटाइटिस-B कण्डोम उपयोग के बाद भी संचरित हो सकता है।

67. Foetal ejection reflex in human female is induced by :-

(A) Differentiation of mammary glands

(B) The pressure exerted by amniotic fluid

(C) Release of oxytocin from the pituitary

(D) Fully developed fetus and placenta

67. मानव मादा में गर्भ उत्क्षेपन प्रतिवर्त किसके द्वारा प्रेरित होता है :-

(A) स्तन ग्रंथियों का विभेदन होने से

(B) एम्नियोटिक तरल द्वारा दाब पड़ने से

(C) पीयूष से ऑक्सीटोसिन के विमोचन से

(D) पूर्ण विकसित भ्रूण (गर्भ) एवं अपरा से

68. Mature Graafian follicle is generally present in the ovary of a healthy human female around

(A) 5^{th} – 8^{th} day of menstrual cycle

(B) 11^{th} – 17^{th} day of menstrual cycle

(C) 18^{th} – 23^{th} day of menstrual cycle

(D) 24^{th} – 28^{th} day of menstrual cycle.

69. Which part of the spermatid forms acrosome of sperm ?

(A) Mitochondria

(B) Golgibody

(C) Nucleus

(D) Lysosome

70. At the end of first meiotic division, the male germ cells differentiate into

(A) Spermatogonium

(B) Primary spermatocyte

(C) Secondary spermatocyte

(D) Spermatid

71. Select the option including all sexually transmitted diseases.

(A) AIDS, Malaria, filaria

(B) Cancer, AIDS, syphilis

(C) Gonorrhoea, Syphilis, Genital Herpes

(D) Gonorrhoea, Syphilis, Typhoid

72. The Graafian follicle ruptures to release _____ from the ovary by the process called ovulation

(A) Primary oocyte

(B) Secondary oocyte after completing meiosis-II

(C) Secondary oocyte after completing meiosis-I and with the release of Ist polar body

(D) Mature ovum

73. Miller synthesised simple amino-acid from :

(A) Methane, ammonia, oxygen, nitrogen

(B) Hydrogen, methane, ammonia, water

(C) Ammonia, methane, carbon-dioxide, oxygen

(D) Hydrogen, oxygen, water, nitrogen

74. Primitive atmosphere was reducing because :

(A) Hydrogen atoms were few

(B) Hydrogen atoms were active and in greater number

(C) Nitrogen atoms were more

(D) Oxygen atoms were more

68. परिपक्व ग्राफियन पुटिका (mature graafian follicle) एक स्वस्थ मानव मादा के अण्डाशय में उपस्थित होती है-

(A) आतर्वचक्र के 5वें - 8वें दिन में

(B) आतर्वचक्र (menstrual cycle) के 11वें - 17वें दिन में

(C) आतर्वचक्र के 18 वें - 23 वें दिन में

(D) आतर्वचक्र के 24 वें -28 वें दिन में

69. शुक्राणु प्रसू के किस भाग से शुक्राणु का एक्रोसोम बनता है

(A) माइटोकॉन्ड्रिया

(B) गोल्जीकाय

(C) केन्द्रक

(D) लाइसोसोम

70. प्रथम मियोटिक विभाजन के बाद नर जनन कोशिका किसमें विभेदित होती है

(A) स्पर्मेटोगोनियम

(B) प्राथमिक स्पर्मेटोसाइट

(C) द्वितीयक स्पर्मेटोसाइट

(D) स्पर्मेटिड

71. यौन संचरित रोगों के सही विकल्प का चयन करें

(A) एड्स, मलेरिया, फाइलेरिया

(B) केंसर, एड्स, सिफलिस

(C) गोनेरिया, सिफलिस, जिनाइटल हर्पिज

(D) गोनेरिया, सिफलिस, टाइफॉइड

72. अण्डोत्सर्ग प्रक्रिया के द्वारा अण्डाशय से ग्रेफियन पुटिका फटकर _____ मुक्त करती है

(A) प्राथमिक ऊसाईट

(B) अर्धसूत्री विभाजन-II के पूर्ण होने के पश्चात द्वितीयक अण्डक कोशिका को

(C) अर्धसूत्री विभाजन-I के पूर्ण होने के पश्चात व 1^{st} ध्रुवकाय के मुक्त होने पर द्वितीयक अण्डक कोशिका को

(D) परिपक्व अण्डाणु

73. मिलर ने किन से सरल अमीनो अम्ल बनाये थे:

(A) मीथेन, अमोनिया, ऑक्सीजन , नाइट्रोजन

(B) हाइड्रोजन, मीथेन, अमोनिया, जल

(C) अमोनिया, मीथेन, कार्बन-डाइ-आक्साइड , ऑक्सीजन

(D) हाइड्रोजन, ऑक्सीजन, जल, नाइट्रोजन

74. आद्य वायमुमण्डल अपचायक क्यों था:

(A) हाइड्रोजन परमाणु कम थे

(B) हाइड्रोजन परमाणु सक्रिय तथा अधिक संख्या मे थे

(C) नाइट्रोजन परमाणु अधिक थे

(D) ऑक्सीजन परमाणु अधिक थे

75. Pasteur succeeded in disproving the theory of spontaneous generation because :

(A) The laboratory was clean

(B) He pulled out the neck of flask into a tube

(C) He was lucky

(D) Yeast used in flask were dead

76. Believers of spontaneous generation theory believed that:

(A) Life originated from other similar organisms or spontaneously

(B) Life originated only spontaneously

(C) Life originated from similar organisms

(D) Life originated from air

77. Now the basis of origin of life is :

(A) Spontaneous generation

(B) God's desire

(C) Sunlight on mud

(D) None of them

78. Pasteur gave :

(A) Cellular theory

(B) Recapitulation theory

(C) Germ theory of disease

(D) Germ plasm theory

79. Who completely dismissed the theory of spontaneous generation

(A) Louis pasteur

(B) Van Elmont

(C) Lazzaro spllanzani

(D) Fransisco Reddy

80. Ship used by Darwin

(A) HSM Beagle

(B) Her Majesty service

(C) HMS Beagle

(D) He Majesty ship

81. Two plants can be conclusively said to belong to the same species if they :

(A) Have same number of chromosomes

(B) Can reproduce freely with each other and from seeds

(C) Have more than 90 percents similar genes

(D) Looks similar and possess identical secondary metabolites

75. पाश्चर ने स्वतः जनन को गलत सिद्ध करने में सफलता पायी क्योंकि:

(A) प्रयोगशाला स्वच्छ थी

(B) फ्लास्क की गर्दन को नाल के रूप में खींच दिया था

(C) वह भाग्यशाली थे

(D) फ्लास्क में प्रयोग की गई यीस्ट मृत थी

76. स्वतः जनन वाद के अनुसार:

(A) जीवों की उत्पत्ति दूसरे समान जीवों से या स्वतः जनन से होती है

(B) जीवों की उत्पत्ति स्वतः जनन से हुई है

(C) जीवन की उत्पत्ति समान जीवों से हुई है

(D) जीवों की उत्पत्ति वायु से हुई है

77. आजकल जीवन की उत्पत्ति का आधार माना जाता है

(A) स्वतः जनन

(B) ईश्वर की इच्छा

(C) कीचड़ पर सूर्य का प्रकाश

(D) इनमें कोई नहीं

78. पाश्चर ने क्या प्रस्तुत किया था:

(A) कोशिका सिद्धान्त

(B) पुनरावृत्ति सिद्धान्त

(C) रोग का जर्म सिद्धान्त

(D) जर्म प्लाज्म सिद्धान्त

79. किस वैज्ञानिक ने स्वतः जननवाद को पूर्णतया खारिज कर दिया

(A) लुइस पाश्चर

(B) वॉन हेल्मोन्ट

(C) फ्राँसिसको रेड्डी

(D) लैजेरो स्पैलजानी

80. डॉर्विन के द्वारा प्रयोग किये गये जहाज का नाम -

(A) HSM बीगल

(B) हर मेजेस्टी सर्विस

(C) HMS बीगल

(D) ही मेजेस्टी जहाज?

81. दो पौधों को निर्णायक तौर पर एक ही स्पीशीज का तब कहा जा सकता है जब -

(A) उनमें क्रोमोसोम संख्या सामान होती हो

(B) वे एक - दूसरे के साथ निर्विघ्न जनन कर सकते एवं बीज बना सकते हों|

(C) उनमें 90 प्रतिशत से अधिक जीन समान हों

(D) वे समान दिखते हों एवं उनमें समान प्रकार के द्वितीयक उपापचयज होते हैं

82. Which of the following can be called a mutation :-

(A) The halfing of the chromosome number at meiosis

(B) The doubling of the chromosome after syngamy

(C) The possession of an additional chromosome

(D) All the above

83. Mutation causes normally :-

(A) Small changes

(B) Negligible changes

(C) Large changes

(D) No change

84. "Single step large mutation" were called as "saltation" by:-

(A) Darwin

(B) Malthus

(C) Devries

(D) Miller

85. A Scientist kept 69 generations of Drosophila in darkness even after that the flies had normal eyes, this disproves the law of :

(A) Synthetic theory

(B) Natural selection

(C) Germ plasm theory

(D) Acquired characters are inherited

82. निम्न में से किसे उत्परिवर्तन कहेंगे:-

(A) अर्द्धसूत्रण में गुणसूत्रों की संख्या का आधा होना

(B) संयुग्मन में क्रोमोसोम की संख्या का दुगना होना

(C) केन्द्रक में अतिरिक्त गुणसूत्र का होना

(D) उपरोक्त कोई भी उत्परिवर्तन नहीं है

83. उत्परिवर्तन के कारण सामान्यतः क्या होता है:-

(A) थोड़ा सा परिवर्तन

(B) नगण्य परिवर्तन

(C) बड़ा परिवर्तन

(D) कोई परिवर्तन नहीं होता

84. ''एकल पद के वृहद उत्परिवर्तन'' को ''साल्टेशन'' किसने कहा थाः-

(A) डार्विन ने

(B) माल्थस ने

(C) डिव्रिज ने

(D) मिलर ने

85. एक वैज्ञानिक ने ड्रॉसोफाइला की 69 पीढ़ियों को अंधेरे में रखा। फिर भी इनमें साधारण प्रकार के नेत्र पाए गए, इससे कौनसा मत गलत सिद्ध होता है:

(A) संश्लेषणात्मक सिद्धाँत

(B) प्राकृतिक चयनवाद

(C) जनन द्रव्य सिद्धाँत

(D) उपार्जित लक्षणों की वंशागति

PART – II _ SECTION – B _ [ZOOLOGY]

86. In which stage of embryo the implantation occurs :-

(A) Morula

(B) Blastula

(C) Gastrula

(D) Neurula

87. Consider the following **four statements (A) - (D)** and **select** the **option** that **correctly identifies** the **true (T) and false (F)** ones :
(A) Among STDs, HIV infection is most dangerous and fatal.
(B) MTP is a Contraceptive device and significant role in decreasing the population.
(C) Progestogens alone or in combination with estrogen can also be used by females as injections or implants under the skin.
(D) Sterilisation is a terminal method for male/female partner to prevent any more pregnancics.
Options :

(A) (A)-T, (B)-T, (C)-F, (D)-F

(B) (A)-F, (B)-F, (C)-F, (D)-T

(C) (A)-T, (B)-F, (C)-T, (D)-T

(D) (A)-F, (B)-T, (C)-F, (D)-T

88. Consider the statements given below regarding contraception and answer as directed there after:

(a) Medical Termination of Pregnancy (MTP) during first trimester is generally safe
(b) Generally chances of conception are nil until mother breast-feeds the infant upto two years.
(c) Intrauterine devices like copper T are effective contraceptives.
(d) Contraceptive pills may be taken one week after coitus to prevent conception
Which of the statements are **correct** ?

(A) a, c

(B) a, b, d

(C) b, c, a

(D) c, d

86. भ्रूण की किस अवस्था में अन्तर्रोपण होता है :-

(A) मोरूला

(B) ब्लास्टुला

(C) गेस्टुला

(D) नेरूला

87. निम्न चार कथनों **(A-D)** पर विचार करें और उस विकल्प का चयन करें जो **सही रूप** से **सत्य (T)** व **असत्य (F)** को बताता है:
(A) STDs में HIV संक्रमण सर्वाधिक खतरनाक तथा घातक होता है।
(B) MTP एक गर्भनिरोधक युक्ति होती है, तथा यह जनसंख्या को घटाने में महत्वपूर्ण भूमिका निभाती है।
(C) स्त्रियों में प्रोजेस्टोजन अकेले या फिर एस्ट्रोजन के साथ इसका संयोजन भी टीके या त्वचा के नीचे अन्तर्रोप (implants) के रूप में किया जा सकता है।
(D) नर/मादा साथी के लिए बन्ध्यकरण (Sterilisation), गर्भावस्था रोकने के लिए एक प्रकार की समापन विधि है

(A) (A)-T, (B)-T, (C)-F, (D)-F

(B) (A)-F, (B)-F, (C)-F, (D)-T

(C) (A)-T, (B)-F, (C)-T, (D)-T

(D) (A)-F, (B)-T, (C)-F, (D)-T

88. गर्भनिरोध के सम्बन्ध में निम्नलिखित कथनों पर विचार कीजिये और उनके आगे पूछे जा रहे प्रश्न का उत्तर दीजिये ?

(a) प्रथम तिमाही में चिकित्सीय गर्भ समापन (MTP) सामान्यतः निरापद (खतरे से बाहर) होता है।
(b) जब तक मां अपने शिशु को दो वर्ष तक स्तनपान कराती रहती है तब तक गर्भाधान की संभावनाऐं नहीं होती है।
(c) कॉपर-T जैसी अंतःगर्भाशय युक्तियां कारगर गर्भनिरोधक होती है।
(d) गर्भ निरोधन के लिए गर्भ निरोधक गोलियाँ संभोग के बाद एक सप्ताह बाद भी ली जा सकती है।
दिए गए कथनों में से कौनसे **सही** है ?

(A) a, c

(B) a, b, d

(C) b, c, a

(D) c, d

89. Which of the following does not occur during implantation?

(A) The embryo secretes enzymes that digest away part of the endometrium.

(B) The chorionic villi and uterine tissue become interdigitated to form placenta between developing embryo and mother's body.

(C) The embryo forms finger-like projections that burrow into the uterine wall.

(D) The embryo develops a hollow ball around it with a fluid-filled interior.

89. इम्प्लान्टेशन के दौरान निम्न में से क्या नहीं होता है?

(A) भ्रुण एन्जाइम्स स्त्रावित करता है जो एण्डोमेट्रियम के एक भाग का पाचन (Digest) करता है।

(B) कॉरियॉनिक विलाई तथा गर्भाश्यी ऊतक आपस में धंस कर विकसित भ्रुण तथा माता के शरीर के मध्य अपरा का निर्माण करते है।

(C) भ्रुण उँगलियों जैसे उभार बनाते हैं जो यूटेराइन भित्ति में धंस जाते है।

(D) भ्रुण स्वयं के आसपास एक खोखली गेंद जैसी संरचना विकसित करता है जिसके अन्दर द्रव भरा होता है।

90. The main source of progesterone during the first two months of pregnancy is the :-

(A) Placenta

(B) Corpus luteum

(C) Graafian folllicle

(D) Posterior pituitary

90. गर्भावस्था के प्रथम दो महीनों में प्रोजेस्टिरॉन का मुख्य स्त्रोत है :-

(A) प्लेसेन्टा

(B) कार्पस ल्यूटियम

(C) ग्राफियन पुटिका

(D) पश्च पीयूष

91. Find out the correct statements -
(a) Cell differentation occur in blastocyst stage.
(b) Three germinal layers are formed during gastrullation.
(c) At the time of implantation embryo is in Blastulla stage.
(d) The first evidence of gastrulation is the formation of the "primitive streak".
(e) The trophoblast layer contains certain cells called stem cells which have the potency to give rise to all the tissue and organs.

Option :

(A) a, b, c, d, e

(B) a, b, c, d

(C) b, c, d

(D) b, c, d, e

91. सही कथन का चयन कीजिए।
(a) कोशिका विभेदन ब्लास्टोसिस्ट अवस्था में होता है।
(b) गेस्टुलेशन के दौरान तीन जनन स्तरो का निर्माण होता है।
(c) अन्तरोर्पण के समय भ्रुण, ब्लास्टुला अवस्था में होता है।
(d) आदि रेखा (प्रिमीटीव स्ट्रीक) का बनना गेस्टुला भवन का प्रथम प्रमाण है।
(e) ट्रोफोब्लास्ट स्तर में कोशिकाए होती है जिन्हे स्टेम कोशिका कहते है जिसमें सभी ऊतक तथा अंगो को उत्पन्न करने की क्षमता होती है।
विकल्प:

(A) a, b, c, d, e

(B) a, b, c, d

(C) b, c, d

(D) b, c, d, e

92. Which could be used as a emergency contraceptives to avoid possible pregnancy due to rape or casual unprotected intercourse ?

(A) Implants

(B) Tubectomy

(C) IUD's

(D) Vaults

92. निम्न में से सामान्य असुरक्षित यौनसंबन्धों या बलात्कार के कारण होने वाली संभावित सगर्भता से बचने के लिए आपातकालीन गर्भनिरोधक (emergency contraceptives) के रूप में किसे प्रयोग किया जा सकता है ?

(A) अन्तर्रोप (Implants) को

(B) नलिका उच्छेदन

(C) IUD's को

(D) वोल्ट्स (Vaults) को

93. Which hormones attain a peak level in the middle of the menstrual cycle?

(A) Estrogen and FSH

(B) Progesterone and LH

(C) Estrogen and Progesterone

(D) LH and FSH

93. कौनसे हार्मोन, आर्तव चक्र (menstrual cycle) के मध्य में अपने उच्चतम स्तर को प्राप्त करते है ?

(A) एस्ट्रोजन तथा FSH

(B) प्रोजेस्टीरोन तथा LH

(C) एस्ट्रोजन तथा प्रोजेस्टीरोन

(D) LH तथा FSH

94. Which hormone is responsible for endometrium of uterus regenerates through proliferation?

(A) Progesterone

(B) LH

(C) Estrogen

(D) FSH

94. निम्न में से कौनसा हार्मोन, गर्भाशय में प्रचुरोद्भवन (proliferation) के द्वारा गर्भाशय अन्तःस्तर (endometrium) को पुनः पैदा करने के लिए जिम्मेदार है ?

(A) प्रोजेस्टीरोन

(B) LH

(C) एस्ट्रोजन

(D) FSH

95. The male sex accessory ducts include?

(A) Rete testis, Vasa efferentia, Seminiferous tubules and Seminal vesicles.

(B) Rete testis, Epididymis, Vas deferens and Urethra

(C) Rete testis, Vasa efferentia, Epididymis and Vas deferens.

(D) Vasa efferentia, Vas deferens, Ejaculatory duct and Penis.

95. नर लिंग सहायक नलिकाओं (male sex accessory ducts)में शामिल हैं?

(A) वृषण जालिकाएँ, शुक्र वाहिकाएँ, शुक्रजनक नलिकाएँ (Seminiferous tubules) एवं शुक्राशय (seminal vesicles)

(B) वृषण जालिकाएँ, अधिवृषण, शुक्रवाहक एवं मूत्रमार्ग (Urethra)

(C) वृषण जालिकाएँ (Rete testis)] शुक्र वाहिकाएँ (Vasa efferentia), अधिवृषण (Epididymis) एवं शुक्रवाहक (Vas deferens)

(D) शुक्र वाहिकाएँ, शुक्रवाहक, स्खलनीय वाहिनी (Ejaculatory duct) तथा शिश्न (Penis)

96. The ultimate source of organic variation is :

(A) Mutation

(B) Sexual reproduction

(C) Natural selection

(D) Hormonal action

96. जैव विकास में विभिन्नताओं का अन्तिम स्रोत है:

(A) उत्परिवर्तन

(B) लैंगिक प्रजनन

(C) प्राकृतिक चयन

(D) हॉरमोन क्रिया

97. The primate which existed 15 mya was

(A) Homo habilis

(B) Australopithecus

(C) Ramapithecus

(D) Homo erectus

97. वह प्राइमेट् जो 15 मिलियन वर्ष पूर्व अस्तित्व में था-

(A) होमो हैबिलिस

(B) आस्ट्रेलोपिथेकस

(C) रामापिथेकस

(D) होमो इरेक्टस

98. The extinct human who lived 1,00,000 to 40,000 years ago, in Europe and Asia, with short stature, heavy eye brows, retreating fore heads, large jaws with heavy teeth, stocky bodies, a lumbering gait and stopped posture was

(A) Homo habilis

(B) Neanderthal man

(C) Cro-magnon man

(D) Ramapithecus

98. विलुप्त मानव जो 1,00,000 से 40,000 वर्ष पूर्व यूरोप और एशिया में रहता था, जिसका कद छोआ, भौंहे भरी हुई, माथा पीछे की ओर, निचले जबड़ों पर भारी दाँत, गठीला शरीर, लंबरिंग चाल और कंधे झुके हुए थे, वह था-

(A) होमो हैबिलिस

(B) नियेंडरथल मानव

(C) क्रो-मैग्नन मानव

(D) रामापिथेकस

99. The cranial capacity was largest among the

(A) Peking man

(B) Java ape man

(C) African man

(D) Neanderthal man

99. निम्न में किसकी कपालिय क्षमता सबसे अधिक थी-

(A) पेकिंग मानव

(B) जावा ऐप मानव

(C) अफ्रीकन मानव

(D) नियेंडरथल मानव

100. Which character applies to Homo sapiens :

(A) Opposable toe

(B) Large canine

(C) Cranial capacity 1450 cc

(D) Chin prominence absent

100. होमो सेपिएन्स में कौनसा लक्षण है:

(A) पैर का अंगूठा विपरीत दिशा में मुड़ने वाला

(B) बड़े केनाइन दाँत

(C) कपालिय क्षमता 1450 cc

(D) ठोड़ी का अभाव

PART - III _ SECTION – A _ [PHYSICS]

101. Two point charges exert force of F newton when separated by a distance of $10\ \mathrm{cm}$ in air. The distance for which the force between them will be same if the medium between them has $\varepsilon_r = 4$, is

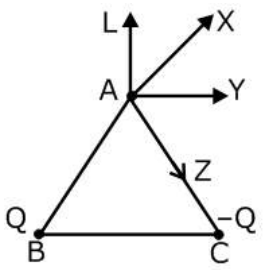
(A) 10 cm

(B) 20 cm

(C) 5 cm

(D) 25 cm

102. For the given figure the direction of electric field at A will be :



(A) towards AL

(B) towards AY

(C) towards AX

(D) towards AZ

103. The ratio of specific charge of an $\alpha-$ particle to that of a proton is :-

(A) $2:1$

(B) $1:1$

(C) $1:2$

(D) $1:3$

104. An electron is accelerated by $200\,\mathrm{kV}$ potential. Its energy is :-

(A) 200 keV

(B) 200 J

(C) 3.2 J

(D) 3.2 MeV

101. हवा में 10 सेमी दूरी पर स्थित दो बिन्दु आवेशों के मध्य F बल लगता है। किस नई दूरी के लिए उन दोनों के बीच बल समान होगा यदि दोनों के मध्य $\varepsilon_r = 4$ का माध्यम होः-

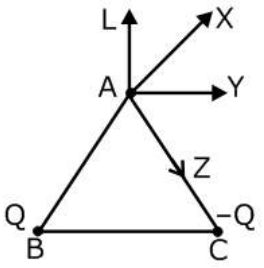
(A) 10 cm

(B) 20 cm

(C) 5 cm

(D) 25 cm

102. दिये गये चित्र में A पर विद्युत क्षेत्र की दिशा होगी -



(A) AL के अनुदिश

(B) AY के अनुदिश

(C) AX के अनुदिश

(D) AZ के अनुदिश

103. $\alpha-$ कण तथा प्रोटॉन के विशिष्ट आवेश का अनुपात हैं :-

(A) 2 : 1

(B) 1 : 1

(C) 1 : 2

(D) 1 : 3

104. एक इलेक्ट्रॉन को 200 किलो वोल्ट विभव से त्वरित किया जाता है। इसकी ऊर्जा होगी :-

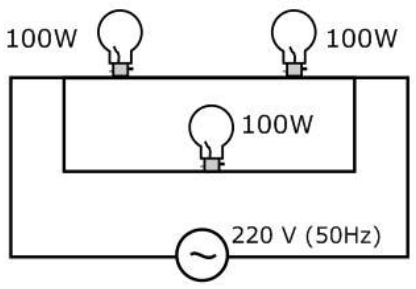
(A) 200 keV

(B) 200 J

(C) 3.2 J

(D) 3.2 MeV

105. Two electric bulbs of $100\,\text{watt}(220\,\text{volt})$ are connected in series and these are connected with other bulb of $100\text{W}(220\text{V})$ in parallel then total power in watt will be -



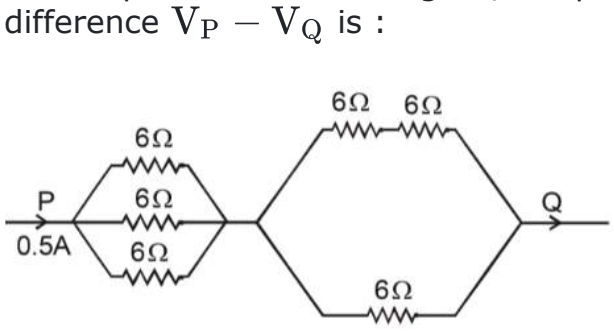
(A) 300 Watt

(B) 50 Watt

(C) 150 Watt

(D) 25 Watt

106. Resistances of $6\ \text{ohm}$ each are connected in the manner shown in adjoining figure. With the current 0.5 ampere as shown in figure, the potential difference $\text{V}_\text{P} - \text{V}_\text{Q}$ is :



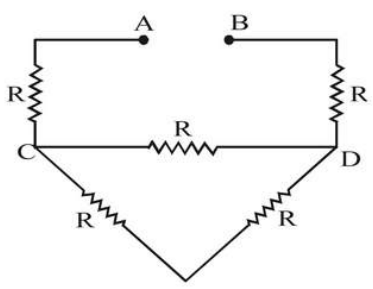
(A) 3.6 V

(B) 6.0 V

(C) 3.0 V

(D) 7.2 V

107. If $\text{R} = 3\Omega$, then the equivalent resistance between A and B is:-



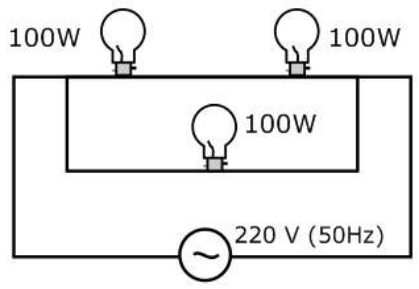
(A) 8Ω

(B) 9Ω

(C) 12Ω

(D) 15Ω

105. दो विद्युत बल्ब 100 वॉट (220 वोल्ट) श्रेणी में एवं एक अन्य विद्युत बल्ब 100W (220V) को इनके समान्तर क्रम में चित्र में दर्शाऐ अनुसार जोड़ा जाये तो कुल शक्ति वॉट में होगी -



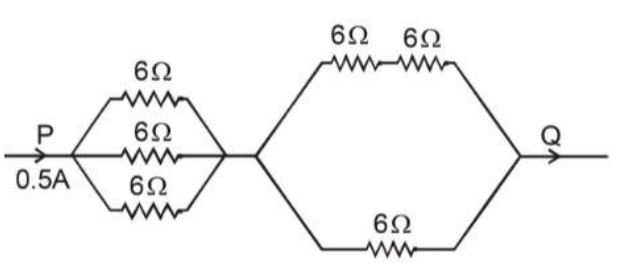
(A) 300 वॉट

(B) 50 वॉट

(C) 150 वॉट

(D) 25 वॉट

106. प्रत्येक 6 ओम के प्रतिरोध चित्र में दर्शाये गए अनुसार संयोजित है ! चित्रानुसार 0.5 एम्पियर की धारा प्रवाहित हो तो विभान्तर $\text{V}_\text{P} - \text{V}_\text{Q}$ होगा



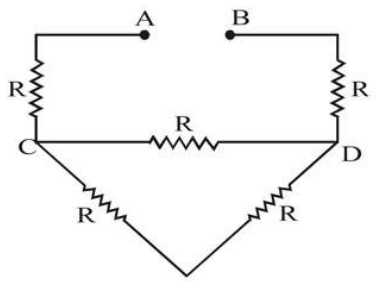
(A) 3.6 V

(B) 6.0 V

(C) 3.0 V

(D) 7.2 V

107. यदि $\text{R} = 3\Omega$ है, तो A और B के बीच तुल्य प्रतिरोध होगा-



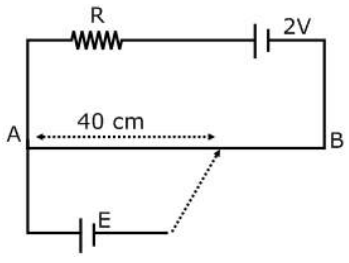
(A) 8Ω

(B) 9Ω

(C) 12Ω

(D) 15Ω

108. AB is potentiometer wire of length 100 cm and its resistance is 10 ohm. It is connected in series with a resistance R = 40 ohm and a battery of e.m.f. 2V and negligible internal resistance. If a source of unknown emf E is balanced by 40cm length of the potentiometer wire, the value of E is :-



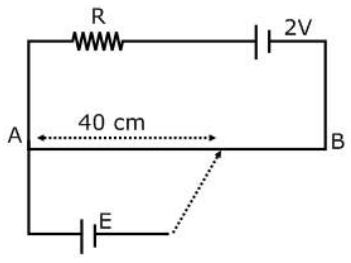
(A) 0.8V

(B) 1.6V

(C) 0.08V

(D) 0.16V

108. AB, 100 सेंटीमीटर लम्बाई का विभवमापी तार है तथा इसका प्रतिरोध 10 ohm है| यह नगण्य आन्तरिक प्रतिरोध व 2V वि.वा.बल की एक बैट्री तथा R = 40 ohm के एक प्रतिरोध के साथ श्रेणी में जोड़ा जाता है। यदि अज्ञात वि.वा.बल E का एक स्त्रोत विभवमापी तार की 40cm लम्बाई से संतुलित किया जाता है, तो E का मान होगा -



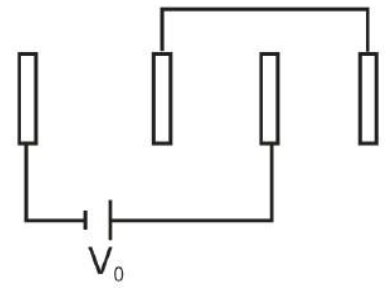
(A) 0.8 V

(B) 1.6 V

(C) 0.08V

(D) 0.16V

109. If surface area of each surface of a plate is A and separation between two adjacent plates is d. calculate charge given by battery :-



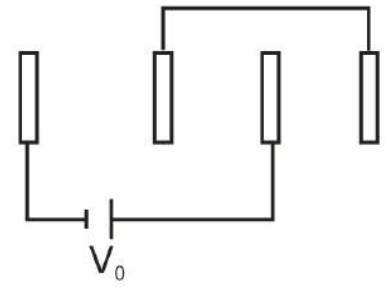
(A) $\frac{2}{3}\left(\frac{\varepsilon_0 A}{d}\right)V_0$

(B) $\frac{3\varepsilon_0 A}{d}V_0$

(C) $\frac{3}{2}\frac{\varepsilon_0 A}{d}V_0$

(D) $\frac{1}{2}\frac{\varepsilon_0 A}{d}V_0$

109. यदि प्लेटों के प्रत्येक सतह का क्षेत्रफल A व दो समीप प्लेटों के मध्य दुरी d है तो बैटरी द्वारा दिया गया आवेश हैं:-



(A) $\frac{2}{3}\left(\frac{\varepsilon_0 A}{d}\right)V_0$

(B) $\frac{3\varepsilon_0 A}{d}V_0$

(C) $\frac{3}{2}\frac{\varepsilon_0 A}{d}V_0$

(D) $\frac{1}{2}\frac{\varepsilon_0 A}{d}V_0$

110. Value of Tesla in gauss is -

(A) 10^3

(B) 10^6

(C) 10^4

(D) 10^2

110. टेसला का गॉउस में मान है

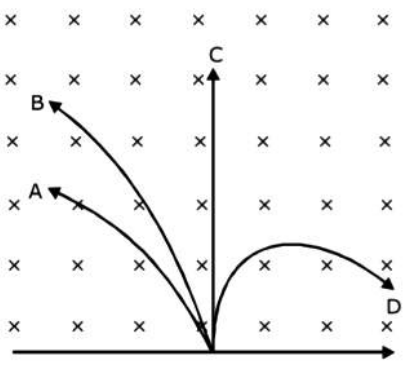
(A) 10^3

(B) 10^6

(C) 10^4

(D) 10^2

111. A neutron, a proton, an electron and an α-particle enters a uniform magnetic field with equal velocities. The field is directed along the inward normal to the plane of the paper. The tracks of the particles are labeled in figure. Find track follows by electron and α- particle.



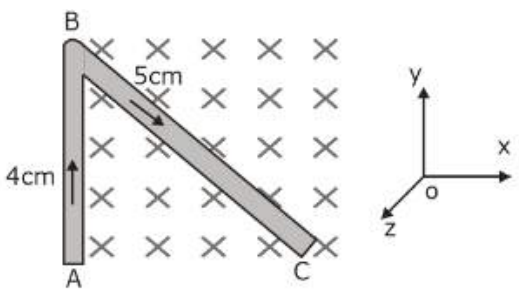
(A) D, B

(B) A, C

(C) B, C

(D) A, D

112. A uniform conducting wire ABC has a mass of 10g. A current of 2A flows through it. The wire is kept in a uniform magnetic field B = 2T. The acceleration of the wire will be :-



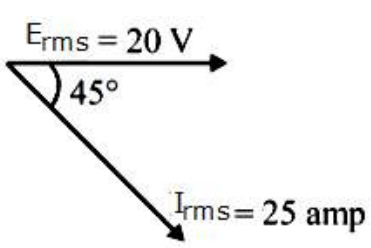
(A) Zero

(B) $12\ \text{ms}^{-2}$ along y-axis

(C) $1.2 \times 10^{-3}\ \text{ms}^{-2}$along y-axis

(D) $0.6 \times 10^{-3}\ \text{ms}^{-2}$along y-axis

113. The vector diagram of current and voltage for a circuit is as shown. The components of the circuit may be :-



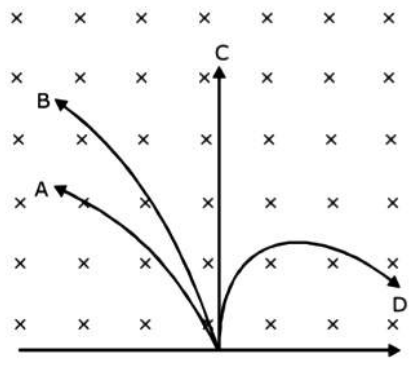
(A) LCR

(B) RC

(C) LCR or LR

(D) LC

111. एक न्यूट्रॉन, एक प्रोटोन, एक इलेक्ट्रान तथा एक एल्फा कण समान वेगो से एकसमान चुम्बकीय क्षेत्र में प्रवेश करते है | चुम्बकीय क्षेत्र कागज के तल के अभिलम्बवत अन्दर की ओर है | कणो के पथ चित्र में रेखांकित है | इलेक्ट्रान और α कण का अनुसरित पथ ज्ञात करो |



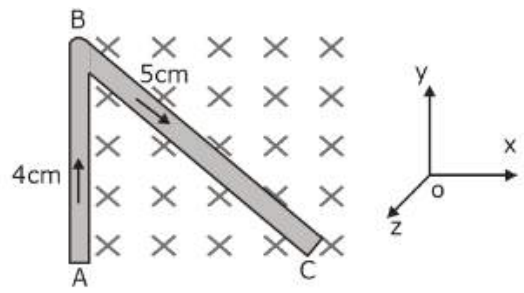
(A) D, B

(B) A, C

(C) B, C

(D) A, D

112. एक समरूप चालक तार ABC का द्रव्यमान 10g है। इसमें से 2A की धारा प्रवाहित है। तार एक समरूप चुम्बकीय क्षेत्र B = 2T में रखा जाता है। तार का त्वरण होगा:-



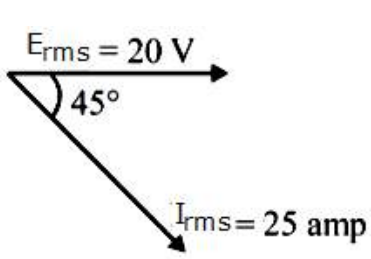
(A) शून्य

(B) $12\ \text{ms}^{-2}$ y—अक्ष के अनुदिश

(C) $1.2 \times 10^{-3}\ \text{ms}^{-2}$ y—अक्ष के अनुदिश

(D) $0.6 \times 10^{-3}\ \text{ms}^{-2}$ y—अक्ष के अनुदिश

113. एक परिपथ की विद्युत धारा तथा वोल्टेज के सदिश निरूपण को चित्र में दिखाया गया है तो परिपथ में उपस्थित अवयव हो सकते है :-



(A) LCR

(B) RC

(C) LCR or LR

(D) LC

114. The value of electric potential at any point due to any electric dipole is :-

(A) $k.\frac{\vec{p}\times\vec{r}}{r^2}$

(B) $k.\frac{\vec{p}\times\vec{r}}{r^3}$

(C) $k.\frac{\vec{p}\cdot\vec{r}}{r^2}$

(D) $k.\frac{\vec{p}\cdot\vec{r}}{r^3}$

115. Specific resistance of a wire depends on the

(A) length of the wire

(B) area of cross–section of the wire

(C) resistance of the wire

(D) material of the wire

116. A capacitor stores energy in the form of :-

(A) electromagnetic field

(B) magnetic field

(C) electric field

(D) none of these

117. The inward and outward electric flux for a closed surface in units of $N-m^2/C$ are respectively 8×10^3 and 4×10^3. Then the total charge inside the surface is [Where $\in_0$ is permittivity of vaccum] :-

(A) $4\times10^3\ C$

(B) $-4\times10^3\ C$

(C) $\left(\frac{-4\times10^3}{\in_0}\right)$ C

(D) $-4\times10^3\in_0 C$

118. If the potential of a capacitor having capacity 6μF is increased from 10 volt to 20 volt then increase in energy will be:-

(A) 4×10^{-4} J

(B) 9×10^{-6} J

(C) 9×10^{-4} J

(D) 4×10^{-6} J

114. किसी विद्युत द्विध्रुव के कारण किसी बिन्दु पर विद्युत विभव का मान होता है।

(A) $k.\frac{\vec{p}\times\vec{r}}{r^2}$

(B) $k.\frac{\vec{p}\times\vec{r}}{r^3}$

(C) $k.\frac{\vec{p}\cdot\vec{r}}{r^2}$

(D) $k.\frac{\vec{p}\cdot\vec{r}}{r^3}$

115. किसी तार का विशिष्ट प्रतिरोध निर्भर करता है -

(A) तार की लम्बाई पर

(B) तार के अनुप्रस्थ काट के क्षेत्रफल पर

(C) तार के प्रतिरोध पर

(D) तार के पदार्थ पर

116. एक संधारित्र ऊर्जा संग्रहित करता है :-

(A) विद्युत चुम्बकीय क्षेत्र के रूप में

(B) चुम्बकीय क्षेत्र के रूप में

(C) विद्युत क्षेत्र के रूप में

(D) किसी भी रूप में नहीं

117. किसी बन्द पृष्ठ के लिए अन्दर की ओर तथा बाहर की ओर विद्युत फ्लस्क $N-m^2/C$ इकाईयों में क्रमशः 8×10^3 व 4×10^3 है, तो पृष्ठ के अन्दर कुल आवेश होगा [जहॉ $\in_0$ निर्वात की विद्युतशीलता है]:-

(A) 4×10^3 कुलॉम

(B) -4×10^3 कुलॉम

(C) $\left(\frac{-4\times10^3}{\in_0}\right)$ कूलॉम

(D) $-4\times10^3\in_0$ कुलॉम

118. जब 6μF धारिता वाले किसी संधारित्र का विभव 10 वोल्ट से 20 वोल्ट तक बढ़ाया जाता है तो उसकी ऊर्जा में वृद्धि होगी:-

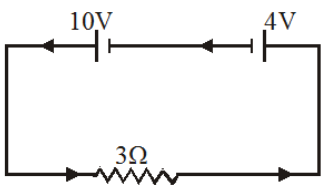
(A) 4×10^{-4} J

(B) 9×10^{-6} J

(C) 9×10^{-4} J

(D) 4×10^{-6} J

119. In the circuit shown in figure. The power consumed by 4V battery is :-



(A) 5 W

(B) 10 W

(C) 2 W

(D) 8 W

120. A 1 μF capacitance of TV is subjected to 4000 V potential difference, The energy stored in the capacitor is

(A) $8\ \mathrm{J}$

(B) $16\ \mathrm{J}$

(C) $4 \times 10^{-3}\ \mathrm{J}$

(D) $2 \times 10^{-3}\ \mathrm{J}$

121. If the capacity of a parallel plate capacities in air is 1μF and 80μF in an another medium. The dielectric constant of medium will be-

(A) 80

(B) 1/80

(C) 40

(D) 1/40

122. A capacitor of capacitance $500\mu\mathrm{F}$ is charged at the rate of $500\mu\mathrm{C/s}$. The time in which the potential difference will become $20\ \mathrm{V}$, is

(A) 100 s

(B) 50 s

(C) 20 s

(D) 10 s

123. Two circular coils made of similar wires but of radius 20 cm and 40 cm are connected in parallel to a battery. The ratio of magnetic fields at their centre is -

(A) 4 : 1

(B) 1 : 4

(C) 2 : 1

(D) 1 : 2

124. A current of 2 ampere is flowing through a coil of radius 0.1 m and having 10 turns. The magnetic moment of the coil will be

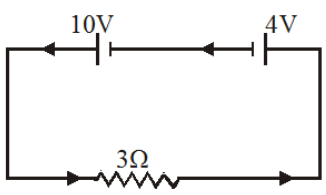
(A) $20\mathrm{A} - \mathrm{m}^2$

(B) $2\mathrm{A} - \mathrm{m}^2$

(C) $0\ .314\ \mathrm{A} - \mathrm{m}^2$

(D) $0\ .628\ \mathrm{A} - \mathrm{m}^2$

119. चित्र में प्रदर्शित परिपथ में 4V बैट्री द्वारा उपभोग की गई शक्ति है :-



(A) 5 W

(B) 10 W

(C) 2 W

(D) 8 W

120. TV के एक 1 μF धारिता के संधारित्र पर 4000V विभवान्तर आता है। संधारित्र में संग्रहित ऊर्जा है :-

(A) $8\ \mathrm{J}$

(B) $16\ \mathrm{J}$

(C) $4 \times 10^{-3}\ \mathrm{J}$

(D) $2 \times 10^{-3}\ \mathrm{J}$

121. एक समान्तर प्लेट संधारित्र की धारिता वायु में 1μF तथा अन्य माध्यम में 80μF है माध्यम का परावैद्युतांक होगा

(A) 80

(B) 1/80

(C) 40

(D) 1/40

122. एक $500\mu\mathrm{F}$ धारिता का संधारित्र $500\mu\mathrm{C/s}$ दर से आवेशित किया जाता है | समय जिसमें विभान्तर $20\ \mathrm{V}$ हो जाता है, है |

(A) 100 s

(B) 50 s

(C) 20 s

(D) 10 s

123. दो वृत्तीय कुण्डलियाँ समान तारों की बनी हुई है तथा इनकी त्रिज्याऐं 20cm और 40cm है तथा यह एक बैट्री से समानान्तर क्रम में जोड़ी जाती है | उनके केन्द्र पर चुम्बकीय क्षेत्रों का अनुपात होगा -

(A) 4 : 1

(B) 1 : 4

(C) 2 : 1

(D) 1 : 2

124. 0.1 मीटर त्रिज्या और 10 फेरों वाली कुण्डली में 2 एम्पियर धारा प्रवाहित हो रही है | कुण्डली का चुम्बकीय आघूर्ण होगा -

(A) $20\ A - m^2$

(B) $2\ A - m^2$

(C) $0.314 A - m^2$

(D) $0.628 A - m^2$

125. Magnetic susceptibility of the following is :

(A) negative for diamagnetic

(B) positive for diamagnetic and paramagnetic

(C) negative for diamagnetic and zero for paramagnetic

(D) zero for paramagnetic and positive for ferromagnetic

125. निम्नलिखित में चुम्बकीय प्रवृति (susceptibility) होती है :

(A) प्रतिचुम्बकीय के लिये ऋणात्मक

(B) अनुचुम्बकीय व प्रतिचुम्बकीय के लिये धनात्मक

(C) प्रतिचुम्बकीय के लिये ऋणात्मक व अनुचुम्बकीय के लिये शून्य

(D) अनुचुम्बकीय के लिये शून्य एवं लौह चुम्बकीय के लिये धनात्मक

126. At a certain place the angle of dip is 30° and the horizontal component of earth's magnetic field is 0.50 Oersted. The earth's total magnetic field is

(A) $\sqrt{3}$ oersted

(B) 1 oersted

(C) $\frac{1}{\sqrt{3}}$ oersted

(D) $\frac{1}{2}$ oersted

126. एक निश्चित स्थान पर नमन कोण का मान 30° एवं पृथ्वी के चुम्बकीय क्षेत्र का क्षैतिज घटक 0.50 ओरस्टेड़ है। पृथ्वी का कुल चुम्बकीय क्षेत्र है -

(A) $\sqrt{3}$ ओरस्टेड़

(B) 1 ओरस्टेड़

(C) $\frac{1}{\sqrt{3}}$ ओरस्टेड़

(D) $\frac{1}{2}$ ओरस्टेड़

127. A charge Q μC is placed at the centre of a cube. The flux coming out from any surface will be :-

(A) $\frac{Q}{6\in_0} \times 10^{-6}$

(B) $\frac{Q}{6\in_0} \times 10^{-3}$

(C) $\frac{Q}{24\in_0}$

(D) $\frac{Q}{8\in_0}$

127. एक आवेश Q μC किसी घन के केन्द्र पर रखा है। किसी भी सतह से निर्गत फलक्स होगा:-

(A) $\frac{Q}{6\in_0} \times 10^{-6}$

(B) $\frac{Q}{6\in_0} \times 10^{-3}$

(C) $\frac{Q}{24\in_0}$

(D) $\frac{Q}{8\in_0}$

128. A current of 1A through a coil of inductance of 200 mH is increasing at a rate of 0.5 A/sec. The energy stored in the inductor per second is :-

(A) 0.5 J/sec

(B) 5.0 J/sec

(C) 0.1 J/sec

(D) 2.0 J/sec

128. 200 mH प्रेरकत्व की कुण्डली में 1A धारा प्रवाहित है। यह 0.5 A/sec दर से बढ़ रही है। प्रेरकत्व में प्रति सेकण्ड संग्रहित ऊर्जा होगी:-

(A) 0.5 J/sec

(B) 5.0 J/sec

(C) 0.1 J/sec

(D) 2.0 J/sec

129. A coil of self inductance 50 henry is joined to the terminals of a battery of emf 2 volts through a resistance of 10 ohm and a steady current is flowing through the circuit. If the battery is now disconnected the time in which the current will decay to 1/e of its steady value is-

(A) 500 sec

(B) 50 sec

(C) 5 sec

(D) 0.5 sec

129. एक 50 हेनरी व 10 ओम प्रतिरोध की कुण्डली को 2 वोल्ट की बैटरी से जोड़ा जाता है। यदि बैटरी को हटा दिया जाये, तो कितने समय में धारा शिखर मान की 1/e रह जाती है -

(A) 500 sec

(B) 50 sec

(C) 5 sec

(D) 0.5 sec

130. The velocity of electromagnetic wave is parallel to:-

(A) $\overrightarrow{B} \times \overrightarrow{E}$

(B) $\overrightarrow{E} \times \overrightarrow{B}$

(C) $\overrightarrow{E}$

(D) $\overrightarrow{B}$

130. विद्युत चुम्बकीय तरंग का वेग निम्न के समान्तर होता है:-

(A) $\overrightarrow{B} \times \overrightarrow{E}$

(B) $\overrightarrow{E} \times \overrightarrow{B}$

(C) $\overrightarrow{E}$

(D) $\overrightarrow{B}$

131. For a coil having L = 2 mH, current flow through it is $I = t^2 e^{-t}$ then the time at which emf become zero :–

(A) 2 s

(B) 1 s

(C) 4 s

(D) 3 s

131. L = 2mH की एक कुण्डली में धारा $I = t^2 e^{-t}$ प्रवाहित हो रही है। तो वि.वा. बल किस समय शून्य होगा :-

(A) 2 s

(B) 1 s

(C) 4 s

(D) 3 s

132. If the frequncy of AC is 60 Hz the time difference corresponding to a phase difference of $60^\circ$is -

(A) 60 s

(B) 1s

(C) $1/60$s

(D) $1/360$s

132. यदि प्रत्यावर्ती धारा की आवृत्ति 60Hz है तो 60° के कालान्तर से संबधित समयान्तर होगा -

(A) 60 s

(B) 1s

(C) $1/60$s

(D) $1/360$s

133. During current growth in an LR circuit the time constant is the time in which the magnitude of current becomes (Where $I_0 \rightarrow$peak current) :-

(A) I_0

(B) $I_0/2$

(C) $0.63I_0$

(D) $0.37I_0$

133. धारा वृद्धि के लिए LR परिपथ का समय नियतांक उस समय के तुल्य होता है जिसमें धारा का परिमाण हो जाता है (जहाँ $I_0 \rightarrow$ शिखर धारा) :-

(A) I_0

(B) $I_0/2$

(C) $0.63I_0$

(D) $0.37I_0$

134. In an A.C. circuit V and I are given by $V = 100\ \sin(100t)$ volts $I = 100\ \sin(100t + \pi/3)\ mA$ The power disspated in the circuit is

(A) 10^4 watt

(B) 10 watt

(C) 2.5 watt

(D) 5.0 watt

134. एक प्रत्यावर्ती धारा परिपथ में V और I निम्नलिखित समीकरण से दिए जाते है, V=100 sin (100 t) वोल्ट, $I = 100 \sin(100t + \pi/3)$ मिली एम्पियर तो परिपथ में शक्ति क्षय होगी

(A) 10^4 वॉट

(B) 10 वॉट

(C) 2.5 वॉट

(D) 5.0 वॉट

135. For a series LCR circuit the power loss at resonance is-

(A) $\frac{V^2}{\left[\omega L - \frac{1}{\omega C}\right]}$

(B) $I^2 L\omega$

(C) $I^2 R$

(D) $\frac{V^2}{C\omega}$

135. श्रेणी LCR परिपथ के लिए अनुनाद के समय शक्ति हानि होती है -

(A) $\frac{V^2}{\left[\omega L - \frac{1}{\omega C}\right]}$

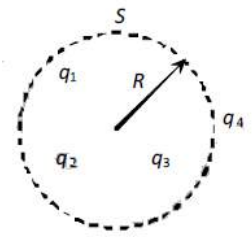
(B) $I^2 L\omega$

(C) $I^2 R$

(D) $\frac{V^2}{C\omega}$

PART - III _ SECTION – B _ [PHYSICS]

136. q_1, q_2, q_3 and q_4 are point charges located at points as shown in the figure and s is a spherical Gaussian surface of radius R. Which of the following is true according to the Gauss's law



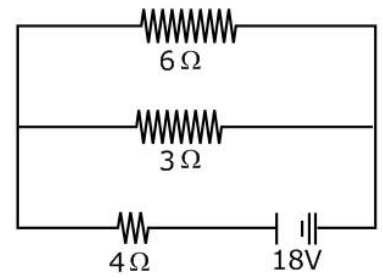
(A) $\oint_s \left(\vec{E}_1 + \vec{E}_2 + \vec{E}_3\right) . d\vec{A} = \frac{q_4}{\varepsilon_0}$

(B) $\oint_s \left(\vec{E}_1 + \vec{E}_2 + \vec{E}_3 + \vec{E}_4\right) . d\vec{A} = \frac{(q_1+q_2+q_3)}{\varepsilon_0}$

(C) $\oint_s \left(\vec{E}_1 + \vec{E}_2 + \vec{E}_3\right) . d\vec{A} = \frac{q_1+q_2+q_3+q_4}{2\varepsilon_0}$

(D) None of the above

137. The total power dissipated in watts in the circuit shown here is :-



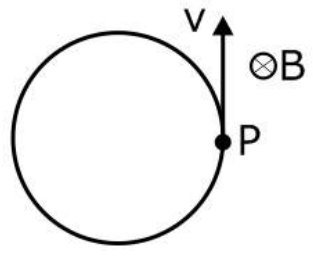
(A) 4W

(B) 16W

(C) 40W

(D) 54W

138. A particle having charge of $10\ \mu C$ and $1\ \mu g$ mass moves along circular path of 10 cm radius in the effect of uniform magnetic field of 0.1 T. When charge is at point 'P', a uniform electric field applied in the region so charge moves tangentially with constant speed. The value of electric field is:-



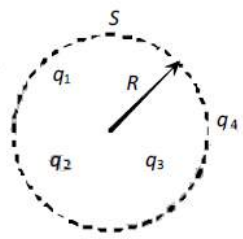
(A) $0.1\ V/m$

(B) $1\ V/m$

(C) $10\ V/m$

(D) $100\ V/m$

136. q_1, q_2, q_3 व q_4 बिन्दु आवेश चित्रानुसार स्थित हैं। S एक R त्रिज्या का गॉसीय पृष्ठ है। गॉसीय नियम के अनुसार निम्न में से क्या सही है



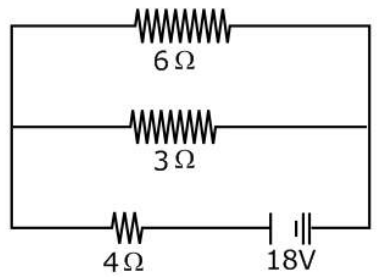
(A) $\oint_s \left(\vec{E}_1 + \vec{E}_2 + \vec{E}_3\right) . d\vec{A} = \frac{q_4}{\varepsilon_0}$

(B) $\oint_s \left(\vec{E}_1 + \vec{E}_2 + \vec{E}_3 + \vec{E}_4\right) . d\vec{A} = \frac{(q_1+q_2+q_3)}{\varepsilon_0}$

(C) $\oint_s \left(\vec{E}_1 + \vec{E}_2 + \vec{E}_3\right) . d\vec{A} = \frac{q_1+q_2+q_3+q_4}{2\varepsilon_0}$

(D) उपरोक्त में से कोई नहीं

137. यहां दिखाये परिपथ मे कुल क्षयित शक्ति वॉट में है -



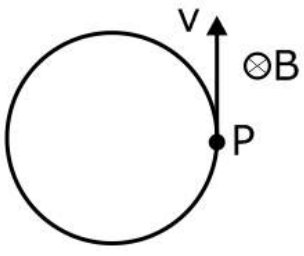
(A) 4W

(B) 16W

(C) 40W

(D) 54W

138. $10\mu C$ आवेश एवं $1\mu g$ द्रव्यमान वाला कण 10 सेमी त्रिज्या के वृत्तीय पथ में 0.1 T समरूप चुम्बकीय क्षेत्र के प्रभाव में गतिशील है। जब आवेश बिन्दु P पर है तब क्षेत्र में समरूप विद्युत क्षेत्र इस प्रकार से आरोपित किया जाता है कि आवेश स्पर्श रेखीय दिशा में नियत चाल से गतिमान हो जाता है। विद्युत क्षेत्र का मान होगा :-



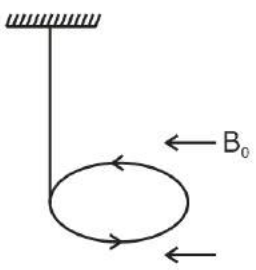
(A) 0.1 V/m

(B) 1 V/m

(C) 10 V/m

(D) 100 V/m

139. A uniform current carrying ring of mass m and radius R is connected by a massless string as shown. A uniform magnetic field B_0 exist in the region to keep the ring in horizontal position, then the current in the ring is -



(A) $\frac{mg}{\pi RB_0}$

(B) $\frac{mg}{RB_0}$

(C) $\frac{mg}{3\pi RB_0}$

(D) $\frac{mg}{\pi R^2 B_0}$

140. A point charge is located at origin. At point (a, a), electric field is $\overrightarrow{E_1}$. At point $(-a, a)$ electric field is $\overrightarrow{E_2}$ and a point $(-a, -a)$ electric field is $\overrightarrow{E_3}$. Then choose the correct option.

(A) $\overrightarrow{E_1} . \overrightarrow{E_2} = 0$

(B) $\left|\overrightarrow{E_1} \times \overrightarrow{E_3}\right| = 0$

(C) both are correct

(D) both are wrong

141. A uniform electric field having a magnitude E_0 and direction along the positive X-axis exists. If the potential V is zero at X = 0, then its value at x = +x will be :-

(A) $V_{(x)} = +xE_0$

(B) $V_x = -xE_0$

(C) $V_x = +x^2E_0$

(D) $V_x = -x^2E_0$

142. No current flows between two charged bodies connected together when they have the same

(A) capacitance or Q/V ratio

(B) charge

(C) resistance

(D) potential or Q/C ratio

143. Calculate the heat generated when a condenser of 100 μF capacity and charged to 200 volts is discharged through a 2 ohm resistance.

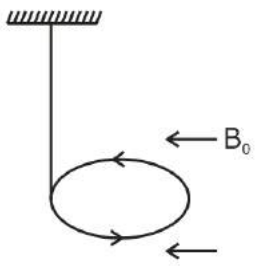
(A) 0

(B) 2 J

(C) 1 J

(D) 4 J

139. द्रव्यमान m तथा R त्रिज्या कि एक समान धारावाही वलय दर्शाएनुसार एक द्रव्यमानहीन डोरी द्वारा जुडी हुई है एक समान चुम्बकीय क्षेत्र B_0 अस्तित्व में है जिससे वलय क्षेतिज स्थिति में रहती है तब वलय में धारा है



(A) $\frac{mg}{\pi RB_0}$

(B) $\frac{mg}{RB_0}$

(C) $\frac{mg}{3\pi RB_0}$

(D) $\frac{mg}{\pi R^2 B_0}$

140. एक बिन्दु आवेश मूल बिन्दु पर स्थित है। बिन्दु (a, a) पर विद्युत क्षेत्र $\overrightarrow{E_1}$ है, बिन्दु (–a, a) पर विद्युत क्षेत्र $\overrightarrow{E_2}$ तथा बिन्दु (–a, –a) पर विद्युत क्षेत्र $\overrightarrow{E_3}$ है। सही विकल्प का चयन कीजिये -

(A) $\overrightarrow{E_1} . \overrightarrow{E_2} = 0$

(B) $\left|\overrightarrow{E_1} \times \overrightarrow{E_3}\right| = 0$

(C) दोनों सही हैं।

(D) दोनों गलत हैं।

141. एक समान वैद्युत क्षेत्र के परिमाण E_0 की दिशा धनात्मक X–अक्ष के अनुदिश है। यदि x = 0 पर विभव V = 0 है तो इसका मान x = +x दूरी पर होगा :-

(A) $V_{(x)} = +xE_0$

(B) $V_x = -xE_0$

(C) $V_x = +x^2E_0$

(D) $V_x = -x^2E_0$

142. एक साथ जुड़ी दो आवेशित वस्तुओं के बीच कोई धारा प्रवाहित नहीं होती है, जब वे रखती है, समान

(A) धारिता या Q/V अनुपात

(B) आवेश

(C) प्रतिरोध

(D) विभव या Q/C अनुपात

143. 100 μF क्षमता के संधारित्र को 200 वोल्ट तक आवेशित करके 2 ओम प्रतिरोध द्वारा निरावेशित करने पर उत्पन्न उष्मा की गणना कीजिए

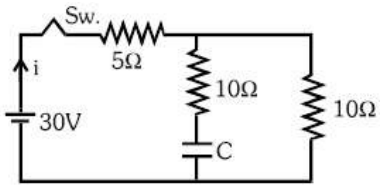
(A) 0

(B) 2 J

(C) 1 J

(D) 4 J

144. For the given circuit, current i is :-



(A) $3\mathrm{A}$, just after switch is closed

(B) $2\mathrm{A}$, after a long duration switch is closed

(C) Both of them

(D) None of them

145. Two bulbs are working in parallel order. Bulb A is brighter than bulb B. If $\mathrm{R_A}$ and $\mathrm{R_B}$ are their resistance respectively then :-

(A) $\mathrm{R_A} > \mathrm{R_B}$

(B) $\mathrm{R_A} < \mathrm{R_B}$

(C) $\mathrm{R_A} = \mathrm{R_B}$

(D) None of these

146. Resistance of a Galvanometer coil is 8Ω and 2Ω Shunt resistance is connected with it. If main current is 1A then the current flow through 2Ω resistance will be-

(A) 0.2 A

(B) 0.8 A

(C) 0.1 A

(D) 0.4 A

147. The length of a solenoid is 0.4 m and the number turns in it is 500. A current of 3 A, is flowing in it. In a small coil of radius 0.01 m and number of turns 10, a current of 0.4 A is following. The torque necessary to keep the axis of this coil perpendicular to the axis of solenoid will be-

(A) 5.92×10^{-6} N-m

(B) 5.92×10^{-4} N-m

(C) 5.92×10^{-6} dyne-cm

(D) 5.92×10^{-4} dyne-cm

148. A metallic disc of radius `R' is rotated with constant angular speed 'ω' in external magnetic field B which is perpendicular to the plane of the disc then induced emf between the centre and any peripherical point of the disc is given by-

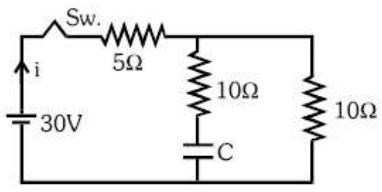
(A) $\pi\omega\mathrm{BR}^2$

(B) $\omega\mathrm{BR}^2$

(C) $\pi\omega\mathrm{B}\frac{\mathrm{R}^2}{2}$

(D) $\omega\mathrm{B}\frac{\mathrm{R}^2}{2}$

144. दिये गये परिपथ मे धारा i है:-



(A) 3A, स्विच बन्द करने के ठीक पश्चात

(B) 2A, स्विच बन्द करने के लंबे समय अन्तराल के बाद

(C) उपरोक्त दोनों

(D) उपरोक्त में से कोई नही

145. दो बल्ब A तथा B समान्तर क्रम में जुड़े हैं। बल्ब A बल्ब B से ज्यादा रोशनी देता है। यदि R_A व R_B क्रमशः उनके प्रतिरोध हो तो :-

(A) $\mathrm{R_A} > \mathrm{R_B}$

(B) $\mathrm{R_A} < \mathrm{R_B}$

(C) $\mathrm{R_A} = \mathrm{R_B}$

(D) इनमें से कोई नहीं

146. धारामापी कुण्डली का प्रतिरोध 8Ω है तथा इसके साथ 2Ω का शंट प्रतिरोध जोड़ा जाता है | यदि मुख्य धारा 1A की हो तो 2Ω प्रतिरोध से प्रवाहित धारा होगी:-

(A) 0.2 A

(B) 0.8 A

(C) 0.1 A

(D) 0.4 A

147. 500 फेरों तथा 0.4 m लम्बाई वाली परिनालिका में 3A की धारा प्रवाहित हैं। परिनालिका के अक्ष के लम्बवत् किसी 10 फेरों तथा 0.01m त्रिज्या वाली कुण्डली, जिसमें 0.4 A धारा प्रवाहित हो रही हैं, को रखने हेतु आवश्यक बल आघूर्ण होगा -

(A) 5.92×10^{-6} N-m

(B) 5.92×10^{-4} N-m

(C) 5.92×10^{-6} dyne-cm

(D) 5.92×10^{-4} dyne-cm

148. 'R'त्रिज्या की एक धात्विक चकती जिसका तल चुम्बकीय क्षेत्र B के लम्बवत् है, स्वयं की ज्यामितीय अक्ष के परितः 'ω' कोणीय वेग से घूर्णन कर रही है, तो इसके केन्द्र एवं परिधि के बीच प्रेरित विद्युत वाहक बल का मान होगा -

(A) $\pi\omega\mathrm{BR}^2$

(B) $\omega\mathrm{BR}^2$

(C) $\pi\omega\mathrm{B}\frac{\mathrm{R}^2}{2}$

(D) $\omega\mathrm{B}\frac{\mathrm{R}^2}{2}$

149. The sum and the difference of self inductances of two coils are 13H and 5H respectively. The maximum mutual inductance of coils is :-

(A) 6 H

(B) 5 H

(C) $\sqrt{65}$ H

(D) 18 H

150. Turn ratio of a step–up transformer is 1 : 25. If current in load coil is 2 A, then the current in primary coil will be :-

(A) 25A

(B) 50A

(C) 0.25A

(D) 0.5 A

149. दो कुण्डलियों के स्वप्रेरकत्व का योग व अन्तर क्रमशः 13H व 5H है। कुण्डलियों का अधिकतम अन्योन्य प्रेरकत्व होगा :-

(A) 6 H

(B) 5 H

(C) $\sqrt{65}$ H

(D) 18 H

150. एक उच्चायी ट्रांसफॉर्मर के फेरो का अनुपात (turn ratio) 1 : 25 है। यदि लोड कुण्डली में धारा 2A है, तब प्राथमिक कुण्डली में धारा होगी -

(A) 25A

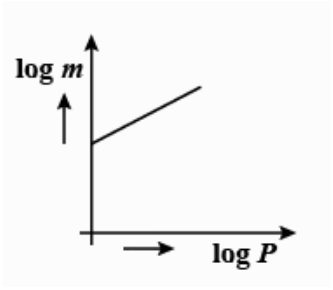
(B) 50A

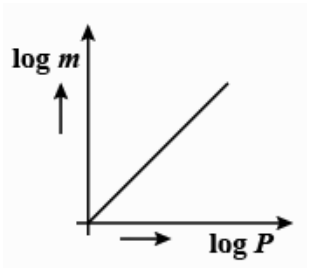
(C) 0.25A

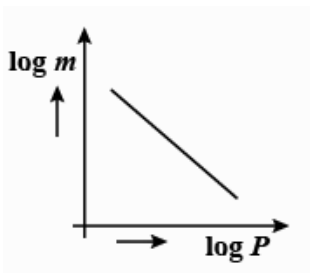
(D) 0.5 A

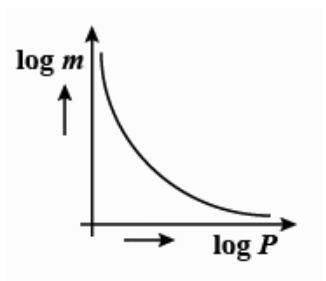
PART - IV _ SECTION – A _ [CHEMISTRY]

151. Which of the following curves represents the Henry's law?

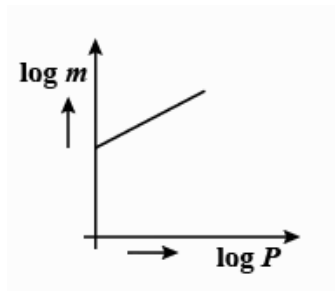
(A) 

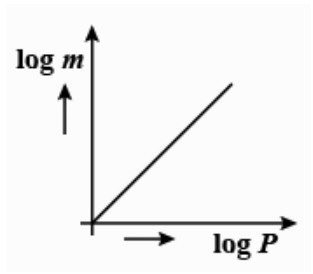
(B) 

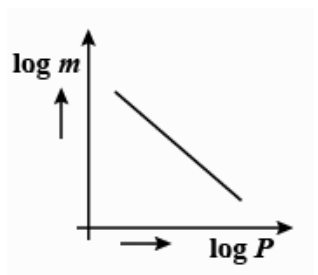
(C) 

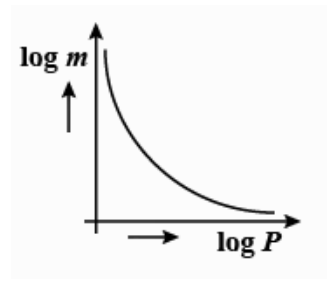
(D) 

151. निम्न में से कौनसा वक्र हेनरी नियम को प्रदर्शित करता है?

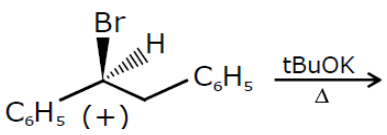
(A) 

(B) 

(C) 

(D) 

152. The major product obtained in the following reaction is :



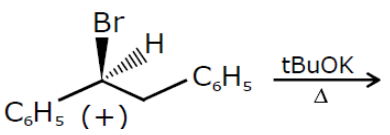
(A) $C_6H_5CH = CHC_6H_5$

(B) $(+)C_6H_5CH(O^tBu)\ CH_2C_6H_5$

(C) $(-)C_6H_5CH(O^tBu)CH_2C_6H_5$

(D) $(\pm)C_6H_5CH(O^tBu)CH_2C_6H_5$

152. निम्न अभिक्रिया में प्राप्त मुख्य उत्पाद है-



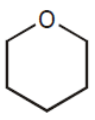
(A) $C_6H_5CH = CHC_6H_5$

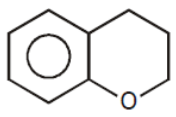
(B) $(+)C_6H_5CH(O^tBu)\ CH_2C_6H_5$

(C) $(-)C_6H_5CH(O^tBu)CH_2C_6H_5$

(D) $(\pm)C_6H_5CH(O^tBu)CH_2C_6H_5$

153. Consider the reaction of HI with the following:

I 

II 

Which forms di-iodide on reaction with HI (excess)?

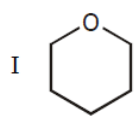
(A) I and II both

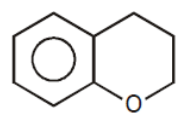
(B) II only

(C) I only

(D) none

153. निम्न के साथ HI की अभिक्रिया पर विचार कीजिए-

I 

II 

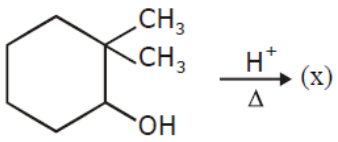
कौनसा HI (आधिक्य) के साथ अभिक्रिया पर डाई-आयोडाइड निर्मित करता है?

(A) I तथा II दोनों

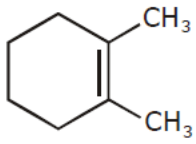
(B) केवल II

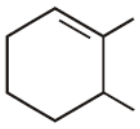
(C) केवल I

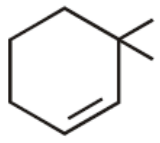
(D) कोई नहीं

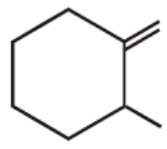
154. 

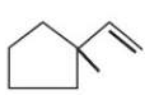
Major product (X) is-

(A) 

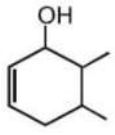
(B) 

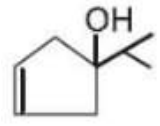
(C) 

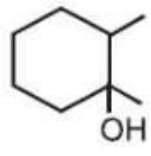
(D) 

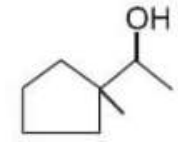
155.  P ;

Identify major product 'P' is-

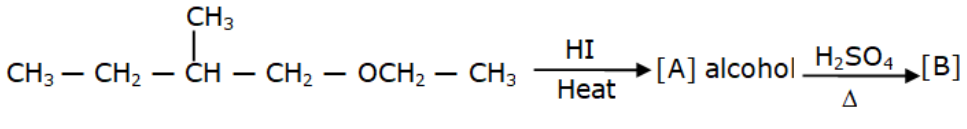
(A) 

(B) 

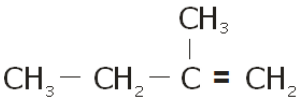
(C) 

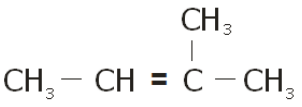
(D) 

156. The major product [B] in the following reactions is-

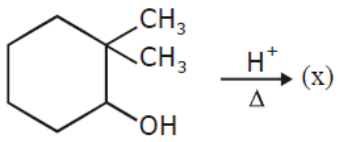


(A) $CH_3 - CH_2 - CH = CH - CH_3$

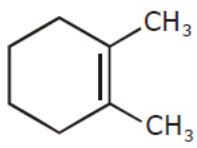
(B) 

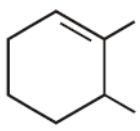
(C) 

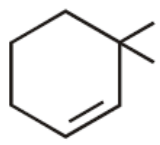
(D) $CH_2 = CH_2$

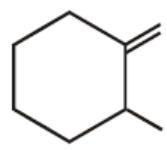
154. 

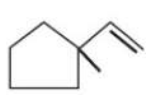
मुख्य उत्पाद (X) है-

(A) 

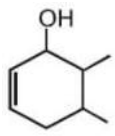
(B) 

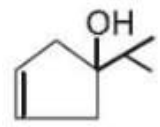
(C) 

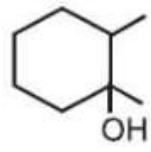
(D) 

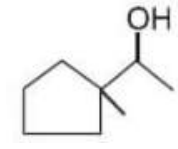
155.  P ;

मुख्य उत्पाद 'P ' को पहचानिए -

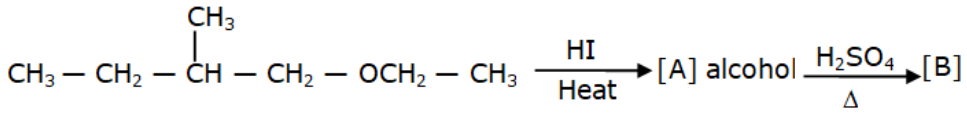
(A) 

(B) 

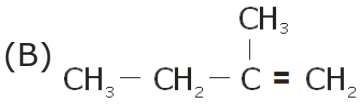
(C) 

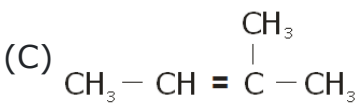
(D) 

156. निम्न अभिक्रिया में मुख्य उत्पाद [B] है-



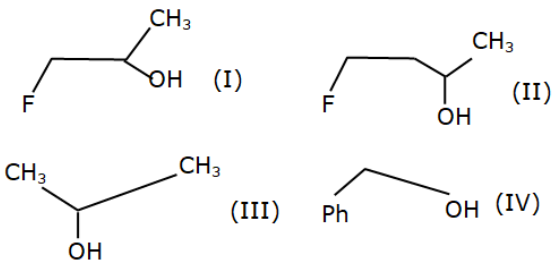
(A) $CH_3 - CH_2 - CH = CH - CH_3$

(B) 

(C) 

(D) $CH_2 = CH_2$

157. The order of reactivity of the following alcohol towards conc. HCl is-

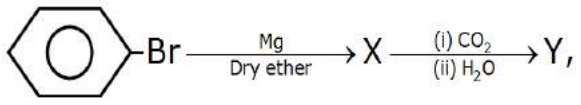


(A) I > II > III > IV

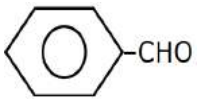
(B) I > III > II > IV

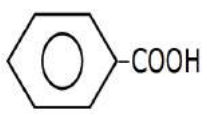
(C) IV > III > II > I

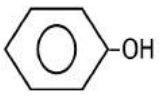
(D) IV > III > I > II

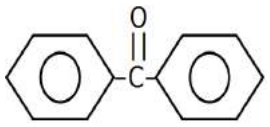
158. 

Y is-

(A) 

(B) 

(C) 

(D) 

159. The nature of the solution of Potash alum is -

(A) Basic

(B) Acidic

(C) Neutral

(D) Amphoteric

160. A solution of a substance containing 1.05 g per 100 ml. was found to be isotonic with 3% glucose solution. The molecular mass of the substance is -

(A) 31.5

(B) 6.3

(C) 630

(D) 63

161. 1.00 g of a non-electrolyte solute (molar mass 250 g mol^{-1}) was dissolved in 51.2 g of benzene. If the freezing point depression constant, K_f of benzene is 5.12 K kg mol^{-1}, the freezing point of benzene will be lowered by -

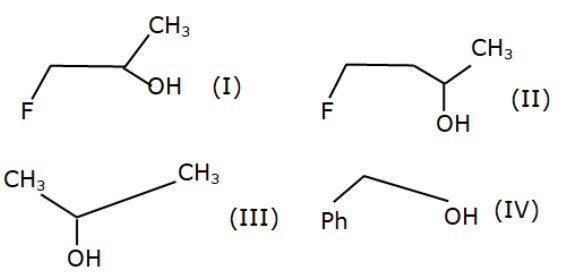
(A) 0.4 K

(B) 0.3 K

(C) 0.5 K

(D) 0.2 K

157. निम्न ऐल्कोहॉल का सान्द्र HCl के प्रति क्रियाशीलता का क्रम होता है-

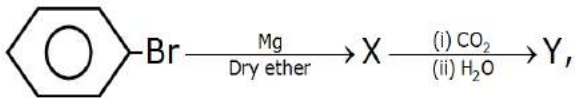


(A) I > II > III > IV

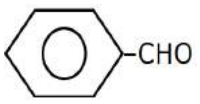
(B) I > III > II > IV

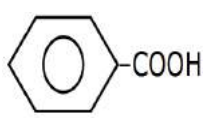
(C) IV > III > II > I

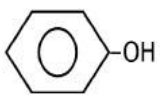
(D) IV > III > I > II

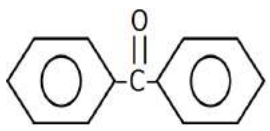
158. 

Y है-

(A) 

(B) 

(C) 

(D) 

159. पोटाश एलम के विलयन की प्रकृति है -

(A) क्षारीय

(B) अम्लीय

(C) उदासीन

(D) उभयधर्मी

160. एक पदार्थ का विलयन जो प्रति 100 ml में 1.05 g युक्त होता हैं, 3% ग्लूकोस विलयन के साथ सम-परासरी पाया जाता हैं। पदार्थ का आण्विक द्रव्यमान निम्न है-

(A) 31.5

(B) 6.3

(C) 630

(D) 63

161. 1.00 g एक अवाष्पशील विलेय (मोलर द्रव्यमान 250 g mol^{-1}) बेंजीन के 51.2 g में घुलनशील है। यदि बेंजीन का हिमांक अवनमन स्थिरांक K_f = 5.12 K kg mol^{-1} है, तो बेंजीन के हिमांक बिंदु में कमी होगी-

(A) 0.4 K

(B) 0.3 K

(C) 0.5 K

(D) 0.2 K

162. What is the molarity of H_2SO_4 solution which is 98% by weight and the density of solution at 35°C is 1.84 gm/cm^3?

(A) 4.18 M

(B) 8.14 M

(C) 18.4 M

(D) 20 M

162. भारानुसार 98% H_2SO_4 वाले विलयन की मोलरता क्या है, यदि 35°C पर विलयन का घनत्व 1.84 gm/cm^3 है ?

(A) 4.18 M

(B) 8.14 M

(C) 18.4 M

(D) 20 M

163. A 500 g tooth paste sample has 0.02 gm fluoride concentration. What is the concentration of fluorine in terms of ppm level ?

(A) 250

(B) 40

(C) 400

(D) 1000

163. एक 500 g टूथपेस्ट के नमूने में फ्लोराइड सान्द्रता 0.02 gm है। ppm स्तर के पदों में फ्लोरीन की सान्द्रता क्या है?

(A) 250

(B) 40

(C) 400

(D) 1000

164. The vapour pressure of benzene at a certain temperature is 640 mm Hg. A non-volatile-non-electrolyte and weighing 2.175 g is added to 39.0 g of benzene. The vapour pressure of the solution is 600 mm Hg. What is the molecular weight of the solid substance ?

(A) 6.96

(B) 65.3

(C) 63.8

(D) none of these

164. एक निश्चित ताप पर बेंजीन का वाष्पदाब 640 mm Hg है। एक 2.175 g भार का अवाष्पशील-वैद्युतअनअपघट्य ठोस बेंजीन के 39.0 g में मिलाया गया। विलयन का वाष्पदाब 600 mm Hg है, तो ठोस पदार्थ का अणुभार क्या है?

(A) 6.96

(B) 65.3

(C) 63.8

(D) इनमें से कोई नहीं

165. When mercuric iodide is added to the aqueous solution of potassium iodide, the -

(A) freezing point is raised

(B) freezing point is lowered

(C) freezing point does not change

(D) boiling point does not change

165. जब मर्क्युरिक आयोडाइड को पोटेशियम आयोडाइड के जलीय विलयन में मिलाया जाता है, तो-

(A) हिमांक बढ़ता है

(B) हिमांक कम होता है

(C) हिमांक परिवर्तित नहीं होता है

(D) क्थांक परिवर्तित नहीं होता है

166. 0.1 mole of which of the following when added to 1 L water, the aqueous solution obtained will have the lowest freezing point?

(A) $C_6H_5NH_2Cl$

(B) $K_3[Fe(CN)_6]$

(C) $K_4[Fe(CN)_6]$

(D) $Al(NO_2)_3$

166. निम्न में से किसके 0.1 मोल 1L जल में मिलाने पर प्राप्त होने वाले जलीय विलयन का हिमांक न्यूनतम होगा?

(A) $C_6H_5NH_2Cl$

(B) $K_3[Fe(CN)_6]$

(C) $K_4[Fe(CN)_6]$

(D) $Al(NO_2)_3$

167. An element, density 6.8 g cm^{-3} occurs in bcc structure with cell edge 290 pm. Calculate the number of atoms present in 200 g of the element?

(A) 2.4×10^{42}

(B) 1.2×10^{42}

(C) 1.2×10^{24}

(D) 2.4×10^{24}

167. एक तत्व, जिसका घनत्व 6.8 g cm^{-3} है bcc संरचना रखता है जिसकी कोष्ठिका कोर की लम्बाई 290 pm है। तत्व के 200 g में उपस्थित परमाणुओं की संख्या ज्ञात कीजिए ?

(A) 2.4×10^{42}

(B) 1.2×10^{42}

(C) 1.2×10^{24}

(D) 2.4×10^{24}

168. Xenon crystallizes in face centered cubic unit cell with edge length of 620 pm then radius of xenon atom is -

(A) 268 pm

(B) 219.20 pm

(C) 436.6 pm

(D) 526.8 pm

169. The edge length of face centred unit cubic cell is 508 pm. If the radius of the cation is 110 pm the radius of the anion is -

(A) 285 pm

(B) 398 pm

(C) 144 pm

(D) 618 pm

170. In CsCl structure, each Cs^+ ion is surrounded by ?

(A) 4 Cl^- ions

(B) 6 Cl^- ions

(C) 8 Cl^- ions

(D) 12 Cl^- ions

171. Which of the following will show Schottky defect?

(A) CaF_2

(B) ZnS

(C) AgCl

(D) CsCl

172. NaCl is doped with 10^{-4} mol% $SrCl_2$, the concentration of cation vacancies is-

(A) 6.02×10^{15} mol^{-1}

(B) 6.02×10^{16} mol^{-1}

(C) 6.02×10^{17} mol^{-1}

(D) 6.02×10^{14} mol^{-1}

173. Strongly heated ZnO crystal can conduct electricity. This is due to-

(A) Movement of extra Zn^{2+} ions present in the interstitial sites

(B) Movement of electrons in the anion vacancies

(C) Movement of both Zn^{2+} ions and electrons

(D) None of these

174. The number of atoms present in a unit cell of a monatomic substance (element) of simple cubic lattice, body-centred cubic and face centred cubic respectively are -

(A) 8, 9 and 14

(B) 1, 2 and 4

(C) 4, 5 and 6

(D) 2, 3 and 5

168. जीनॉन 620 pm की कोर लम्बाई के साथ फलक केन्द्रित घनीय इकाई कोष्ठिका में क्रिस्टलीकत होता है, तो जीनॉन परमाणु की त्रिज्या है-

(A) 268 pm

(B) 219.20 pm

(C) 436.6 pm

(D) 526.8 pm

169. फलक केन्द्रित इकाई घनीय कोष्ठिका की कोर लम्बाई 508 pm है| यदि धनायन की त्रिज्या 110 pm हो, तो ऋणायन की त्रिज्या होगी–

(A) 285 pm

(B) 398 pm

(C) 144 pm

(D) 618 pm

170. CsCl संरचना में, प्रत्येक Cs^+आयन घिरा रहता है ?

(A) 4 Cl^- आयनों से

(B) 6 Cl^- आयनों से

(C) 8 Cl^- आयनों से

(D) 12 Cl^- आयनों से

171. निम्न में से कौनसा शॉट्की दोष दर्शाएगा?

(A) CaF_2

(B) ZnS

(C) AgCl

(D) CsCl

172. NaCl में 10^{-4} mol% $SrCl_2$ अशुद्धि मिलाई जाती है, तो धनायन रिक्तियों की सान्द्रता है-

(A) 6.02×10^{15} mol^{-1}

(B) 6.02×10^{16} mol^{-1}

(C) 6.02×10^{17} mol^{-1}

(D) 6.02×10^{14} mol^{-1}

173. ZnO क्रिस्टल को प्रबल गर्म करने पर विद्युतीय चालकता दर्शा सकता है। इसका कारण है-

(A) अन्तराकाशी स्थानों में उपस्थित अतिरिक्त Zn^{2+} आयनों की गति के कारण

(B) ऋणावेशित रिक्तियों में उपस्थित इलेक्ट्रॉनों की गति के कारण

(C) Zn^{2+} आयनों व इलेक्ट्रॉन दोनों की गति के कारण

(D) इनमें से कोई नहीं

174. एकल परमाण्विक पदार्थ (तत्व) की क्रमशः सरल घनीय फलक, काय-केंद्रीत घनीय तथा फलक-केंद्रित घनीय एकक कोष्ठिका में उपस्थित परमाणुओं की संख्या है-

(A) 8, 9 तथा 14

(B) 1, 2 तथा 4

(C) 4, 5 तथा 6

(D) 2, 3 तथा 5

175. Which one of the following group has maximum leaving ability for S_N reaction?

(A) OH^-

(B) F_3CCOO^-

(C) Cl^-

(D) $F_3SCO_3^-$

176. An alkyl halide reacted with a metal cyanide to give an alkanenitrile. The metal cyanide is -

(A) AgCN

(B) KCN

(C) $Cu_2(CN)_2$

(D) $Ba(CN)_2$

177. The reaction of C_6H_5OH with $CHCl_3$ in presence of NaOH at 340 K, followed by acidification to form salicyladehyde is called-

(A) Kolbe-Schmit reaction

(B) Sandmeyer's reaction

(C) Reimer-Tiemann reaction

(D) Kolbe's electrolytic method

178. Which of the following pairs form the same osazone?

(A) Glucose and fructose

(B) Glucose and galactose

(C) Galactose and mannose

(D) Galactose and Fructose

179. Reactivity order of halides for dehydrohalogenation is -

(A) $R-F > R-Cl > R-Br > R-I$

(B) $R-I > R-Br > R-Cl > R-F$

(C) $R-I > R-Cl > R-Br > R-F$

(D) $R-F > R-I > R-Br > R-Cl$

180. The organic compound that will response Fehling's solution test is-

(A) Ethanol

(B) Acetone

(C) Maltose

(D) Benzaldehyde

181. Glucose on reaction with Br_2 water gives-

(A) Glucaric acid

(B) Gluconic acid

(C) Saccharic acid

(D) Citric acid

175. निम्न में कौनसा समूह S_N अभिक्रिया के लिये सर्वाधिक निष्कासन योग्यता रखता है ?

(A) OH^-

(B) F_3CCOO^-

(C) Cl^-

(D) $F_3SCO_3^-$

176. एक एल्किल हैलाइड एक धातु सायनाइड के साथ क्रिया कर एक एल्केन नाइट्राइल देता है | धातु सायनाइड है -

(A) AgCN

(B) KCN

(C) $Cu_2(CN)_2$

(D) $Ba(CN)_2$

177. 340 K पर NaOH की उपस्थिति में C_6H_5OH तथा $CHCl_3$ की अभिक्रिया, तदोपरान्त सेलिसिलेल्डीहाइड के निर्माण के लिए अम्लीकरण कहलाता है-

(A) कोल्बे-स्मिट अभिक्रिया

(B) सेण्डमेयर अभिक्रिया

(C) राइमन-टीमान अभिक्रिया

(D) कोल्बे विद्युत अपघटनीय अभिक्रिया

178. कौनसा युग्म समान ओसाजोन का निर्माण करता हैं?

(A) ग्लूकोज तथा फ्रक्टोज

(B) ग्लूकोज तथा ग्लैक्टोज

(C) ग्लैक्टोज तथा मैनोज

(D) ग्लैक्टोज तथा फ्रक्टोज

179. विहाइड्रोहैलोजनीकरण के लिए हैलाइडों का क्रियाशीलता क्रम है -

(A) $R-F > R-Cl > R-Br > R-I$

(B) $R-I > R-Br > R-Cl > R-F$

(C) $R-I > R-Cl > R-Br > R-F$

(D) $R-F > R-I > R-Br > R-Cl$

180. वह कार्बनिक यौगिक जो फेहलिंग विलयन के साथ परीक्षण देता है-

(A) एथेनॉल

(B) एसीटोन

(C) माल्टोज

(D) बेन्जेल्डिहाइड

181. ग्लूकोज, Br_2 जल के साथ अभिक्रिया पर देता है-

(A) ग्लूकेरिक अम्ल

(B) ग्लूकोनिक अम्ल

(C) सेकेरिक अम्ल

(D) सिट्रिक अम्ल

182. Boron forms BX_3 type of halides. The correct increasing order of Lewis-acid strength of these halides is-

(A) $BF_3 > BCl_3 > BBr_3 > BI_3$

(B) $BI_3 > BBr_3 > BCl_3 > BF_3$

(C) $BF_3 > BI_3 > BCl_3 > BBr_3$

(D) $BF_3 > BCl_3 > BI_3 > BBr_3$

183. C_{60}, an allotrope of carbon contains:

(A) 12 hexagons and 20 pentagons

(B) 20 hexagons and 12 pentagons

(C) 16 hexagons and 16 pentagons

(D) 18 hexagons and 14 pentagons

184. The number of types of bonds between two carbon atoms in calcium carbide is -

(A) One sigma, one pi

(B) Two sigma, one pi

(C) Two sigma, two pi

(D) One sigma, two pi

185. Plumbosolvency is represented by the reaction-

(A) $2\ Pb + O_2 \rightarrow 2\ PbO$

(B) $Pb + 2HCl \rightarrow PbCl_2 + H_2$

(C) $2Pb + O_2 + 2H_2O \rightarrow 2Pb(OH)_2$

(D) $2PbS + 3O_2 \rightarrow 2\ PbO + 2SO_2$

182. बोरोन BX_3 प्रकार के हैलाइड बनाता है। इन हैलाइडो का लुईस अम्लीय सामर्थ्य का सही बढ़ता क्रम है-

(A) $BF_3 > BCl_3 > BBr_3 > BI_3$

(B) $BI_3 > BBr_3 > BCl_3 > BF_3$

(C) $BF_3 > BI_3 > BCl_3 > BBr_3$

(D) $BF_3 > BCl_3 > BI_3 > BBr_3$

183. कार्बन के एक अपररूप C_{60} में होते हैं:

(A) 12 षट्भुज तथा 20 पंचभुज

(B) 20 षट्भुज तथा 12 पंचभुज

(C) 16 षट्भुज तथा 16 पंचभुज

(D) 18 षट्भुज तथा 14 पंचभुज

184. कैल्शियम कार्बाइड में दो कार्बन परमाणुओं के बीच आबन्ध के प्रकारों की संख्या होती है-

(A) एक सिग्मा, एक पाई

(B) दो सिग्मा, एक पाई

(C) दो सिग्मा, दो पाई

(D) एक सिग्मा, दो पाई

185. प्लम्बोसोल्वेन्सी अभिक्रिया द्वारा प्रदर्षित की जाती है-

(A) $2\ Pb + O_2 \rightarrow 2\ PbO$

(B) $Pb + 2HCl \rightarrow PbCl_2 + H_2$

(C) $2Pb + O_2 + 2H_2O \rightarrow 2Pb(OH)_2$

(D) $2PbS + 3O_2 \rightarrow 2\ PbO + 2SO_2$

PART - IV _ SECTION – B _ [CHEMISTRY]

186. $C_2H_5C \equiv CH \xrightarrow{CH_3MgBr} CH_4 + \left(A\right)$

$CH_4 + \left(A\right) \xrightarrow[(2)\ H_3O^{\oplus}]{(1)\ HCHO} \left(B\right)$

The end product (B) is -

(A) CH_3CH_2OH

(B) $C_2H_5 - \underset{\underset{CH_3}{|}}{C} = CH - CH_2OH$

(C) $C_2H_3 - \underset{\underset{CH_3}{|}}{C} \equiv C - CH - CH_3$

(D) $C_2H_5 - C \equiv C - CH_2\ OH$

186. $C_2H_5C \equiv CH \xrightarrow{CH_3MgBr} CH_4 + \left(A\right)$

$CH_4 + \left(A\right) \xrightarrow[(2)\ H_3O^{\oplus}]{(1)\ HCHO} \left(B\right)$

अन्तिम उत्पाद (B) है-

(A) CH_3CH_2OH

(B) $C_2H_5 - \underset{\underset{CH_3}{|}}{C} = CH - CH_2OH$

(C) $C_2H_3 - \underset{\underset{CH_3}{|}}{C} \equiv C - CH - CH_3$

(D) $C_2H_5 - C \equiv C - CH_2\ OH$

187. In which reaction benzyl chloride is obtained?

(A) $C_6H_6 + Cl_2 \xrightarrow{hv}$

(B) $C_6H_5\text{-}CH_3 + Cl_2 \xrightarrow{AlCl_3}$

(C) $C_6H_5\text{-}CH_3 + Cl_2 \xrightarrow{hv}$

(D) $C_6H_6 + CH_3\text{-}Cl \xrightarrow{AlCl_3}$

187. कौनसी अभिक्रिया में बेंजिल क्लोराइड प्राप्त होता है?

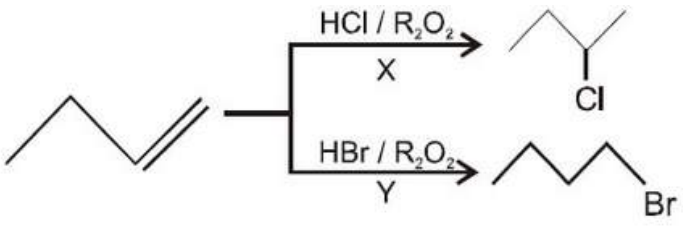
(A) $C_6H_6 + Cl_2 \xrightarrow{hv}$

(B) $C_6H_5\text{-}CH_3 + Cl_2 \xrightarrow{AlCl_3}$

(C) $C_6H_5\text{-}CH_3 + Cl_2 \xrightarrow{hv}$

(D) $C_6H_6 + CH_3\text{-}Cl \xrightarrow{AlCl_3}$

188.



Which is correct statement about X and Y?

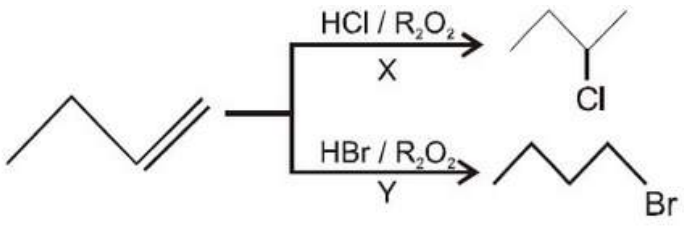
(A) X is product of ionic reaction and Y is product of radical reaction

(B) X and Y both are product of ionic reaction

(C) X and Y both are product of radical reaction

(D) X is radical reaction and Y is ionic reaction

188.



X तथा Y के लिए सही कथन चुनिये?

(A) उत्पाद X आयनिक अभिक्रिया का तथा उत्पाद Y मुक्त मूलक अभिक्रिया का है

(B) X तथा Y दोनों आयनिक अभिक्रिया के उत्पाद है

(C) X तथा Y दोनों मुक्त मूलक अभिक्रिया के उत्पाद है

(D) X मुक्त मूलक अभिक्रिया का तथा Y आयनिक अभिक्रिया का उत्पाद है

189. Which of the following alcohol will show positive iodoform test?

(A) $CH_3\text{–}\underset{\underset{OH}{|}}{CH}\text{–}CH_2\text{–}CH_3$

(B) $CH_3\text{–}\underset{\underset{OH}{|}}{\overset{\overset{CH_3}{|}}{C}}\text{–}CH_2\text{–}CH_3$

(C) $CH_3\text{–}\underset{\underset{OH}{|}}{CH}\text{–}CH_2\text{–}CH_3$

(D) None of these

189. निम्न में से कौनसा ऐल्कोहॉल धनात्मक आयोडोफार्म परीक्षण दर्शाएगा?

(A) $CH_3\text{–}\underset{\underset{OH}{|}}{CH}\text{–}CH_2\text{–}CH_3$

(B) $CH_3\text{–}\underset{\underset{OH}{|}}{\overset{\overset{CH_3}{|}}{C}}\text{–}CH_2\text{–}CH_3$

(C) $CH_3\text{–}\underset{\underset{OH}{|}}{CH}\text{–}CH_2\text{–}CH_3$

(D) इनमें से कोई नहीं

190. Which noble gas most abundant in atmosphere?

(A) He

(B) Ne

(C) Ar

(D) Kr

191. In a body centered cubic cell (BCC), what is the value of lattice parameter, if the atomic radius is r-

(A) $\frac{\sqrt{3}\,r}{4}$

(B) $\frac{r}{\sqrt{3}}$

(C) $\frac{4\,r}{\sqrt{3}}$

(D) 2 r

192. In a face centred lattice of X and Y, X atoms are present at the corners while Y atoms are at face centers. Then the formula of the compound would be if two atoms of X are missing from the corners ?

(A) X_4Y

(B) X_3Y_4

(C) XY_4

(D) X_2Y_4

193. 200 mL of an aqueous solution of a protein contain its 1.26 g. The osmotic pressure of this solution at 300 K is found to be 2.57×10^{-3} bar. the molar mass of protein will be -
(R = 0.083 L bar mol^{-1} K^{-1})

(A) 60377 g mol^{-1}

(B) 51022 g mol^{-1}

(C) 122044 g mol^{-1}

(D) 31011 g mol^{-1}

194. pH of 1M HA (weak acid) is 2. Hence van't Hoff factor is-

(A) 1.2

(B) 1.02

(C) 1.1

(D) 1.01

195. In a 0.2 molal aqueous solution of a weak acid HX the degree of ionization is 0.3. Taking k_f for water as 1.85, the freezing point of the solution will be nearest to -

(A) − 0.260°C

(B) + 0.480°C

(C) –0.480°C

(D) –0.240°C

190. वायुमण्डल में सर्वाधिक प्रचुर मात्रा में पायी जाने वाली गैस है ?

(A) He

(B) Ne

(C) Ar

(D) Kr

191. काय केंद्रित घनीय कोष्ठिका (BCC) में, जालक की लम्बाई क्या होगी, यदि परमाणु की त्रिज्या r हैं-

(A) $\frac{\sqrt{3}\,r}{4}$

(B) $\frac{r}{\sqrt{3}}$

(C) $\frac{4\,r}{\sqrt{3}}$

(D) 2 r

192. X तथा Y के फलक केंद्रित जालक में, X परमाणु कोनों पर तथा Y परमाणु फलक केंद्रों पर उपस्थित है। यौगिक का सूत्र क्या होगा, यदि X के दो परमाणु को कोनों से विलुप्त कर दिया जाए?

(A) X_4Y

(B) X_3Y_4

(C) XY_4

(D) X_2Y_4

193. एक प्रोटीन के 200 mL जलीय विलयन में इसका 1.26 g है। 300 K पर इस विलयन का परासरण दाब 2.57×10^{-3} bar पाया गया, तो प्रोटीन का मोलर द्रव्यमान होगा-

(R = 0.083 L bar mol^{-1} K^{-1})

(A) 60377 g mol^{-1}

(B) 51022 g mol^{-1}

(C) 122044 g mol^{-1}

(D) 31011 g mol^{-1}

194. 1M HA (दुर्बल अम्ल) का pH = 2 है। वॉन्ट हॉफ कारक है-

(A) 1.2

(B) 1.02

(C) 1.1

(D) 1.01

195. एक दुर्बल अम्ल HX के 0.2 मोलल जलीय विलयन के आयनन की मात्रा 0.3 है | जल के लिए k_f = 1.85 लिजिए, विलयन के हिमांक का निकटतम मान होगा-

(A) − 0.260°C

(B) + 0.480°C

(C) –0.480°C

(D) –0.240°C

196. The major product obtained on acid–catalysed hydration of 2–phenylpropene is-

(A) 2-Phenylpropan-2-ol

(B) 2-Phenylpropan-1-ol

(C) 3-Phenylpropan-2-ol

(D) 1-Phenylpropan-1-ol

197. Product in following reaction is-

$CH_3\,MgI + HCHO \rightarrow$ Product

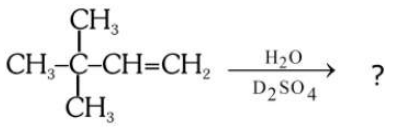
(A) CH_3CHO

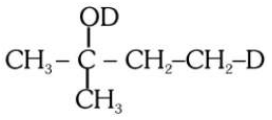
(B) CH_3OH

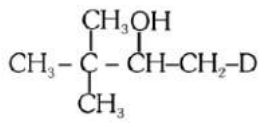
(C) C_2H_5OH

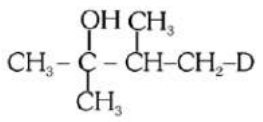
(D) CH_3 -O- CH_3

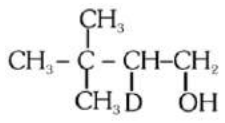
198. Major product in the given reaction is: -



(A) 

(B) 

(C) 

(D) 

199. Select the incorrect statement about the following-

(A) O_3 is used as germicide for purification of air

(B) In O_3, O – O bond length is identical with that of molecular oxygen

(C) O_3 molecule is angular in shape

(D) O_3 is an oxidising agent

200. The Beilstein test is used to detect -

(A) Nitrogen

(B) Sulphur

(C) Carbon

(D) Halogen

196. 2- फेनिल प्रोपीन के अम्ल उत्प्रेरित जलयोजन से प्राप्त मुख्य उत्पाद है -

(A) 2- फेनिल प्रोपेन -2-ऑल

(B) 2-फेनिल प्रोपेन -1-ऑल

(C) 3- फेनिल प्रोपेन -2-ऑल

(D) 1- फेनिल प्रोपेन -1-ऑल

197. निम्न अभिक्रिया में उत्पाद है-

$CH_3\,MgI + HCHO \rightarrow$ उत्पाद

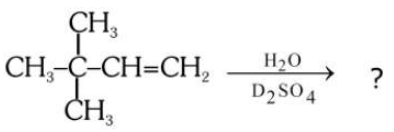
(A) CH_3CHO

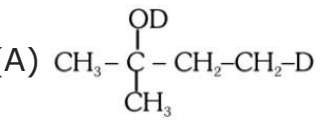
(B) CH_3OH

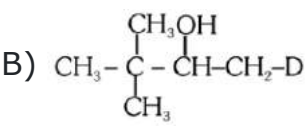
(C) C_2H_5OH

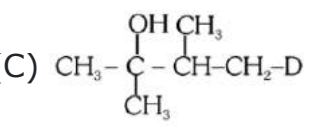
(D) CH_3 -O- CH_3

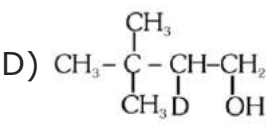
198. दी गई अभिक्रिया में मुख्य उत्पाद है-



(A) 

(B) 

(C) 

(D) 

199. निम्न के विषय में गलत कथन चुनिए-

(A) O_3 वायु के शुद्धिकरण में कीटाणुनाशक के रूप में प्रयुक्त होता है।

(B) O_3 में, O – O बंध लम्बाई आण्विक ऑक्सीजन के साथ समरूप होती है।

(C) O_3 कोणीय आकृति रखता है।

(D) O_3 एक ऑक्सीकारक है।

200. किसकी पहचान के लिए बेलस्टीन परीक्षण काम में लेते हैं-

(A) नाइट्रोजन

(B) सल्फर

(C) कार्बन

(D) हैलोजन

MOTION
Nurturing potential through education

Answer Key
ENTHUSE_SEMI MAJOR TEST-1
13th NEET - Phase 1 : KOTA

Date:10-Feb-2022 **Duration: 3 Hours** **Max Marks:720**

Biology - Section A

1.D	2.D	3.D	4.C	5.B	6.D	7.B	8.B
9.C	10.B	11.D	12.B	13.C	14.C	15.B	16.C
17.B	18.D	19.A	20.C	21.B	22.D	23.D	24.B
25.D	26.B	27.C	28.B	29.D	30.C	31.C	32.A
33.C	34.A	35.D					

Biology - Section B

36.A	37.D	38.B	39.B	40.C	41.D	42.D	43.D
44.B	45.A	46.B	47.D	48.C	49.B	50.C	

Biology - Section C

51.C	52.D	53.B	54.C	55.B	56.D	57.A	58.C
59.D	60.A	61.C	62.C	63.C	64.A	65.B	66.A
67.D	68.B	69.B	70.C	71.C	72.C	73.B	74.D
75.B	76.B	77.A	78.C	79.A	80.C	81.B	82.C
83.C	84.C	85.D					

Biology - Section D

86.B	87.C	88.A	89.A	90.B	91.C	92.C	93.D
94.C	95.C	96.A	97.C	98.B	99.D	100.C	

Physics - Section A

101.C	102.B	103.C	104.A	105.C	106.C	107.A	108.D
109.A	110.C	111.A	112.B	113.C	114.D	115.D	116.C
117.D	118.C	119.D	120.A	121.A	122.A	123.A	124.D
125.A	126.C	127.A	128.C	129.C	130.B	131.A	132.D
133.C	134.C	135.C					

Physics - Section B

136.B	137.D	138.C	139.A	140.C	141.B	142.D	143.B
144.C	145.B	146.B	147.A	148.D	149.A	150.B	

Chemistry - Section A

151.A	152.A	153.C	154.A	155.C	156.C	157.C	158.B
159.B	160.D	161.A	162.C	163.B	164.B	165.A	166.C
167.D	168.B	169.C	170.C	171.D	172.C	173.B	174.B
175.D	176.B	177.C	178.A	179.B	180.C	181.B	182.B
183.B	184.D	185.C					

Chemistry - Section B

186.D	187.C	188.A	189.C	190.C	191.C	192.C	193.A
194.D	195.C	196.A	197.C	198.C	199.B	200.D	

Student's Solution Copy

ENTHUSE_SEMI MAJOR TEST-1

13th NEET - Phase 1

KOTA

Duration: 3 Hours **Max Marks: 720**

Biology - Section A

1. **Answer:** D

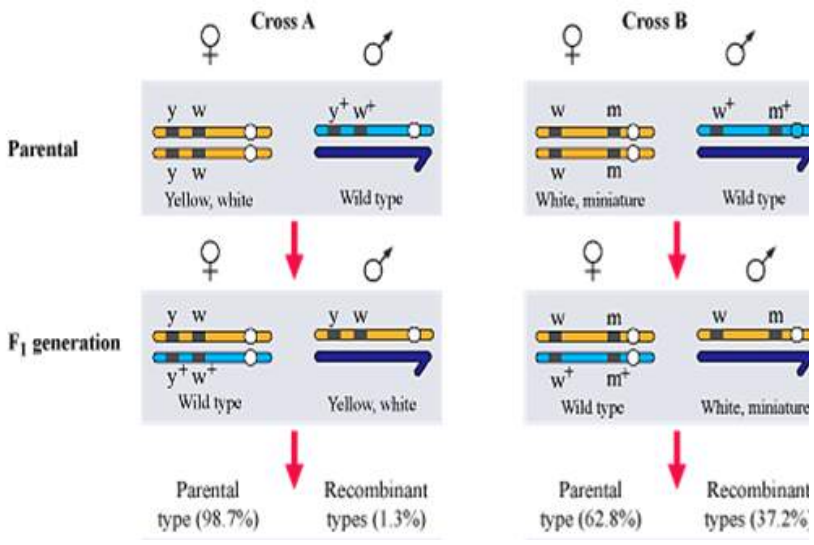
Sol:

the genotypic ratios can be calculated using mathematical probability, by simply looking at the phenotype of a dominant trait, it is not possible to know the genotypic composition. That is, for example, whether a tall plant from F1 or F2 has TT or Tt composition, cannot be predicted. Therefore, to determine the genotype of a tall plant at F2, Mendel crossed the tall plant from F2 with a dwarf plant. This he called a test cross. In a typical test cross an organism (pea plants here) showing a dominant phenotype (and whose genotype is to be determined) is crossed with the recessive parent instead of self-crossing. The progenies of such a cross can easily be analyzed to predict the genotype of the test organism.

2. **Answer:** D

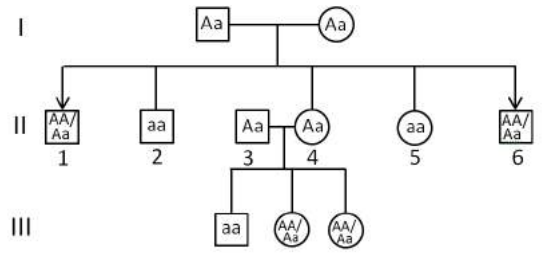
Sol:

Linkage is the close association of genes or other DNA sequences on the same chromosome. Morgan and his group found that even when genes were grouped on the same chromosome, some genes were very tightly linked (showed very low recombination) while others were loosely linked (showed higher recombination). For example he found that the genes white and yellow were very tightly linked and showed only 1.3 per cent recombination while white and miniature wing showed 37.2 per cent recombination. His student Alfred Sturtevant used the frequency of recombination between gene pairs on the same chromosome as a measure of the distance between genes and 'mapped' their position on the chromosome.



3. **Answer:** D

Sol:



Since 3 one is carrier so its genotype will be Aa.

4. **Answer:** C

5. **Answer:** B

Sol:

The diagram represents post-transcriptional processing resulting in the formation of mRNA. Since, introns and exons are present, it is transcription in eukaryotes.The second complexity is that the primary transcripts contain both the exons and the introns and are non-functional. Hence, it is subjected to a process called splicing where the introns are removed and exons are joined in a defined order. hnRNA undergoes additional processing called as capping and tailing. In capping an unusual nucleotide (methyl guanosine triphosphate) is added to the 5′-end of hnRNA. In tailing, adenylate residues (200-300) are added at 3′-end in a template independent manner. It is the fully processed hnRNA, now called mRNA, that is transported out of the nucleus for translation.

During transcription in prokaryotes, the splicing does not occur as there are no introns.

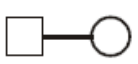
During translation, there are no capping tailing or splicing.

6. **Answer:** D

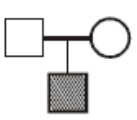
Sol:

Consanguineous marriage is a matrimony between individuals who are closely related. In a clinical sense, marriages between two family members such as second cousins or closer qualify as having a consanguineous marriage.

five unaffected offspring



mating



parents with male child affected with disease

So, the correct option is C.

7. **Answer:** B

Sol:

The cytoplasm of pollen grain is surrounded by a plasma membrane. When the pollen grain is mature it contains two cells, the vegetative cell and generative cell. The vegetative cell is bigger, has abundant food reserve and a large irregularly shaped nucleus. The generative cell is small and floats in the cytoplasm of the vegetative cell. It is spindle shaped with dense cytoplasm and a nucleus. In over 60 per cent of angiosperms, pollen grains are shed at this 2-celled stage. In the remaining species, the generative cell divides mitotically to give rise to the two male gametes before pollen grains are shed (3-celled stage).

8. **Answer:** B

Sol:

Sponges belongs to phylum Porifera. It reproduces by asexual mode of reproduction. Gemmules are bud like structure which mainly forms a new sponge. It is similar to the resistant spores of the bacteria. They are made up of amoebocytes surrounded by a layer of spicules
So, the correct answer is 'Asexual reproduction'

9. **Answer:** C

10. **Answer:** B

Sol:

Double fertilization is a complex fertilization mechanism of flowering plants (angiosperms). This process involves the joining of a female gametophyte (megagametophyte, also called the embryo sac) with two male gametes (sperm).

This is called double fertilization because the true fertilization (fusion of a sperm with an egg) is accompanied by another fusion process (that of a sperm with the polar nuclei) that resembles fertilization.

Out of the two male gametes, one fuses with the egg to carry out generative fertilisation or syngamy. After fertilization, the fertilized ovule forms the seed while the tissues of the ovary become the fruit.

11. **Answer:** D

Sol:

Apomixis -

A special mechanism in certain plants to produce seeds without fertilisation is called apomixis. Apomixis is a form of asexual reproduction that mimics sexual reproduction.e.g., Asteraceae and grasses.

12. **Answer:** B

Sol:

During microsporogenesis, the archesporium cell divides periclinally into primary parietal cell towards the epidermis and primary sporogenous cells towards the inner side which forms microspore mother cells. Primary parietal cell undergoes the anticlinal and periclinal division to form anther wall while sporogenous cell divides to give rise to a number of microspore or pollen mother cells which divided meiotically to form four pollen grains.

13. **Answer:** C

Sol:

Pea plant seed is controlled by two alleles B & b, where BB & bb are responsible for round and wrinkled seeds respectively.

So, when the Bb is crossed with bb, we get,

	B	**b**
b	**Bb**	**bb**
b	**Bb**	**bb**

So, the ratio will be 2:2

= 1:1

Hence, among 630, 315 will be the same and the other 315 will be the same.

So, **the correct option is "c"- 315- Intermediate & 315- small size**.

14. **Answer:** C

Sol:

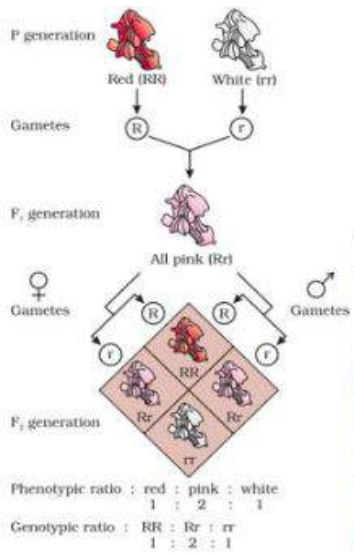
Gene which causes death of individual in early stage when it comes in homozygous condition called lethal gene. Lethal gene may be dominant or recessive both, but mostly recessive for lethality. Many of these genes which do not cause definite lethality are called semilethals. In semilethal gene death occurs in late stage.

15. **Answer:** B

16. **Answer:** C

Sol:

In the dog flower Antirrhinum there are two types of flower color in pure state: red and white. When the two types of plants are crossed, the hybrid or plants of generation have pink flowers. This is due to a phenomenon called the incomplete dominance in which one allele for a specific trait is not completely expressed over its paired allele. This results in a third phenotype in which the expressed physical trait is a combination of the phenotypes of both alleles (in this case the red and white color and incompletely dominant and hence the third color pink is observed when they mix).



17. **Answer:** B

Sol:

A pair of gene change the effect of another non allelic gene is called supplementary gene. Example:- Coat colour in Mice.

If alleles:

C = Black coat colour

c = Albino (Colourless coat) or (It has no effect)

A = Supplementary gene

When black coat mice crossed with albino mice, the F_1 generation is Agouti.

Epistasis is the condition in which two or more gene loci are present over a site. This means that two or more genes control a single phenotype. In Cucurbita, there are 2 genes for flower color. One is the dominant yellow gene and the other is the recessive green gene. Dominant epistasis means only one allele of the gene showing epistasis can ask the effects of other genes. Recessive epistasis is where 2 alleles should be inherited for the phenotype to be masked. So, this is a case of the dominant phenotype. Four comb phenotypes in chickens explained by segregation at the Rose-comb and Pea-comb loci and their interaction.

18. **Answer:** D

Sol:

A cross between 2 individual, which are heterozygous for three alleles will produce phenotypic ration of 1 (all dominant alleles): 6 (atleast one recessive allele) : 15 (at least two recessvie alleles) : 20 (three recessive alleles) : 15 (four revessive alleles) : 6 (give recessive alleles) : 1(all recessive alleles). Incomplete dominance is the condition when none of factors of a gene is dominant, the phenotype of heterozygous dominant individual is blend of dominant and recessive traits. Here, monohybrid cross between two pure varieties gives 1 : 2 : 1 phenotypic ratio in F_2 generation which is 3 : 1 in otherwise dominant traits. The phenotypic ratio of F_2 generation of a dihybrid cross is 9 : 3 : 3 : 1 provided that the alleles of both follow dominant-recessive relationship. A trait governed by more than one gene where dominant allele of each gene express only a part of trait and the full trait is expressed only in presence of dominant alleles of all multiple genes is called polygenic inheritance. The phenotype of the organism depends upon number of dominant alleles. A cross between two individuals which are heterozygous for two alleles produce phenotypic ratio of 1 : 4 : 6 : 4 : 1.

19. **Answer:** A

20. **Answer:** C

Sol:

Epistasis is the interaction between genes. Epistasis takes place when the action of one gene is modified by one or several other genes, which are sometimes called modifier genes. The gene whose phenotype is expressed is said to be epistatic, while the phenotype altered or suppressed is said to be hypostatic.

The normal F_2 dihybrid phenotypic ratio is 9:3:3:1 epistasis results in deviations from this ratio. For recessive epistasis, the phenotypic ratio is 9:3:4 here, the homozygous recessive allele for a gene (the epistatic gene) masks the expression of the dominant allele for another gene(hypostatic gene). Eg: Gene A makes one pigment, which is then converted to a final pigment by gene B. Thus, genotype aa (4/16) makes no pigment. A-bb makes pigment 1 (3/16) and A-B- (9/16) makes the final pigment. The 9:3:4 ratio appears for the mouse coat colors albino, black, and agouti in a dihybrid cross with the mouse genes C (color) and A (Agouti).So, the correct option is C.

Sol:

The genotype aabbcc is considered as a homozygous recessive genotype, the genotype AABBCC is considered as a homozygous dominant genotype.
The total number of alleles in each genotype = 6.
The contribution of each polygene = 160 kg;
The value of homozygous recessive = 100 kg.
The difference of these two values is divided by the total number of alleles in each genotype to find out the contribution of each polygene.
Contribution of each polygene = 160 - 100/6 = 10 kg.So, the correct option is A.

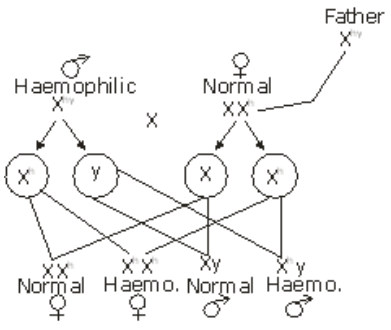
Sol:

Drosophila was found suitable as experimental material because of following reasons:

- It can be easily reared and bred under laboratory conditions.
- The fly has a short life span of about two weeks. The fruit fly can be bred throughout the year so that numerous generations can be obtained in a single year instead of one as in the case of Pea.
- A single mating produces hundreds of offsprings.
- Females are easily distinguishable from the males by the larger body size and presence of ovipositor (egg-laying structure).
- Polytene chromosomes occur in the salivary glands of the larva. Polytene chromosomes can be used to study different types of chromosome aberrations.
- It has heteromorphic (XY) sex chromosomes in the male. The transmission of heteromorphic chromosomes can be easily studied from one generation to another.
- The animal shows a number of externally visible and easily identifiable contrasting traits.
- It has a smaller number (4 pairs) of morphologically distinct chromosomes.

21. **Answer:** B

Sol:



NCERT Page No. 248,249

22. **Answer:** D

Sol:

Sex determination in birds and some reptiles is of ZW-ZZ types in which females are heteromorphic (ZW) and males have homomorphic sex chromosomes (ZZ) which. In roundworms, and few insects (grasshopper), XX-XO mechanism of sex determination is present where females are homogametic (XX) but the male carries only one sex chromosome (XO). Hence, the male grasshopper carries XO sex chromosomes. Some insects (butterflies and moths) show ZO-ZZ type of sex determination wherein males are homogametic (ZZ) but the female carries only one sex chromosome (ZO).

23. **Answer:** D

24. **Answer:** B

Sol:

Chargaff's equivalency rule - In a double stranded DNA amount of purine nucleotides is equals to amount of pyrimidine nucleotides.

Purine = Pyrimidine, [A] + [G] = [T] + [C]

Base ratio = A + T / C + G = constant for a given species.

Sol:

The Basic Requirements for Genetic Material (i.e., the material that determines the inherited characteristics of a functional organism):

- not to change with different stages of life cycle
- not to change with age
- not to change with physiology of the organism
- It must be stable
- It must be capable of being expressed when needed
- It must be capable of accurate replication
- It must be transmitted from parent to progeny without change

All these features are present in DNA, so the DNA is a better genetic material.

The correct answer is option (D)

25. **Answer:** D

Sol:

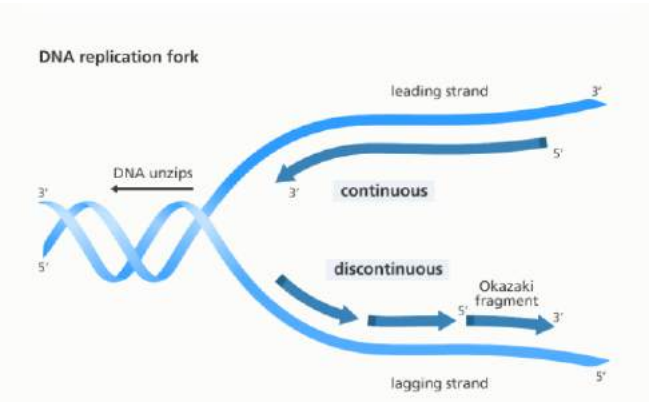
The nucleosome core particle consists of approximately 146 base pairs (bp) of DNA wrapped in 1.67 left-handed superhelical turns around a histone octamer, consisting of 2 copies each of the core histones H_2A, H_2B, H_3, and H_4. Core particles are connected by stretches of linker DNA, which can be up to about 80 bp long. Technically, a nucleosome is defined as the core particle plus one of these linker regions; however the word is often synonymous with the core particle.

Linker histones such as H_1 and its isoforms are involved in chromatin compaction and sit at the base of the nucleosome near the DNA entry and exit binding to the linker region of the DNA. Non-condensed nucleosomes without the linker histone resemble "beads on a string of DNA" under an electron microscope. Thus, h_1 – histone protein is called as 'sealing-protein.

26. **Answer:** B

Sol:

The two strands replication is catalyzed by 'DNA-dependent RNA polymerase' in only one direction i.e. 5' → 3'.



The template strand has a polarity of 3' →5'.

Hence, the correct option is "2" - 5' to 3'.

27. **Answer:** C

28. **Answer:** B

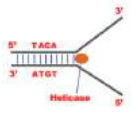
Sol:

RNA Polymerases travel along the template DNA strand in the 3′ to 5′ direction and catalyze the synthesis of new RNA strands in the 5′ to 3′ direction, adding new nucleotides to the 3′ end of the growing RNA strand.

During transcription, the RNA polymerase read the template DNA strand in the 3′→5′ direction, but the mRNA is formed in the 5′ to 3′ direction.

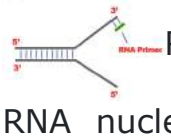
So, option 1 is the correct answer.

Sol:

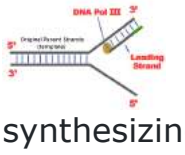


An enzyme called **helicase** breaks the hydrogen bonds between the base pairs of two antiparallel strands. These split apart forming a replication fork. Also, **gyrase(topoisomerase)** relieves the tension in the strand.

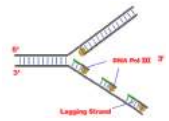
Also, single-strand binding proteins help stabilize DNA.



RNA polymerase synthesizes short RNA nucleotides that act as **primers** and provide the starting point for DNA replication.



DNA polymerase can now start synthesizing new DNA strands in a 3′ → 5′ direction (making DNA in 5’ → 3’).



As the strands continue to unzip more DNA is exposed and new primers are added. As a result **lagging strand is discontinuously formed**.

Hence teh **correct** option is **C**

29. **Answer:** D

30. **Answer:** C

Sol:

mRNAs have some additional sequences that are not translated and are referred as untranslated regions, (UTRs). The UTRs are present at both 5 end (before start codon) and at 3-end (after stop codon). They are required efficient translation process.

The 5' UTR is an important region as it contains a site at which the ribosome can assemble in order to initiate the scanning process for the AUG start codon in the coding region. Additionally, the 5'-most nucleotide is the 5' cap, which mediates mRNA stability as well as facilitates translation.

The 3' UTR contains the polyadenylation signal (AAUAAA), which allows for poly(A) polymerase to recognize the 3' end of the transcript and add non-templated adenines to the end of the mRNA.

hnRNA stands for heterogeneous nuclear RNA. It refers to the large pre-mRNAs of various nucleotide sequences that are made by RNA Polymerase II, and processed in the nucleus to become cytoplasmic mRNAs.

Sol:

A chemical compound (nucleotide) that is incorporated into the growing RNA chain during RNA synthesis and used as an energy source during protein synthesis is GTP (also known as guanylyl imidodiphosphate, guanosine- 5 '-triphosphate, or guanosine triphosphate).

- The energy-carrying molecule adenosine triphosphate (ATP) is present in the cells of all living organisms. ATP captures and releases chemical energy derived from the breakdown of food molecules to power other cellular processes. ATP then functions as a shuttle, transporting energy to areas where energy-consuming activities take place within the cell.

-An amino acid has to be added to the respective tRNA in order to be inserted into the peptide chain, so that it can be taken to the translational machinery as and when necessary by the mRNA codon. 1 ATP is used in this method of attachment to the tRNA, also called tRNA charging.

- 1 GTP is used to render the 305 complex of the ribosome in the initiation step of the translation process. 2 GTPS, 1 GTP for the positioning of the incoming tRNA and the other for the translocation of the ribosome for the continuation of the elongation process are used in the elongation stage of the translation.

-1 GTP is used to release the newly formed polypeptide chain in the termination step of translation. So, 1 ATP and 4 GTP molecules are used for each single amino acid incorporated into the peptide chain.

- One GTP is hydrolyzed to GDP as each successive complex of amino acid-tRNA binds to the ribosome's A site. As the ribosome travels to each fresh codon in the mRNA, a second GTP is broken down to GDP. During amino acid activation, one ATP is hydrolysed to AMP. Thus, 3 high-energy molecules, one ATP and two GTP, are used to form each peptide bond.

31. **Answer:** C

32. **Answer:** A

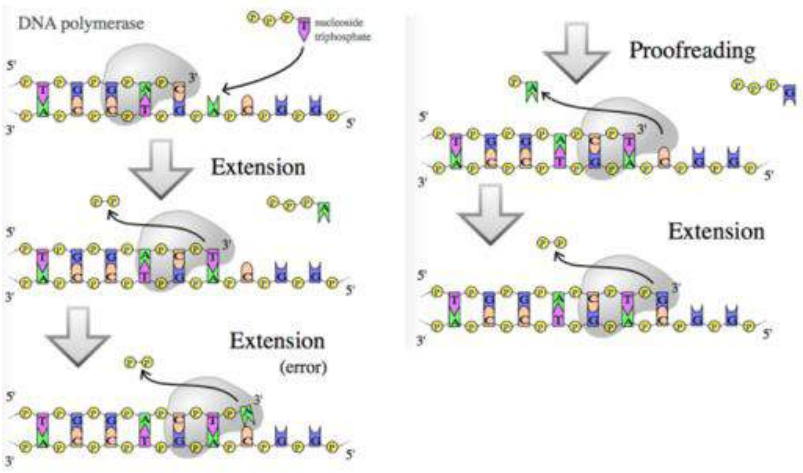
Sol:

Each codon is specific for only one amino acid (or one-stop signal), the genetic code is described as degenerate, or redundant, because a single amino acid may be coded for by more than one codon. Out of 64 codons, 61 codons code for 20 types of amino acids. It is called the Degeneracy of genetic code.

The correct answer is option A

Sol:

The DNA replication enzymes DNA polymerase has a special quality i.e. proof-reading which prevents the mutations as it eliminates them. While in RNA viruses they don't have this property as they have RNA polymerase and they do not have his tendency & thus mutation is faster.



DNA uses thymine instead of uracil because thymine has greater resistance to photochemical mutation, making the genetic message more stable. This is necessary for holding all of the information needed for life to function.

DNA lacks the 2'-hydroxyl group found in RNA which limits the catalytic competency of deoxyribozymes even in comparison to ribozymes.

33. **Answer:** C

Sol:

The lactose operon (lac operon) is an operon required for the transport and metabolism of lactose in E. coli and many other enteric bacteria.

The gene product of lacZ is β-galactosidase which cleaves lactose, a disaccharide, into glucose and galactose. lacY encodes Beta-galactoside permease, a membrane protein that becomes embedded in the cytoplasmic membrane to enable the cellular transport of lactose into the cell. Finally, lacA encodes Galactoside acetyltransferase. Specific control of the lac genes depends on the availability of the substrate lactose to the bacterium. The proteins are not produced by the bacterium when lactose is unavailable as a carbon source.

In turn, increased cAMP levels lead to enhanced expression of the lac operon. In the presence of glucose, however, intracellular levels of cAMP fall, which leads to a lack of lac operon activation. The lac operon is therefore positively regulated by the absence of glucose catabolites.

So, the incorrect option is option "3".

Hence, the correct answer is "3".

34. **Answer:** A

Sol:

Haemoglobin is made of four polypeptide chains two α-chains which are 141 amino acid long and two β-chains which are 146 amino acids long. Sickle cell anaemia is due to inheritance of a defective allele coding for β-globin. It results in the transformation of HbA into Hbs in which glutamic acid (Glu) is replaced by valine (Val) at sixth position in each of two β globin chain of haemoglobin. The substitution of amino acid in the globin protein results due to the single base substitution at the sixth codon of the beta globin gene from GAG to GUG.

35. **Answer:** D

Sol:

Variable number of tandem repeat (or VNTR) refers to the presence of a short nucleotide sequence as a tandem repeat on many chromosomes. The VNTR belongs to a class of satellite DNA referred to as mini-satellite because the mini-satellite number remains the same from chromosome to chromosome in an individual. DNA from a single cell is enough to perform DNA fingerprinting analysis. It has much wider applications in determining population & genetic diversities and differs from individual to individual in a population except in the case of monozygotic twins. So, the correct option is C.

36. **Answer:** A

Sol:

The T. S. shows a dithecous tetrasporangiate anther wherein each anther lobe has two long microsporangia which are separated from each other by shallow groove on the outside, called stomium. The middle parenchymatous tissue that joins two anther lobes together is termed as connective tissue (A). Each microsporangium has two parts, the outer wall and inner homogenous sporogenous tissue. The wall has four types of layers namely epidermis, endothecium, 1-3 middle layers and tapetum. Endothecium(C) consists of larger cells and develops thickening of cellulose on inner and radial walls during differentiation The inner sporogenous tissue of each microsporangium differentiates into microspore/pollen mother cell and undergoes microsporogenesis to produce microspores/pollen grains (B) that remain suspended in central of each microsporangium.

37. **Answer:** D

38. **Answer:** B

39. **Answer:** B

40. **Answer:** C

Sol:

Synergid cell wall forms a filiform apparatus at the micropylar end. Filiform apparatus is the extension of the synergids beyond the apex of the embryo sac. It helps in the entry of pollen tubes in the synergids.

41. **Answer:** D

Sol:

Many non-human model organisms, such as bacteria, yeast, Caenorhabditis elegans (a free living non-pathogenic nematode), Drosophila (the fruit fly), plants (rice and Arabidopsis), etc., have also been sequenced.

Hence **correct** option is **D**.

42. **Answer:** D

Sol:

Thymine is more stable then uracil,as thymine also known as 3-methyl uracil so the matter is that the methyl group gives stability to thymine. In DNA, however, uracil is readily produced by chemical degradation of cytosine, so having thymine as the normal base makes detection and repair of such incipient (developing or initiating) mutations more efficient.

43. **Answer:** D

Sol:

Anticodon loop is present on tRNA. In anticodon, sequence of three nucleotides on a tRNA molecule that bond to a complementary sequence on an mRNA molecule. The anticodon sequence determines the amino acid that the tRNA carries. Polypeptide synthesis is signalled by two initiation codons - AUG (methionine) and GUG (valine). Polypeptide chain termination is signalled by three termination codons UAA, UAG and UGA. They do not specify any amino acid and are hence called non-sense codons.

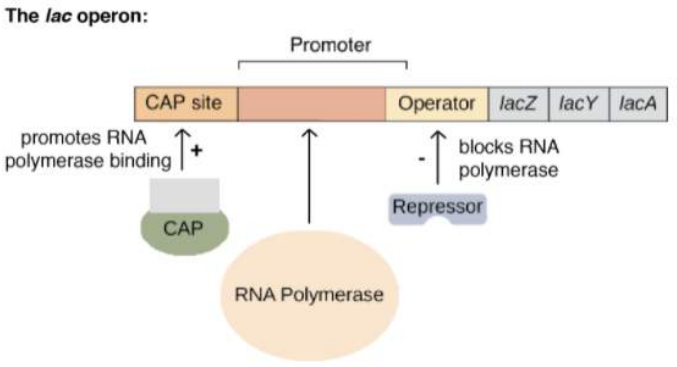
44. **Answer:** B

Sol:

The lac operon is a negatively controlled inducible operon, where the inducer molecule is allolactose. The lac operon is regulated by several factors including the availability of glucose and lactose. It can be activated by allolactose. Lactose (inducer) binds to the repressor (Active repressor) protein and convert it into Inactive repressor and prevents it from repressing gene transcription.

Active repressor + Inducer → Inactive repressor

Positive regulation is shown by tryptophan operon.



45. **Answer:** A

Sol:

The DNA double helix has two types of bonds, covalent and hydrogen. Covalent bonds exist within each linear strand and strongly bond bases, sugars, and phosphate groups (both within each component and between components).

A glycosidic bond or glycosidic linkage is a type of covalent bond that joins a carbohydrate (sugar) molecule to another group, which may or may not be another carbohydrate.

A nitrogen base is linked to sugar by a glycosidic bond .The beta-N-glycosidic bond attaches the nitrogen on the purine or pyrimidine base to the 1' anomeric carbon on the deoxyribose sugar. Phosphodiester linkages connect the 3' and 5' sugar hydroxyl groups on adjacent nucleotides.

46. **Answer:** B

Sol:

If any organism is heterozygous for 5 loci it means it represent pentahybrid hence types of gametes are $(2)^5 = 32$.

47. **Answer:** D

48. **Answer:** C

Sol:

Two organism with a genotype AaBb (A – height, B = colour) are mated with each other. Since, it is a dihybrid cross hence, its phenotypic ratio will be 9: 3: 3: 1.
AABB, AaBb, AaBB, AABb- 9
AAbb, Aabb – 3
AaBB, aaBb= 3
Aabb- 1
Hence, the probability of organisms carrying both the dominant traits is 9/16.
The probability of organisms carrying both the recessive traits is 1/16.

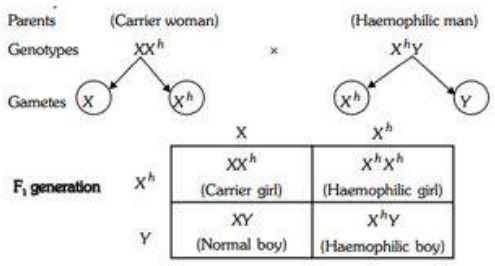
49. **Answer:** B

Sol:

The types of gametes present in the pea plant, it should be subjected to test cross, in which it is crossed with a recessive parent, the offsprings formed with a particular phenotype will help in determining the genotype. So, in the given case AaBb should be crossed with aabb.

Sol:

Haemophilia is an X-linked recessive disorder. Since males are hemizygous for chromosome, one copy of the affected gene in males in each cell is sufficient to cause the disorder (X^hY or X^hY). Females with two copies of the affected gene show the disorder (X^hX^h or X^hX^h). Females heterozygous for this trait will be normal but serve as a carrier of the disease. Since father transmits its X chromosome to the daughters, not to son, so the haemophilic father would not affect the disease inheritance of his son. Son receives its X chromosome from mother which is carrier (X^hX) which means half of her sons will get normal copy of X chromosome and another half will get the affected copy. Thus, there is 50% probability of their son to have the disease. The only haemophilic mother can have all of her sons affected with the disease but the presence of two copies of affected alleles makes the survival of haemophilic female very low. A carrier mother cannot have all normal sons due to the presence of one copy of affected allele.



Here out of two one son is affected which means is 50% probability of their son to have the disease.

50. **Answer:** C

Sol:

There are two possibilities for a couple for their child, that is either son or daughter. The probability of having either sex is 1/2. The probability for each child is independent of each other. Hence, the probability of four sons to a couple is $(1/2)^n$, where n is the number of children. Probability of four sons = $1/2 \times 1/2 \times 1/2 \times 1/2 = 1/16$.

51. **Answer:** C

Sol:

Menstrual cycle is divided into three phase -

Menstrual phase, proliferative phase, luteal(secreting phase).

In the menstrual phase breakdown of endometrium linining occurs which loss in the form of blood.

In the proliferative phase follicles are developed and secrets estrogen hormones which helps in the endometrium proliferation.

In the luteal phase or secretory phase graffian follicles transform into corpus luteum.

So right answer is -

Proliferative phase - Follicular phase

Secretory phase - luteal phase

Menstruation - Breakdown of endometrium lining

52. **Answer:** D

Sol:

Spermatogenesis occurs in the seminiferous tubules of the testes. In this process, the primary spermatocyte gives rise to two cells, the Secondary spermatocyte and the two secondary spermatocytes by their subdivision produce four spermatozoa; four haploid cells. Hence, we can conclude that secondary Spermatocytes produce two spermatozoa.

53. **Answer:** B

Sol:

According to the recent and most popular hypothesis, life was originated in deep sea hydrothermal vents.

Hydrothermal vents are submarine hot springs in which sea water seeps through the cracks in bottom until the water comes close to hot magma.

The water is super heated and expelled forcibly, carrying a variety of molecules which include hydrogen sulphide, methane, iron and sulphide ions.

The deep-sea vents hypothesis of place of origin of life became popular from the new science of genomics especially rRNA sequencing, which suggests that the ancestors of today's prokaryotes are most closely related to the bacteria that live on the deep sea vents i.e., archaebacterial.

54. **Answer:** C

Sol:

Mutations are rarely useful and most mutations are recessive. That is, they do not lead to visible phenotypic effects when in heterozygous combination with the wild-type allele.

The correct answer is option C

55. **Answer:** B

56. **Answer:** D

Sol:

Tertiary follicle changes into mature folicle or graffian follicle.

option (c) is correct but with respect to sperm atogenesis not oogenesis.

In option (a) primary follicle surrounded by granulase cell layer is called secondary follide.

In option (b) antrum is charact eristic of tertiary follide.

57. **Answer:** A

Sol:

[NCERT Page No. 50 & 51]

58. **Answer:** C

59. **Answer:** D

Sol:

Intrauterine devices (IUDs) are plastic or metal objects which are inserted by doctors in the uterus through vagina. These are available hormones releasing IUDs (progestasert, LNG-20).

Hence, the correct answer is **Hormone releasing IUDs**.

60. **Answer:** A

Sol:

The ovulation (ovulatory phase) is followed by the luteal phase during whichthe remaining parts of the Graafian follicle transform as the corpus luteum). The corpus luteum secretes large amounts of progesterone which is essential for maintenance of the endometrium.Such an endometrium is necessary for implantation of the fertilized ovum and other events of pregnancy. Hence, in the absence of corpus luteum, the progesterone level in blood will not rise.

61. **Answer:** C

Sol:

NCERT-Page No. 60 and 61

62. **Answer:** C

Sol:

In artificial insemination, donated sperm is inseminated into a woman's uterus through the vagina. It is suitable in the following conditions:

The male partner has a very low sperm count.

When sperms are not strong enough to swim through the cervix and up into the Fallopian tubes.

If the female partner is suffering from a condition called unreceptive cervical mucus. In this, the mucus that surrounds the cervix prevents sperm from getting into the uterus and fallopian tubes. Using this technique, the sperm skips the cervical mucus entirely.

It is also suitable if the man carries a genetic disease and he does not wish to pass it on to his children.

So, the correct option is 'Artificial introduction of sperms of a healthy donor into the vagina'.

63. **Answer:** C

64. **Answer:** A

Sol:

Sequential events of embryo formation

65. **Answer:** B

66. **Answer:** A

Sol:

NCERT 12th Page No. 63

Sol:

Human placental lactogen (hPL) hormone is made by the placenta. It gives nutrition to the fetus. It also stimulates milk glands in the breasts for breastfeeding.

Progesterone hormone is made by the ovaries and by the placenta during pregnancy. It stimulates the thickening of the uterine lining for implantation of a fertilized egg.Estrogens hormones help develop the female sexual traits. It is formed in the ovaries. It is also made by the placenta during pregnancy to help maintain a healthy pregnancy. Thyroxin is the main hormone secreted into the bloodstream by the thyroid gland.

Hence, the correct answer is **hPL**.

67. **Answer:** D

Sol:

Fetal ejection reflex in human females is induced by the fully developed fetus and placenta.

It is the major process that moves the baby out from the uterus and into the birth canal.

Hence, **the correct option is"4" - Fully developed fetus and placenta.**

68. **Answer:** B

Sol:

[NCERT Page No. 50 & 51]

69. **Answer:** B

Sol:

The acrosome is an organelle, that develops over the anterior half of the head in the human sperm. It is a cap-like structure derived from the Golgi apparatus. Acrosome formation is completed during testicular maturation. In Eutherian mammals, the acrosome contains digestive enzymes including hyaluronidase and acrosin. These enzymes break down the outer membrane of the ovum, called the zona pellucida, allowing the haploid nucleus in the sperm cell to fuse with the haploid nucleus in the ovum and complete the fertilization process.

70. **Answer:** C

Sol:

In testis, the immature male germ cells (spermatogonia) produce sperms by spermatogenesis that begins atpuberty. The spermatogonia present on the inside wall of seminiferous tubules multiply by mitotic division andincrease in numbers. Each spermatogonium is diploid and contains 46 chromosomes. Some of the spermatogonia called primary spermatocytes periodically undergo meiosis. A primary spermatocyte completes the first meiotic division (reduction division) leading to formation of two equal, haploid cells called secondary spermatocytes, which have only23 chromosomes each.

71. **Answer:** C

72. **Answer:** C

Sol:

Both LH and FSH attain a peak level in the middle of the cycle (about the 14^{th} day). Rapid secretion of LH leading to its maximum level during the mid-cycle called LH surge induces rupture of Graafian follicle and thereby the release of an ovum (ovulation). With the ovum(secondary oocyte), the first polar body is also released after the completion of meiosis 1. The ovulation (ovulatory phase) is followed by the luteal phase during which the remaining parts of the Graafian follicle transform as the corpus luteum.

Sol:

Diseases or infections which are transmitted through sexual intercourse are collectively called sexually transmitted diseases (STD) or venereal diseases (VD) or reproductive tract infections (RTI).

Gonorrhoea, syphilis,genital herpes, chlamydiasis, genital warts, trichomoniasis, hepatitis-B.

Malaria, Filaria is caused by the transmission of the parasite through the mosquitoes which act as a vector.

AIDS is a disease caused by the HIV virus and can be transmitted by several methods (through bodily fluids). Cancer is the uncontrollable cell division that leads to the formation of tumors and the causes can be several factors.

Hence, the correct option is "3" - Gonorrhoea, syphilis, genital herpes.

73. **Answer:** B

Sol:

Miller took molecules, which were believed to represent the major components of the early Earth's atmosphere and put them into a closed system. The gases they used were methane (CH_4), ammonia (NH_3), hydrogen (H_2) and water (H_2O). Next, he ran a continuous electric current through the system, to simulate lightning storms believed to be common on the early earth. Analysis of the experiment was done by chromatography. At the end of one week, Miller observed that as much as 10-15% of the carbon was now in the form of organic compounds. Two percent of the carbon had formed some of the amino acids, which are used to make proteins.

74. **Answer:** D

Sol:

A reducing atmosphere is an atmospheric condition in which oxidation is prevented by removal of oxygen and other oxidizing gases or vapours, and which may contain actively reducing gases such as hydrogen, carbon monoxide, and gases such as hydrogen sulfide that would be oxidized by any present oxygen. Or The primitive atmosphere of earth was reducing atmosphere with little or no oxygen but was rich in water vapour, carbon monoxide, carbon dioxide, nitrogen, and hydrogen. The ozone layer of present day atmosphere absorbs these UV and gamma rays.

75. **Answer:** B

Sol:

Pasteur's hypothesis was that if cells could arise from non-living substances, then they should appear spontaneously in sterile broth. To test his hypothesis, he created two treatment groups: a broth that was exposed to a source of microbial cells, and a broth that was not. Due to this he was performed an experiment in which the swan neck flask experiment, Pasteur filled a flask with medium, heated it to kill all life and then drew out the neck of the flask into a long S shape. This prevented microorganisms in the air from easily entering the flask, yet allowed some air interchange. If the swan neck was broken, microbes readily entered the flask and grew. Pasteur succeeded in disproving the theory of spontaneous generation by this experiment.

76. **Answer:** B

Sol:

Spontaneous generation, the hypothetical process by which living organisms develop from nonliving matter; also, the archaic theory that utilized this process to explain the origin of life. According to that theory, pieces of cheese and bread wrapped in rags and left in a dark corner, for example, were thus thought to produce mice, because after several weeks there were mice in the rags. Many believed in spontaneous generation because it explained such occurrences as the appearance of maggots on decaying meat.So, believers of spontaneous generation theory believed that life originated only spontaneously and not originated from similar organisms, from air and from other similar organism or spontaneously.

77. **Answer:** A

78. **Answer:** C

Sol:

In the modern theory, the hypothesis of abiogenesis was proposed with a condition that the non-living materials can give rise to life in the condition of primitive earth. The condition of the primitive earth is different from the present conditions which do not permit abiogenesis.

Whereas,Anaximander and Aristotle was main propounded of theory of spontaneous generation which assume origin of life from nonliving substances. It assumes origin of frog and toads from mud that of microorganisms from air and so on. Concept of spontaneous generation was experimentally refuted by Pasteur, Spallanzani and F. Redi. Concept of special creation assumes origin of all life forms by God's desire and considers the origin of life as spiritual or supernatural event. Origin of life by God's desire was refuted by scientific knowledge based upon fossil records and data from comparative anatomy, morphology and embryology. Origin of life on primitive earth occurred by chemical synthesis of organic compounds from primitive gases and inorganic elements followed y biogenesis. The reducing atmosphere and absence of life on primitive earth favored origin of life which is not possible in present day oxidizing atmosphere because the compounds are readily oxidized as soon as they are formed. Thus, now life is not originating.

79. **Answer:** A

Sol:

Experiments of Francesco Redi, LazzaroSpallanzani, and Louis Pasteur etc supported the theory of biogenesis and disproved the abiogenesis, also called as theory of spontaneous generation. Francesco Redi was the first person to challenge the theory of spontaneous generation

Though the Experiment of Louis Pasteur is most renowned. After his famous 'Swan neck flask experiment' and elaboration spontaneous generation theory was dismissed once and for all.

In which He took two flasks one of broken neck and another of curved neck (swan neck flask/"S" shaped neck flask). He showed that in pre-sterilized swan neck flasks, life did not arise, because of formation of a filter (formed of germ laden dust particles in the air, trapped by the curved neck) in between medium and air . While in another flask open to air (broken neck), new living organisms arose.

81. **Answer:** B

Sol:

Louis Pasteur was a French biologist, microbiologist, and chemist renowned for his discoveries of the principles of vaccination, microbial fermentation, and pasteurization. He is remembered for his remarkable breakthroughs in the causes and prevention of diseases, and his discoveries have saved many lives ever since. He reduced mortality from puerperal fever and created the first vaccines for rabies and anthrax.His medical discoveries provided direct support for the germ theory of disease and its application in clinical medicine.The germ theory of disease states that some diseases are caused by microorganisms. These small organisms, too small to see without magnification, invade humans, animals and other living hosts. Their growth and reproduction within their hosts can cause a disease. "Germ" may refer to a virus, bacterium, protist, fungus, or prion. Microorganisms that cause disease are called as pathogens and the diseases they cause are called as infectious diseases.

While,cellular theory (Robert Hooke), germ plasm theory (Weismann) and recapitulation theory (Haeckel).

80. **Answer:** C

Sol:

H.M.S. Beagle is used by Darwin round the world, Charles Darwin concluded that existing living forms share similarities to varying degrees not only among themselves but also with life forms that existed millions of years ago.

82. **Answer:** C

Sol:

Species can interbreed among themselves to produce fertile offspring. Plants belonging to same species have common character and will be able to reproduce freely with each other to produce new generations. So, two plants can reproduce freely with each other and form seeds, they are concluded to belong to same species.

Hence, the correct answer is can reproduce freely with each other and from seeds.

Sol:

Chromosome structure mutations are alterations that affect whole chromosomes and whole genes rather than just individual nucleotides. These mutations result from errors in cell division that cause a section of a chromosome to break off, be duplicated or move onto another chromosome.

While, meiosis I includes pairing of homologous chromosomes during prophase I and their segregation to opposite poles during anaphase I, this ensures that each gamete receives half the number of chromosomes as in somatic cell. Random fertilization of gametes during syngamy restores the somatic cell chromosome number in the zygote. Thus, reduction of chromosome number to half maintain the somatic chromosome number in the zygote which would otherwise multiply exponentially during each reproductive cycle. Reduction and syngamy are not mutations as there is no change in chemical structure of genes at a molecular level. The presence of additional chromosome, depending on a number of extra chromosomes, results in euploidy or aneuploidy. It is the chromosomal aberration, not the mutation; since, chromosomal aberrations and point mutations produce same phenotypic effects, the former is sometimes referred to as chromosomal mutations.

83. **Answer:** C

Sol:

A mutation is a change in a DNA sequence. Mutations can result from DNA copying mistakes made during cell division, exposure to ionizing radiation, exposure to chemicals called mutagens, or infection by viruses or Mutation occurs when a DNA gene is damaged or changed in such a way as to alter the genetic message carried by that gene. A Mutagen is an agent of substance that can bring about a permanent alteration to the physical composition of a DNA gene such that the genetic message is changed. So,mutations happen spontaneously. The rate of mutation can be increased by environmental factors such as UV radiation, X-rays, gamma rays and certain types of chemicals such as bromine.

84. **Answer:** C

Sol:

Hugo de Vries believed that mutation causes evolution and not the minor heritable variations which were mentioned by Darwin. According to Darwin, evolution was gradual while de Vries believed mutations appear suddenly and hence called it saltation (single step large mutation).The single-step mutation is speciation, can be achieved in a single and in evolutionary terms, for example, mutation by polyploidy in plants.

85. **Answer:** D

Sol:

A Scientist kept 69 generations of Drosophila in darkness even after that the flies had normal eyes, this disproves the law of acquired characters are inherited. Acquired characteristics are characteristics that are gained by an organism after birth as a result of external influences or the organism's own activities which change its structure or function and cannot be inherited.

The correct answer is option D

86. **Answer:** B

Sol:

The zygote is formed after the fertilization. This zygote now undergoes cleavage and forms an 8-16 cell structure known as morula. The morula grows and forms the blastula, which gets implanted in the uterine wall. The outermost layer of the blastocyst(blastula) is of trophoblast cells that help in the implantation. The inner cell mass forms the embryo.

87. **Answer:** C

Sol:

NCERT 12th PAGE No. 59, 60 & 61

88. **Answer:** A

Sol:

NCERT 12th PAGE No. 59, 60 & 61

89. **Answer:** A

Sol:

Embryo does not secrete or digests any enzyme. Placenta acts as an endocrine tissue and produces several hormones like human chorionic gonadotropin (hCG), humanplacental lactogen (hPL), estrogens, progestogens, relaxin etc.

The chorionic villi and uterine tissue become interdigitated with each other and jointly form a structural and functional unit between developing embryo (foetus) and the maternal body called as Placenta. The syncytiotrophoblast (primary structure that determines which substances cross the placenta) then implants the blastocyst into the endometrium of the uterus by forming finger-like projections into the uterine wall called chorionic villi. After the cleavage has produced over 100 cells, the embryo is called a blastula. The blastula is usually a spherical layer of cells (the blastoderm) surrounding a fluid-filled or yolk-filled cavity (the blastocoel).

90. **Answer:** B

Sol:

Corpus luteum is the temporary endocrine gland of ovary which is formed from Graafian follicle after ovulation. Ovulation is followed by rupturing of Graafian follicle with a clot inside called as corpus hemoragicum. Absorption of clot and other changes transforms it into corpus luteum which secretes estrogen and progesterone during first three months of pregnancy. Corpus luteum is maintained by human chorionic gonadotropic hormone, if pregnancy occurs. Placenta takes over the function to secrete it for next 6 months of pregnancy till parturition.

91. **Answer:** C

92. **Answer:** C

93. **Answer:** D

94. **Answer:** C

Sol:

Estrogen hormone is responsible for endometrium of uterus regenerates through proliferation.

FSH (follicular stimulating hormone) stimulate the formation of follicle cells.

LH (luteinizing hormone) helps in ovulation process.

Progesterone helps in pregnancy.

Thus right answer is estrogen hormone.

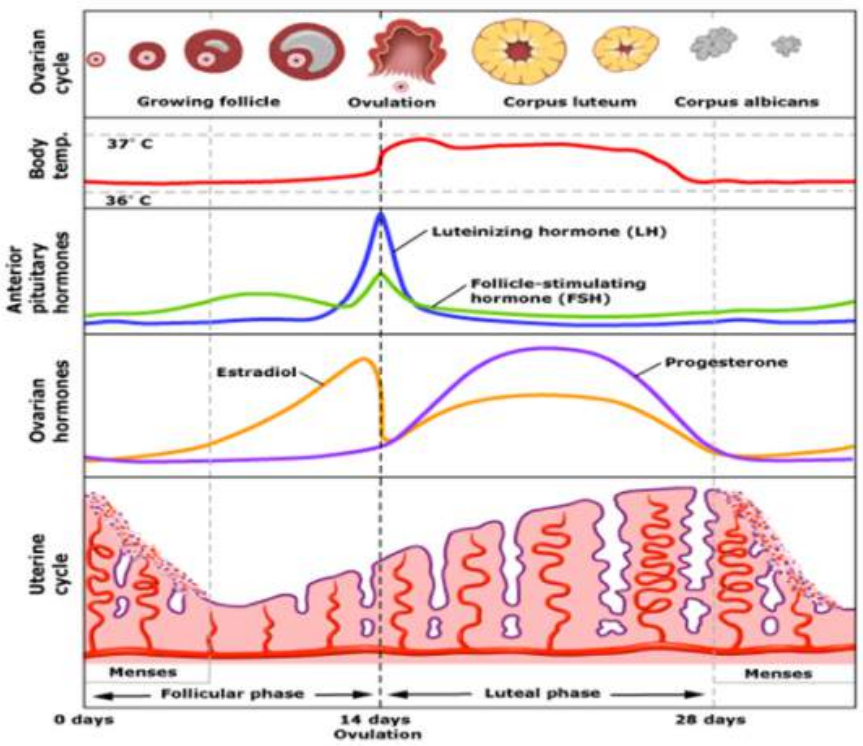
Sol:

The LH and FSH are secreted by the anterior pituitary also called gonadotropins. They both are involved in the stimulation of gonads.

ACTION OF LH:- It is associated with the release of an egg known as the process of Ovulation. In males, it stimulates testosterone. In females, it stimulates steroids for egg release.

ACTION OF FSH:- It is responsible for preparing the body for fertilization by the maturation of the Ovary, preparing the tract for fertilization so that implantation occurs and the pregnancy continues.

Both hormones attain a peak in the mid of the menstrual cycle.



Hence, the correct option is "4"- LH & FSH.

95. **Answer:** C

Sol:

Vasa efferentia, epididymis, vas deferens, and rete testis are the male accessory ducts and they play an important role in the transport and temporary storage of sperms. Male accessory glands are seminal vesicles, prostate glands, and bulbourethral glands.

Hence, the correct option is "3" -Rete testis, Vasa efferentia, Epididymis, and Vas deferns.

96. **Answer:** A

Sol:

The ultimate source of organic variation isMutation. Mutation is important as the first step of evolution because it creates a new DNA sequence for a particular gene, creating a new allele. Recombination also can create a new DNA sequence (a new allele) for a specific gene through intragenic recombination.

The correct answer is option A

97. **Answer:** C

Sol:

About 15 million years ago, primates called Dryopithecus and Ramapithecus were existing. They were hairy and walked like gorillas and chimpanzees. Ramapithecus was more man-like while Dryopithecus was more ape-like. Few fossils of man-like bones have been discovered in Ethiopia and Tanzania.

98. **Answer:** B

99. **Answer:** D

Sol:

Neanderthal-1300-1600cc(avg.1450) and Homo sapiens has cranial capacity of 1450cc.

Neanderthal man existed in late Pleistocene period and fossil was discovered in 1856 by C Fuhlrott.

Neanderthal man arose about 150000 years ago and flourished in Asia,Europe and North Africa.

They extinct about 25000 years ago.

Neanderthal walked upright with bipedal movement.

Cranial capacity of peking man was 850-1200cc.

Cranial capacity of java man was 940cc.

100. **Answer:** C

Sol:

Estimated time is 2,000Years ago to present.Hominid Type is Homo sapiens sapiens. Description is “Modern man" walks upright, uses tools and technology, mainly cultural and technical evolution from Cro-Magnon man, reached the moon, mastered laws of nature at the nuclear level. Cranial capacity: 950-1800cc with an average of 1400cc.

101. **Answer:** C

Sol:

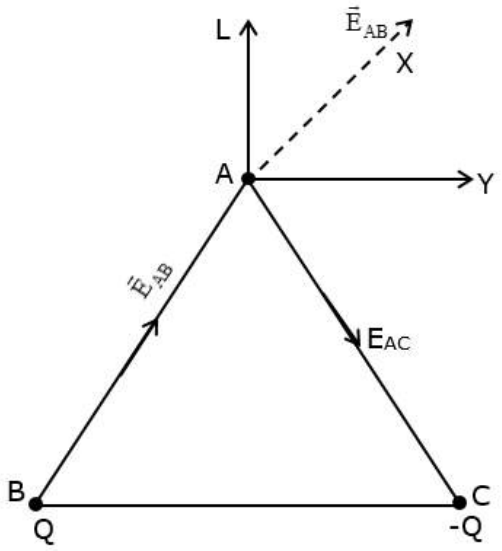
F= F'

$\frac{q_1 q_2}{4\pi\varepsilon_0(10)^2} = \frac{q_1 q_2}{4\pi\varepsilon_0(4)x^2}$

$100 = 4x^2 \Rightarrow x^2 = 25 \Rightarrow x = 5\,\text{cm}$

102. **Answer:** B

Sol:



Electric field at A due to +Q at B is given by, E_{AB} in the direction of X.

Also, electric field at C is given by E_{AC} in the direction of Z.

Hence, the resultant will be the sum of these two electric field and will be given by the parallelogram law of vector addition and will be in the direction of AY.

Therefore, the correct option is (B).

103. **Answer:** C

Sol:

Specific charge = $\frac{q}{m}$

Ratio = $\frac{(q/m)_\alpha}{(q/m)_p} = \frac{q_\alpha}{q_\rho} \times \frac{m_p}{m_\alpha} = \left(\frac{2e}{e} \times \frac{m}{4m}\right) = \frac{1}{2}$

Therefore, the correct answer is (C).

104. **Answer:** A

Sol:

$E = qv$

$= e(200\,\text{KV})$

$= 200\,\text{KeV}$

105. **Answer:** C

Sol:

Resistance of $220V, 100W$ bulbs is given by-

$R = \frac{V^2}{P} = \frac{220\times220}{100} = 484\Omega$

when connected in series then total resistance

$R_5 = 484 + 484 = 968\Omega$

then connected in parallel.

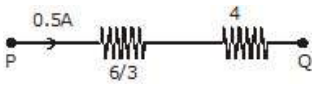
$R_P \frac{968\times484}{968+484} = \frac{968\times484}{1452}$

$R_P = \frac{968}{3} = 322\ .2\ \Omega$

then power $P = \frac{V^2}{R_P} = \frac{220\times220}{322}$ =150 Watt

106. **Answer:** C

Sol:



$\Delta V = 0.5 \times [2+4] = 3\ V$

107. **Answer:** A

108. **Answer:** D

Sol:

Potential gradient

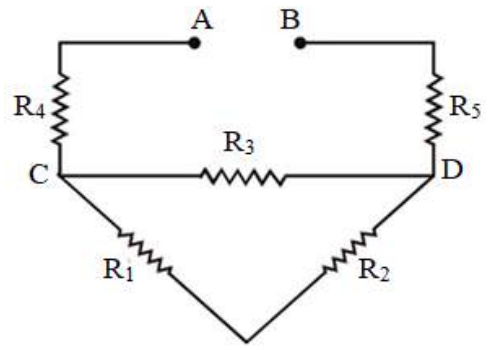
$\phi = \frac{V_\omega}{L_\omega} = \frac{E_0 R_\omega}{R_\omega + R_h} \times \frac{1}{L_\omega}$

$= \frac{2\times10}{40+10} \times \frac{1}{100(\text{cm})} = \frac{2}{5}\text{V/m}$

E= $\phi . l_b = \frac{2}{5} \times 0.4$

= 0.16 V

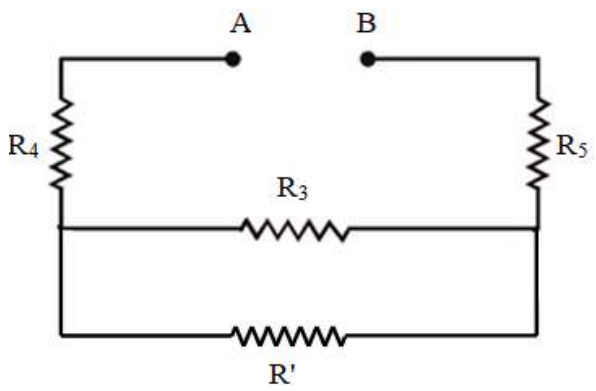
Sol:



$R_1 = R_2 = R_3 = R_4 = R_5 = R$

R_1 and R_2 are in series
Their equivalent resistance R' is given by

$R' = R_1 + R_2 \Rightarrow 2R$



Now, R' and R_3 are in parallel

Their equivalent resistance R'' is given by

$\frac{1}{R''} = \frac{1}{R'} + \frac{1}{R_3} \Rightarrow \frac{1}{2R} + \frac{1}{R}$

$\frac{1}{R''} = \frac{1+2}{2R}$

$R'' = \frac{2R}{3}$

Now, R_4, R'', R_5 are in series

Their final equivalent resistance is

$R_{final} = R_4 + R'' + R_5 \Rightarrow 2R + \frac{2R}{3} = \frac{8R}{3}$

Given :- $R = 3\Omega$

$R_f = 8 \times \frac{3}{3} \Rightarrow 8\Omega$

109. **Answer:** A

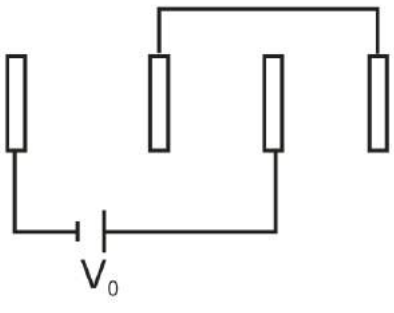
110. **Answer:** C

Sol:

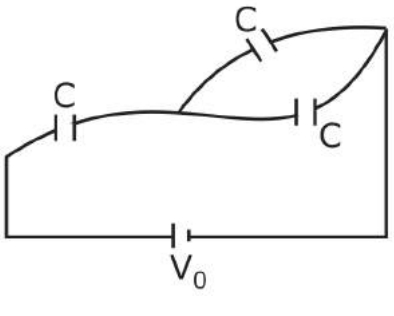
1 T = 10^4 gauss

Sol:

the given circuit is,



its equivalent circuit can be;



here, $C_{eq} = \frac{2C}{3}$

as we know that charge given by the battery

$Q = C_{eq}V$

So, $Q = \frac{2C}{3}V_0$

$\left(\text{for parallel plate } C = \frac{\varepsilon_0 A}{d}\right)$

therefore $Q = \frac{2}{3}\left(\frac{\varepsilon_0 A}{d}\right)V_0$

111. **Answer:** A

Sol:

$\Rightarrow R \propto \frac{m}{q}$

$R_p : R_e : R_\alpha = \frac{m_p}{q} \cdot \frac{m_e}{q} : \frac{4\,m_p}{2q}$

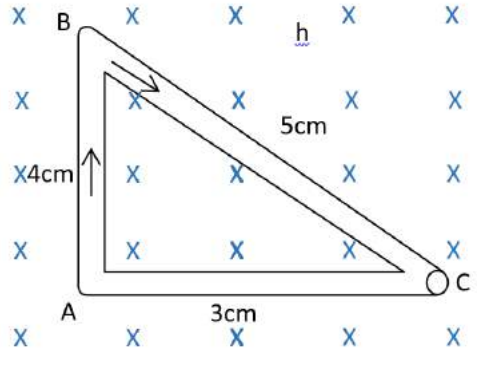
$R = \frac{mv}{qB}$

α-particle has maximum R, so the path followed is B and electron follows path D

Therefore, the correct answer is (A)

112. **Answer:** B

Sol:



Given that- $m = 10g,\ i = 2\ A$

$B = 2T,\ \theta = 90$

Force acting on the wire AC

$F = Bi\ell$

$= 2\times2\times3\times10^{-2}$

$= 12\times10^{-2}$ N along y-axis

So, acceleration of wire

$a = \frac{F}{m} = \frac{12\times10^{-2}}{10\times10^{-3}}$

$= 12\ m/s^2$

Therefore, the correct answer is (B).

113. **Answer:** C

Sol:

From the given diagram current is lagging with E_{rms} so. It has the component of LRC and LR circuit.

Therefore, the correct Answer is (C)

114. **Answer:** D

Sol:

Potential due to dipole in general position is given by

$$V = \frac{k\,p\cos\theta}{r^2} = \frac{k\ pr\ \cos\theta}{r^3} = \frac{k\cdot\left(\vec{p}\cdot\vec{r}\right)}{r^3}$$

115. **Answer:** D

Sol:

The specific resistance of a wire depends on the temperature and on the material that is used in the wire.
Therefore, the correct answer is (D)

116. **Answer:** C

Sol:

Capacitor stores energy in the form of electric field.

Therefore, the correct answer is (C)

117. **Answer:** D

Sol:

According to convention, inward flux is taken negative and outward flux is positive.

Hence, Flux

$\phi = -8\times10^3 + 4\times10^3 \Rightarrow -4\times10^3\,Nm^2/C$

Now, we know that, $\phi = \frac{q_{in}}{\in_0}$

$\Rightarrow q_{in} = \phi \in_0$

$\Rightarrow q_{in} = -4\times10^3 \in_0 C$

Therefore, the correct answer is (D)

118. **Answer:** C

Sol:

$E = \frac{1}{2}CV^2$

$\Delta E = \frac{1}{2}C\left[V_2^2 - V_1^2\right]$

$= \frac{1}{2}\times 6\mu F\left[400-100\right]$

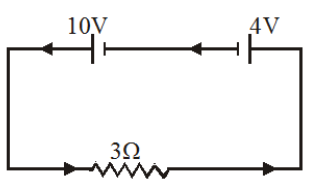
$= \frac{1}{2}\times 6\mu\times 300$

$\boxed{\Delta E = 9\times10^{-4}J}$

Therefore, the correct answer is (C)

119. **Answer:** D

Sol:



$i = \frac{10-4}{3} = \frac{6}{3} = 2A$

$\therefore P = Vi = 4(2) = 8\ W$

Therefore, the correct answer is (D)

120. **Answer:** A

Sol:

Given:

$C = 1\mu F$,

$V = 4000$ volt.

Energy stored in the capacitor is,

$U = \frac{1}{2}CV^2$

$U = \frac{1}{2}\times1\times10^{-6}\times(4000)^2 = 8\ J$

121. **Answer:** A

Sol:

$C_{air} = \frac{\varepsilon_0 A}{d}$

$C_{medium} = \frac{K\varepsilon_0 A}{d}$

$\frac{C_{medium}}{C_{air}} = K \Rightarrow \frac{80\times10^{-5}}{1\times10^{-5}} = K$

$\therefore K = 80$

Therefore, the correct answer is (A)

122. **Answer:** A

Sol:

$Q = CV$

$\Rightarrow \left(\frac{Q}{t}\right)T = CV$

$500\times10^{-6}\times T = 500\times10^{-6}\times20$

$T = 20$ sec

123. **Answer:** A

124. **Answer:** D

Sol:

As coils are in parallel so potential difference V is equal on both coils.

as $\mathrm{B}=\frac{\mu_0 \mathrm{I}}{2 \mathrm{r}} \Rightarrow \mathrm{B} \propto \frac{\mathrm{I}}{\mathrm{r}}$

$\frac{B_1}{B_2}=\frac{I_1}{I_2} \times \frac{r_2}{r_1}$

But $\frac{\mathrm{I}_1}{\mathrm{I}_2}=\frac{\mathrm{V} / \mathrm{R}_1}{\mathrm{V} / \mathrm{R}_2}=\frac{\mathrm{R}_2}{\mathrm{R}_1}=\frac{\rho \ell_2 / \mathrm{A}}{\rho \ell_1 / \mathrm{A}}=\frac{\ell_2}{\ell_1}$

$=\frac{2 \pi \mathrm{r}_2}{2 \pi \mathrm{r}_1}=\frac{\mathrm{r}_2}{\mathrm{r}_1}$

$\therefore \frac{\mathrm{B}_1}{\mathrm{B}_2}=\frac{\mathrm{r}_2}{\mathrm{r}_1} \times \frac{\mathrm{r}_2}{\mathrm{r}_1}=\left(\frac{40}{20}\right)^2=4$

Therefore, the correct answer is (A)

125. **Answer:** A

Sol:

Magnetic susceptibility is the degree of magnetization of material in response to applied magnetic field.

Thus $\mathrm{M}=\chi \mathrm{H}$

In case of diamagnetic materials, the magnetic field in the materials is weakened by the induced magnetization.

Thus, the magnetic susceptibility of diamagnetic materials is negative.

Therefore, the correct answer is (A).

126. **Answer:** C

Sol:

$B_H=B \cos \theta,$

$\therefore \mathrm{B}=\frac{\mathrm{B_H}}{\cos \theta}=\frac{0.5}{\cos 30^{\circ}}=\frac{0.5}{\frac{\sqrt{3}}{2}}=\frac{1}{\sqrt{3}}$

127. **Answer:** A

Sol:

Total flux coming out $=\frac{\mathrm{Qenclosed}}{\varepsilon_0}$

$\int \mathrm{E}. \mathrm{ds}=\frac{\mathrm{Q} \times 10^{-6}}{\varepsilon_0}$ (gause law)

As Q is placed at center, flux coming out of all sides will be equal.

flux from one of the side $=\frac{\mathrm{Q} \times 10^{-6}}{6 \varepsilon_0}$

128. **Answer:** C

Sol:

Magnetic potential energy stored in an inductor:

$\mathrm{U}=\frac{1}{2} \mathrm{LI}^2$

$\Rightarrow \frac{\mathrm{dU}}{\mathrm{dt}}=\frac{1}{2} \mathrm{L}\left(2 \mathrm{I} \frac{\mathrm{dI}}{\mathrm{dt}}\right)$

$=\mathrm{LI} \frac{\mathrm{dI}}{\mathrm{dt}}=200 \times 10^{-3} \times 1 \times 0.5=0.1 \ \mathrm{J} / \mathrm{sec}$

Therefore, the correct answer is (C)

129. **Answer:** C

Sol:

Given :

R = 10Ω

V = 2 volt

L = 50 H ; $\tau=\frac{\mathrm{L}}{\mathrm{R}}$

$\mathrm{I}=\frac{\mathrm{I}_0}{\mathrm{e}}$

Now the steady current is $\mathrm{I}_0=\frac{\mathrm{V}}{\mathrm{R}}=\frac{2}{10}=0.2 \mathrm{A}$

As we know that the current is given by $\mathrm{I}=\mathrm{I}_0\left(\mathrm{e}^{-\mathrm{t} / \tau}\right)$

$\frac{\mathrm{i}_0}{\mathrm{e}}=\mathrm{i}_0 \mathrm{e}^{-\frac{10}{50} \mathrm{t}}$

$\frac{1}{\mathrm{e}}=\mathrm{e}^{-\frac{\mathrm{t}}{\mathrm{s}}}$

$\mathrm{e}^{-1}=\mathrm{e}^{-\frac{\mathrm{t}}{\mathrm{s}}}$

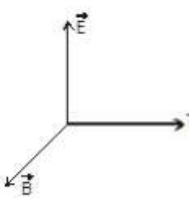
$\boxed{\mathrm{t}=5}$

Therefore, the correct answer is (C)

130. **Answer:** B

Sol:

For electromagnetic wave



$\hat{\mathrm{n}}=\overrightarrow{\mathrm{E}} \times \overrightarrow{\mathrm{B}}$

$\hat{\mathrm{n}}$ =direction of velocity of EMW

Therefore, the correct, answer is (B)

131. **Answer:** A

132. **Answer:** D

Sol:

Given :

L = 2mH

$I = t^2 e^{-t}$

As we know that the induced emf is given by

$$E = L\left(\frac{dI}{dt}\right)$$

$$0 = 2 \times 10^{-3} \frac{d}{dt}\left(t^2 e^{-t}\right)$$

$$\text{differentiating wrt time } (t)$$

$$-t^2\left(e^{-t}\right) + 2te^{-t} = 0$$

$$2te^{-t} = t^2 e^{-t}$$

$$t = 2\,\text{sec}$$

133. **Answer:** C

Sol:

If we put $t = \tau = \frac{L}{R}$ in this equation then:

$$I = I_{max}\left(1 - \frac{1}{e}\right)$$

$$= 0.631 I_0$$

Therefore, the correct answer is (C)

134. **Answer:** C

Sol:

$$P_{avg} = V_{rms} I_{rms} \cos\phi$$

$$= \frac{100}{\sqrt{2}} \times \frac{100}{\sqrt{2}} \times 10^{-3} \cos\left(\frac{\pi}{3}\right)$$

$$= 2.5 \text{ watt}$$

135. **Answer:** C

Sol:

at resonance $\omega L = \frac{1}{\omega C}$

$\therefore Z = R$

Power loss at resonance $= I^2 R$

Therefore, the correct answer is (C)

136. **Answer:** B

Sol:

Four point charges -

According to gauss law -

$\phi = \int \overrightarrow{E}\, d\overrightarrow{A} = \frac{Q_{enclosed}}{\varepsilon_0}$

$\oint_s \left(\overrightarrow{E}_1 + \overrightarrow{E}_2 + \overrightarrow{E}_3 + \overrightarrow{E}_4 \right) d\overrightarrow{A} = \frac{q_1+q_2+q_3}{\varepsilon_0}$

137. **Answer:** D

Sol:

$\frac{1}{R_1} = \frac{1}{6} + \frac{1}{3} = \frac{1+2}{6} = \frac{1}{2}$ or $R_1 = 2\Omega$

Again,R_1 is in series with 4Ω resistor, so that

$R = R_1 + 4 = 2 + 4 = 6\Omega$

Thus, the total power dissipated in the circuit

$p = \frac{V^2}{R}$

Here, V = 18 V, $R = 6\Omega$

Thus, $P = \frac{(18)^2}{6} = 54\ W$

138. **Answer:** C

Sol:

$\left|\overrightarrow{F}_m\right| = \left|\overrightarrow{F}_e\right|$

$qvB = qE \Rightarrow E = vB$

from $r = \frac{mv}{qB} \Rightarrow v = \frac{qBr}{m}$

Then $E = \left(\frac{qBr}{m}\right)B = \frac{qB^2 r}{m}$

$E = \frac{10\times10^{-6}\times0.1\times0.1\times10\times10^{-2}}{1\times10^{-6}\times10^{-3}} = 10\ V/m$

Therefore, the correct answer is (C).

139. **Answer:** A

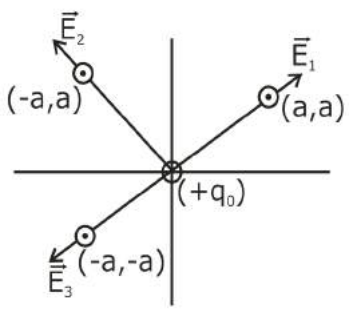
Sol:

τ_{mg} about the left and (from where string is connected) $\left|\overrightarrow{M} \times \overrightarrow{B}\right|$= MB sin 90°

or (mgR) = (iA) B_0 = i (πR^2)B_0
or i = $\frac{mg}{\pi R B_0}$

140. **Answer:** C

Sol:



{Electric field is radialy outward}

as $\theta = 90^o$ so $\overrightarrow{E_1}.\overrightarrow{E_2} = 0 \Rightarrow \overrightarrow{E_1} \perp \overrightarrow{E_2}$

and $\theta = 180^o$ between $\overrightarrow{E_1}$ and $\overrightarrow{E_3}$

$\overrightarrow{E_1} \times \overrightarrow{E_3} = 0$

$\Rightarrow \overrightarrow{E_1} \| \overrightarrow{E_3}$

141. **Answer:** B

Sol:

$\int dV = -\int \overrightarrow{E}\, d\overrightarrow{r}$

$V_i - V_f = \overrightarrow{E}.d\overrightarrow{r}$

$0 - V_{(x)} = E\int_0^x dx$

$-V_{(X)} = E_0 x$

$V_{(X)} = -E_0 x$

142. **Answer:** D

Sol:

Charge / Current flows from higher to lower potential or Q/C ratio.

if the potential or Q/C ratio is same then no charge / current flow through the applience

Therefore, the correct answer is (D)

143. **Answer:** B

144. **Answer:** C

Sol:

The energy stored in the condenser,

$U = \frac{1}{2}CV^2$

Here, $C = 100\mu F = 100 \times 10^{-6} F, V = 200$ volts.

$\therefore U = \frac{1}{2} \times 100 \times 10^{-6}(200)^2 = 2\ J$

When discharged through a resistor (2Ω),

the whole energy is dissipated as heat.

So, Heat produced, Q = U = 2 J.

Therefore, the correct answer is (B).

145. **Answer:** B

Sol:

$\therefore$In parallel the potential is same so the

power $P = \frac{V^2}{R} \Rightarrow P \propto \frac{1}{R}$

When Brightness increases then resistance decreases

$P_A > P_B$

then $R_B > R_A$

Therefore the correct answer is (B).

147. **Answer:** A

Sol:

$B_{solenoid} = \mu_0 n_s i_s = \frac{\mu_0 N_s i_s}{L_s}$,

$\tau = B_s iNA = \frac{\mu_0 N_s i_s N_{\pi r^2}}{L_s}$

$\tau = \frac{4\pi \times 10^{-7} \times 500 \times 3 \times 0.4 \times 10 \times \pi \times (0.01)^2}{0.4}$

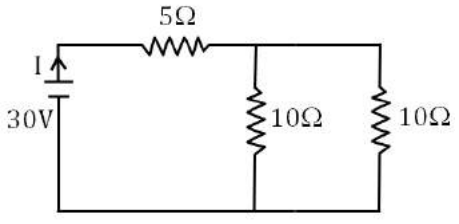
$= 5.92 \times 10^{-6}\ N - m.$

Therefore, the correct answer is (A)

149. **Answer:** A

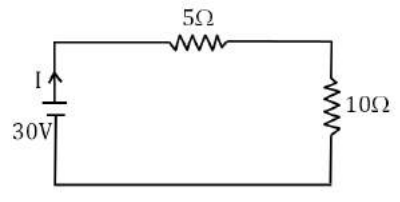
Sol:

Just after switch is closed , capacitor behaves as short circuit,



$I = \frac{30}{5 + \frac{10 \times 10}{20}} = 3A$

After long time of switch is closed, capacitor behaves as open circuit



$I = \frac{30}{15} = 2A$

Therefore, the correct answer is (C)

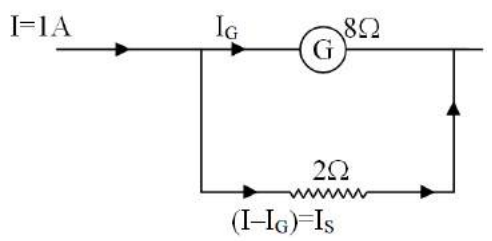
146. **Answer:** B

Sol:

Applying kirchoff's voltage law

voltage across galvanometer=voltage across resistance $2\ ohm$

$S = \left(\frac{i - i_s}{i_s}\right) G$



$\frac{i_s}{i} = \frac{G}{S+G} = \frac{8}{2+8} = \frac{8}{10}$

$i_S = 0.8i = 0.8 \times 1 = 0.8\ A$

148. **Answer:** D

Sol:

Change in flux $= B \times$ area $\Rightarrow B \times \pi R^2$

induced emf $= \frac{\text{Change in flux}}{\text{time}}$

$e = \frac{B \times \pi R^2}{T} = B\pi R^2 f$

$f = \frac{\omega}{2\pi}$

$e = \frac{BR^2\omega}{2}$

150. **Answer:** B

Sol:

Note : Load coil ≡ Secondary coil

$\frac{E_s}{E_P} = \frac{N_s}{N_P} = \frac{I_P}{I_s} \Rightarrow \frac{25}{1} = \frac{I_P}{2}$

Therefore I_p = 50 A

Therefore, the correct answer is (B).

Sol:

$M = k\sqrt{L_1 L_2}$ (if k = 1)

Since, $M_{max} = \sqrt{L_1 L_2}$

According to the given conditions,

$L_1 + L_2 = 13H \quad \ldots(1)$

$L_1 - L_2 = 5H \quad \ldots(2)$

Now solving equations (1) & (2) we get;

$L_1 = 9H$

$L_2 = 4H$

So max. mutual Inductance will be,

$M_{max} = \sqrt{L_1\, L_2} = \sqrt{36} = 6H$

Therefore, the correct answer is (A)

151. **Answer:** A

Sol:

From Henry's law $m = K_H.P$

where

m = mass of gas absorbed by given volume of the solvent

P = pressure of gas

$\therefore \log m = \log K_H + \log P$

$y = mx + C$

$\therefore$ Straight line equation with positive slop.

Therefore, correct option is (A).

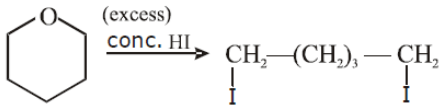
152. **Answer:** A

Sol:

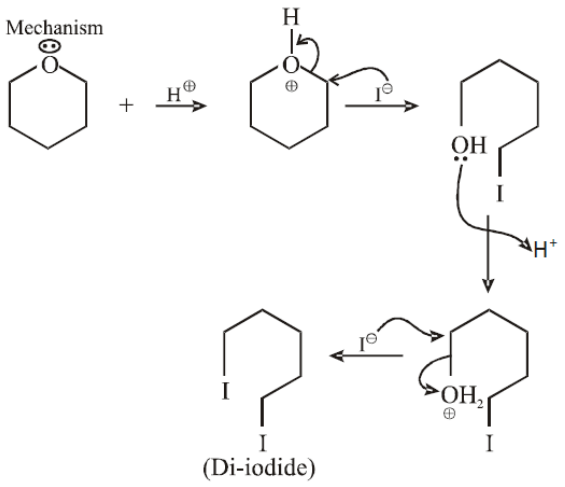
Due to the presence of a bulky base product would be an alkene.

153. **Answer:** C

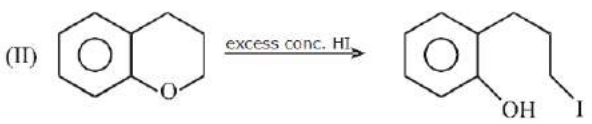
Sol:



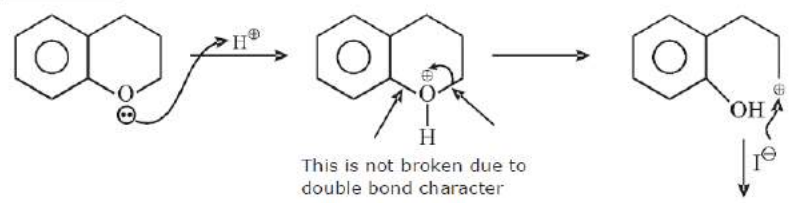
Mechanism

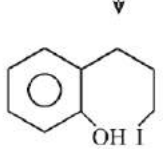


(II)



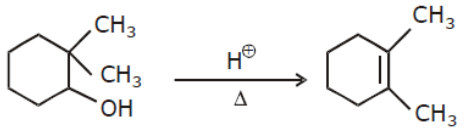
Mechanism

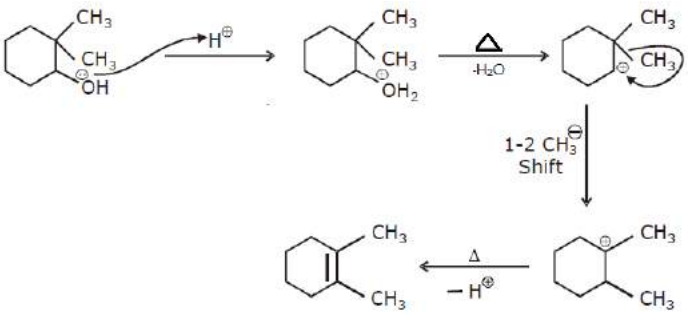




154. **Answer:** A

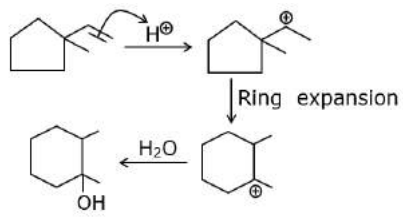
Sol:





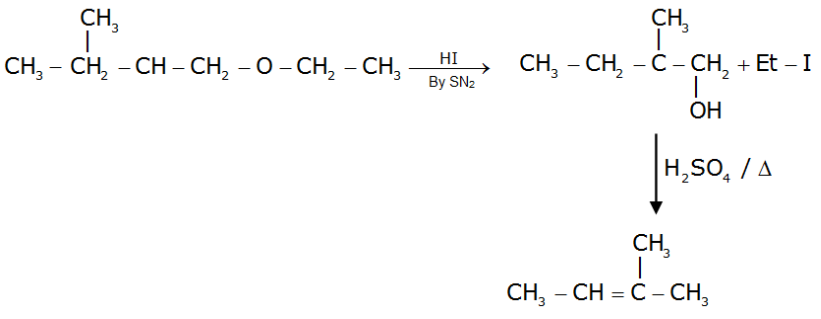
155. **Answer:** C

Sol:



156. **Answer:** C

Sol:



157. **Answer:** C

158. **Answer:** B

Sol:

Reactivity towards conc. HCl ∝ stability of carbocation.

The order of reactivity of alcohol with conc. HCl is decided by the stability of the intermediate carbocation. Alcohol (IV) is most reactive as it leads to the formation of the most stable benzyl cation.

159. **Answer:** B

Sol:

Aqueous solution of potash alum is acidic in nature due to cationic hydrolysis.Potash Alum is a salt of potassium and aluminium with sulfate. The acidity comes from Al^{3+} ions. When Al^{3+} ions are solvated by water molecules, their high charge pulled electron density toward them, making electron density between O−H in solvating water molecules become less. Protons are therefore more likely to be abstracted by water. So, The nature of solution of potash alum is acidic.

161. **Answer:** A

Sol:

$\Delta T_f = K_f \times \frac{W_1 \times 1000}{W_2 \times M_1}$

where W_1 = Weight of the solute

W_2 = Weight of solvent

M_1 = Molar mass of solute

K_f = Freezing point depression constant

Now, $\Delta T_f = 5.12 \times \frac{1 \times 1000}{51.2 \times 250}$

$\Delta T_f = 0.4$ K

Therefore, the correct answer is (A).

163. **Answer:** B

Sol:

PPM formula = $\frac{\text{mass of solute}}{\text{mass of solution}} \times 10^6$

mass of solute = 0.02 gm

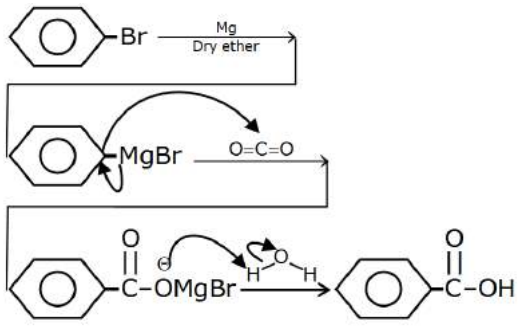
mass of solution = 500 gm

ppm = $\frac{0.02}{500} \times 10^6$

= $\frac{20000}{500}$ = 40

165. **Answer:** A

Sol:



160. **Answer:** D

Sol:

Given that the unkonwn solution is isotonic with glucose solution. That means osmotic pressure is same$\pi = CRT$

$\pi = \frac{W_2}{M_2 V} \times RT$;

$\left(\frac{W_2}{M_2 V} \times RT\right)_{unknown} = \left(\frac{W_2}{M_2 V} \times RT\right)_{glucose}$

$\left(\frac{1.05}{M_2 \times 0.1} \times RT\right)_{unknown} = \left(\frac{3}{180 \times 0.1} \times RT\right)_{glucose}$

$M_2 = \frac{180 \times 0.1 \times 1.05}{0.1 \times 3}$ = 63 g

Therefore, the correct answer is (D).

162. **Answer:** C

Sol:

H_2SO_4 is 98% by weight = 98 gm solute and 100 gm solution

$\text{density} = \frac{\text{mass}}{\text{volume}}$

1.84 = $\frac{98}{\text{volume}}$

volume of solution = $\frac{98}{1.84}$ ml

Molarity = $\frac{\text{mass} \times 1000}{\text{molecular weight} \times \text{volume of solution}}$

= $\frac{98 \times 1.84}{98 \times 98} \times 1000$

=18.4 M

Therefore the correct answer is (C)

164. **Answer:** B

Sol:

According to Roult's law

$\frac{P_0 - P_s}{P_0} = \frac{n}{n+N}$

m = molecular mass of solid substance.

$n = \frac{2.175}{m}$; N = $\frac{39}{98}$ = 0.5 [Molecular mass of benzene = 78]

P_o = 640 mm Ps = 600 mm

Substituting the values in above equation.

$\frac{640-600}{640} = \frac{\frac{2.175}{m}}{\frac{2.175}{m} \times 0.5} = \frac{2.175}{2.175 + 0.5m}$

m = $\frac{2.175 - 2.175}{0.5}$ = 65.25

m = $\frac{2.175 \times 16 - 2.175}{0.5}$ = 65.25

Therefore the correct answer is (B)

166. **Answer:** C

Sol:

Addition of HgI_2 of KI solution establish following reaction equilibrium $HgI_2 + 2KI \rightleftharpoons K_2[HgI_4]$

The above equilibrium decreases the number of ions (4 ion on left side of the reactions becomes three ions on right side) so after reaction number of ions decreased.

Freezing point $\propto \frac{1}{\text{decrement of particles}}$,

So freezing point of the solution increase.

Therefore the correct answer is (A)

Sol:

The greater the number of ions greater will be lowering in freezing point.

$\Delta T_f = i\, x\, K_f \times m$

$T_f^o - T_f = i\, x\, K_f \times m$

$-\left(T_f - T_f^o\right) = i\, x\, K_f \times m$

$T_f^o = 0^oC$ for water

$-T_f = i \times K_f \times m$

$-T_f \propto i$

(A) i = 2

(B) i = 4

(C) i = 5(max.)

(D) i = 4

i is max. for $K_4\left[Fe\left(CN\right)_6\right]$, so, $K_4\left[Fe\left(CN\right)_6\right]$ will have the lowest freezing point

Therefore, the correct answer is (C).

167. **Answer:** D

Sol:

In BCC structure there are two-atom per unit cell.

Let, m be the gram molecular mass of the element

mass per unit cell = no of atom in the unit cell x mass per atom.

$2 \times \frac{m}{6.02 \times 10^{-24}}$

volume of unit cell = $(290 \times 10^{-10} cm)^3$ $24.4 \times 10^{-24}\ cm^3$

density = $\frac{\text{mass of unit cell}}{\text{volume of unit cell}}$

density is 6.8 g cm^{-3}. (given)

$6.8 = \frac{2 \times m}{6.02 \times 10^{-23} \times 24.4 \times 10^{-24}}$ = 50 g

Thus, the gram molecular mass of the element 50 g

$\because$ 50 gm of an element contains, 6.023×10^{23} atoms.

therefore, 200 gm of the element would contain, $\frac{6.023 \times 10^{-23} \times 200}{50}$ = 24.09×10^{23} atoms.

Therefore, the correct answer is (D).

168. **Answer:** B

Sol:

Given; a = 620 pm

For fcc

$\because$ $4r = \sqrt{2}a$

r = ?

$\therefore$ $r = \frac{\sqrt{2} \times 620}{4}$

r = 219.20 pm

Therefore, the correct answer is (B)

169. **Answer:** C

Sol:

Distance between centres of cation and anion

$= \frac{d}{2} = \frac{508}{2} = 254\,pm$

$r_c + r_a = 254\,pm$ or $110 + r_a = 254$ or $r_a = 144\,pm$

170. **Answer:** C

Sol:

In the CsCl structure, the Cs^+ ion is present at the body center and Cl^- ions are present at all corners. Hence, each Cs^+ ion is surrounded by 8 Cl^- ions.

Therefore, the correct answer is (C).

171. **Answer:** D

172. **Answer:** C

Sol:

Schottky defect is a point defect in a crystal that occurs due to the absence of equal number of cations and anions from the lattice site creating vacancies. Absence of equal number of cation and anion results into maintaining electrical neutrality and the stoichiometry. It occurs in highly ionic compounds with high coordination number and mostly when the cation and the anion are of comparable size i.e. little difference between cation and anion size. Examples of crystals showing Schottky defect are NaCl, KCl, KBr, CsCl etc.

173. **Answer:** B

Sol:

On heating, $ZnO_{(s)}$ dissociates reversibly as $ZnO \rightleftharpoons Zn^{2+} + \frac{1}{2} O_2 + 2e^-$. The Zn^{2+} ions occupy certain interstitial sites whereas the electrons released are present at the neighboring anion vacancies, which act as F-centres.

Therefore, the correct answer is (B).

Sol:

As each Sr^{2+} ion introduces one cation vacancy, therefore, concentration of cation vacancies = mole % of $SrCl_2$, added

$\therefore$ concentration of cation vacancies

$= 10^{-4}\,\text{mole}\,\%$

$= \frac{10^{-4}}{100} \times 6.023 \times 10^{23}$

$= 6.023 \times 10^{17}$

174. **Answer:** B

Sol:

In simple cubic unit cell atoms are present at all corners of the cube

So, no. of atoms in one unit cell $= 8 \times \frac{1}{8} = 1$

In body centred cubic unit cell atoms are present at all corners and at body centre

So no. of atoms in one unit cell $= 8 \times \frac{1}{8} + 1 = 2$

In face centred cubic unit cell atoms are present at all corners and all face centres

so, no. of atoms in one unit cell
$= 8 \times \frac{1}{8} + 6 \times \frac{1}{2} = 4$

175. **Answer:** D

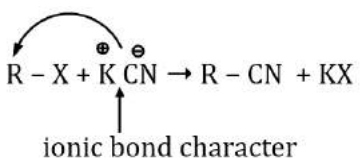
Sol:

Leaving group ability $\propto$ Stability of anion.

$F_3CSO_3^-$ this is most stable anion because their are 3 oxygen where the negative charge is delocalized and 3F has –I effect which stable the –ve charge.the compond is most stable.so this compound is good leaving group.

176. **Answer:** B

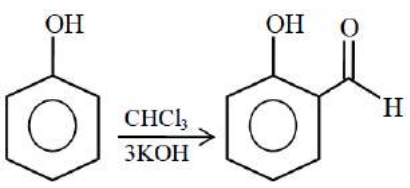
Sol:



177. **Answer:** C

Sol:

Equation of Reimer Tiemann Reaction



178. **Answer:** A

Sol:

Osazone formed by reaction at C-1 & C-2 only, rest carbons configuration is same in glucose & fructose So give exact osazone.

179. **Answer:** B

Sol:

Size↑so the tendency bond to break ↑

Order of size helogens is

I > Br > Cl > F

180. **Answer:** C

Sol:

Aromatic aldehyde i.e. benzaldehyde does not gives fehling test whereas maltose is reducing sugar that gives fehling test.

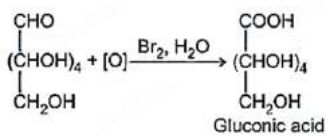
Only aliphatic aldehyde which have alpha Hydrogen give test with fehling's solution and aldehyde group oxidised to carboxylic acid.

181. **Answer:** B

182. **Answer:** B

Sol:

Glucose on oxidation with Br_2 water gives gluconic acid.



Gluconic acid

183. **Answer:** B

Sol:

C_{60} an allotorpe of carbon continas 12 pentagons & 20 hexagons

184. **Answer:** D

Sol:

As boron trihalides are covalent compounds that contain 6 electrons and thus are short of two electrons to complete its octet, thus it can easily accept an electron pair and thus acts as a lewis acid. The bonding tendency in BF_3 is optimum (due to the identical size of 2p- orbitals of B and F, the electron deficiency of B decreases) and decreases from BF_3 to BI_3. Thus BI_3 behaves as a Lewis acid which is strongest.

→ Acidic nature decreases due to back bonding

$BI_3 > BBr_3 > BCl_3 > BF_3$

Therefore, the correct answer is, (B)

185. **Answer:** C

Sol:

Plumbosolvency is the dissolution of lead in ordinary water. It increases lead concentration in water that passes through lead pipes. This makes water unfit for human consumption and may lead to health hazards. Due to this phenomenon lead pipes are not used for carrying water.

$2Pb + O_2 + 2H_2O \rightarrow 2Pb(OH)_2$

Therefore, the correct answer is (C).

Sol:

The chemical formula of calcium carbide is CaC_2

The structure of Ca^2 is as follows –

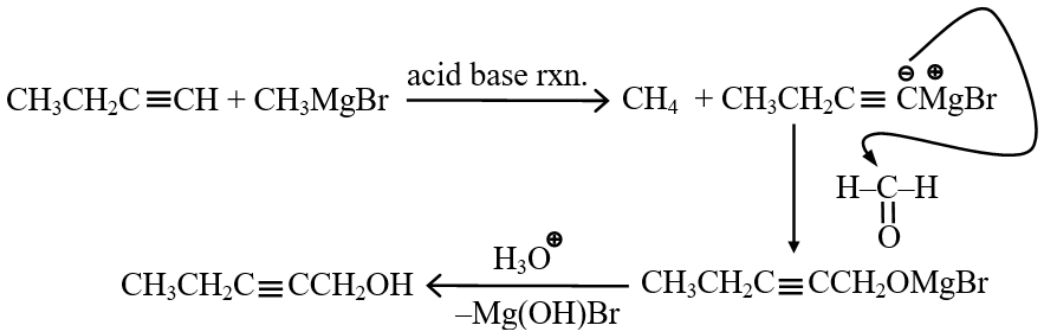
$Ca^{+2} \; -C \equiv C-$

The carbide contains two carbon atoms bonded with triple bond. This triple bond contains 2 π bonds one sigma bond.

Therefore, the correct answer is (D).

186. **Answer:** D

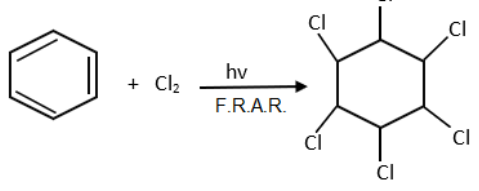
Sol:



187. **Answer:** C

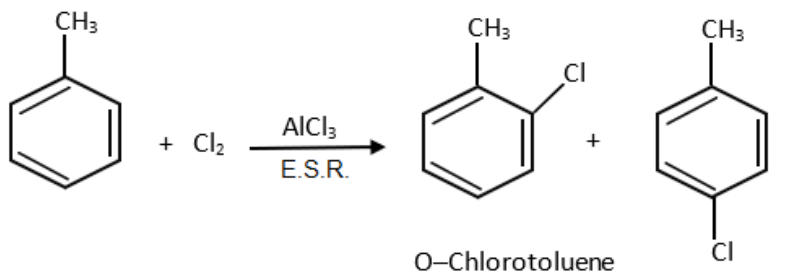
Sol:

(A)



Hexachlorobenzene

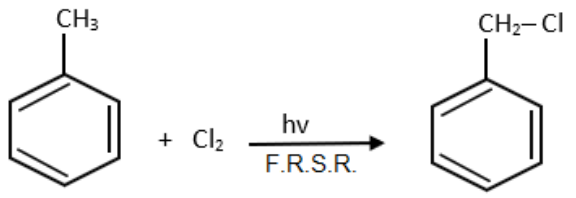
(B)



O–Chlorotoluene

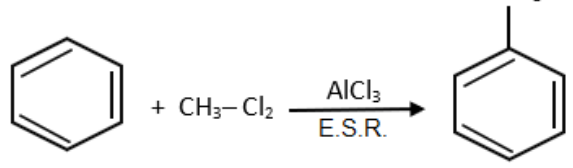
P– Chlorotoluene

(C)



Benzylchloride

(D)

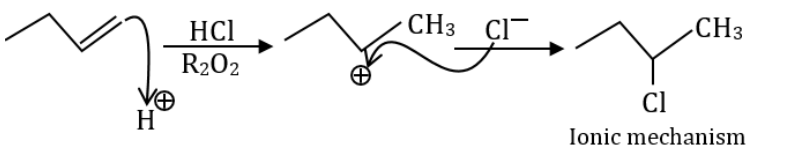


(Friedel–Craft Toluene alkylation)

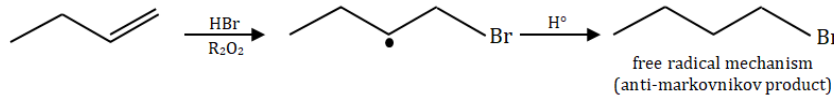
Hence, the correct answer is (C).

188. **Answer:** A

Sol:



Ionic mechanism
(Markovnikov product)

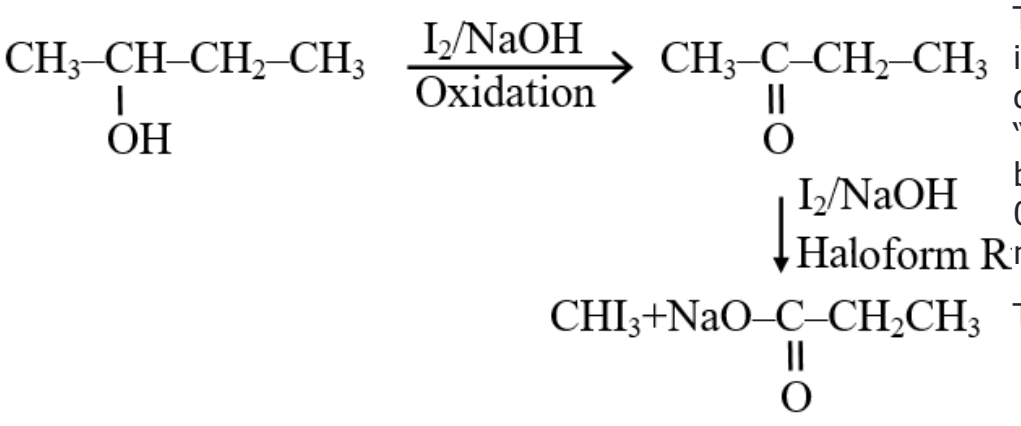


free radical mechanism
(anti-markovnikov product)

In the presence of peroxide HBr follows free radical mechanism while HCl follows the ionic mechanism,

189. **Answer:** C

Sol:



190. **Answer:** C

Sol:

The most abundant noble gas in atmosphere is Argon. Argon is the first noble gas to be discovered. Argon is from the Greek word "Argos" which means "lazy" or "inactive". It belongs to noble gas and makes up about 0.93% of Earth's atmosphere. It is the third most abundant gas in the atmosphere.

Therefore, the correct answer is (C).

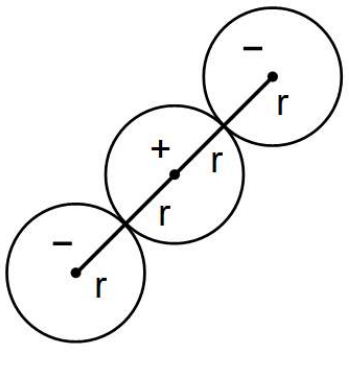
191. **Answer:** C

192. **Answer:** C

Sol:

In a body centred cubic unit cell (bcc) atoms are present at body centre and corners of the cube.

The closed approach of atoms is at body diagonal represented as follows:



Body diagonal = $\sqrt{3}$a = 4 r

so, a = $\frac{4r}{\sqrt{3}}$

193. **Answer:** A

Sol:

$\pi = CRT = \frac{wt \times 1000}{GMM \times V} RT$

$2.57 \times 10^{-3} = \frac{1.26 \times 1000}{GMM \times 200} \times 0.083 \times 300$

GMM = 60377 g/mol

194. **Answer:** D

Sol:

$HA = H^+ + A^-$

$(1-\alpha) \quad \alpha \quad \alpha$

pH = 2 =$[H^+]$; $10^{-2} = C^2$

$\alpha = 0.01$

$i = 1 + \alpha = 1 + 0.01 = 1.01$

195. **Answer:** C

Sol:

$HX \rightleftharpoons H^+ + X^-$

1 0 0

1-0.3 0.3 0.3

total no. of moles after dissociation

0.3 + 0.3 + 0.3 = 1.3

$\frac{k_f}{1.85} = \frac{1-3}{1}$

$k_f = 1.85 \times 1.3 = 2.405$

$\Delta T_f = k_f \times$ moles

$2.405 \times 0.2 = 0.4010$

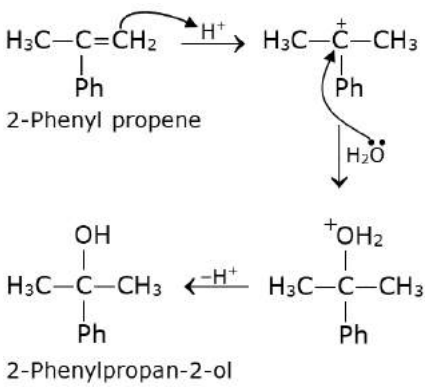
freezing pt

= 0.0481

= – 0.480°C

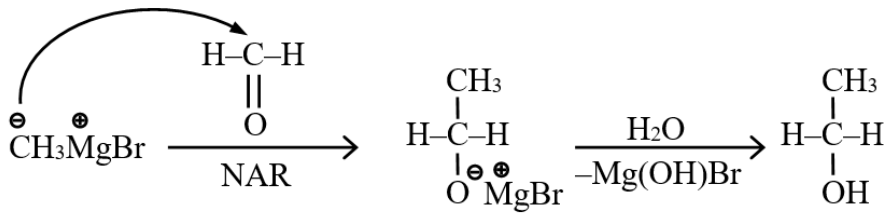
196. **Answer:** A

Sol:



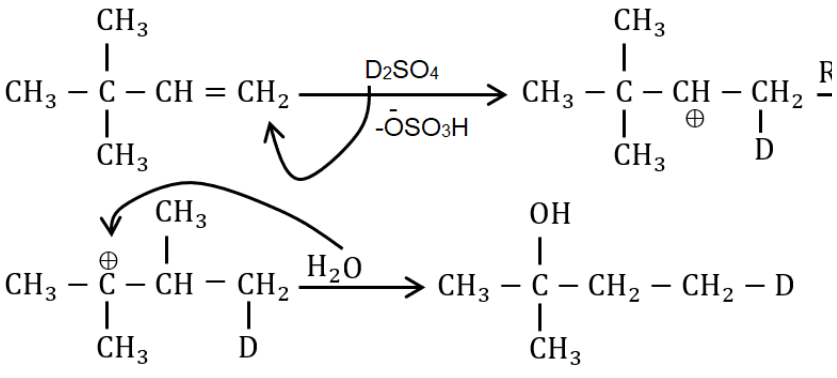
197. **Answer:** C

Sol:



198. **Answer:** C

Sol:



199. **Answer:** B

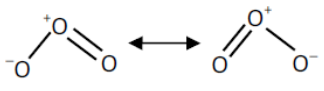
200. **Answer:** D

Sol:

Ozone(O_3) or trioxygen , is an inorganic molecule.O_3 is used as germicide for purification of air.

In O_3, O – O bond length is not identical with that of molecular oxygen. O_3 molecule is angular in shape due to presence of lone pair on centred oxgen its shape get angular.

O_3 is an oxidizing agent.

ozone bond 

Sol:

The Beilstein test is commonly used to detect the presence of halogens in organic compounds. To conduct the test, a piece of Copper wire or copper gauze placed in a flame to burn off impurities.

When the flame shows no green, the copper wire is removed and a small piece or drop of the material to be tested is placed on its surface, then metal is returned to the flame.

A green flame is a positive result for the presence of a halogen compound.

Therefore, the correct answer is (D).