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Question Paper
ENTHUSE_SEMI MAJOR TEST-3
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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PART – I _ SECTION – A _ [BOTANY]

1. Identify the types of inflorescence shown in figure and select the correct option for P and Q

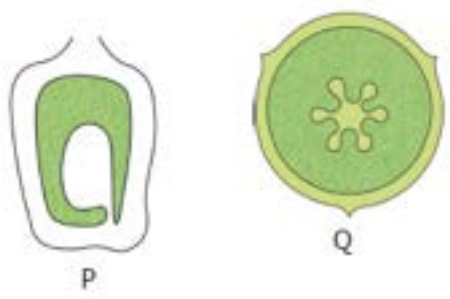
(A) **(P)** Cymose – **(Q)** Racemose

(B) **(P)** Racemose – **(Q)** Cymose

(C) **(P)** racemose – **(Q)** racemose

(D) **(P)** Cymose – **(Q)** Cymose

2. What is true for the (P) and (Q) type of placentation given below



(A) P = Found in sunflower, Q = Found in pea

(B) P = Found in marigold, Q = Found in Dianthus and Primrose

(C) P = Found in pea, Q = Found in sunflower

(D) P = Found in Dianthus and Primrose, Q = Found in marigold

1. चित्रा में दर्शाये गये पुष्पक्रम के प्रकार को पहिचानिये तथा P और Q के लिए सही विकल्प को चुनिये।

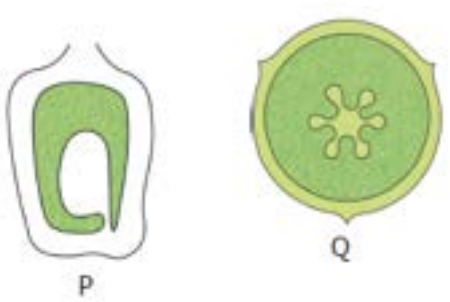
(A) **(P)** ससीमाक्षी – **(Q)** असीमाक्षी

(B) **(P)** असीमाक्षी – **(Q)** ससीमाक्षी

(C) **(P)** असीमाक्षी – **(Q)** असीमाक्षी

(D) **(P)** ससीमाक्षी – **(Q)** ससीमाक्षी

2. नीचे दिये बीजाण्डन्यास के प्रकार (P) तथा (Q) के लिए क्या सही है।



(A) P = सूरज मुखी में पाया जाता है। Q = मटर में पाया जाता है।

(B) P = गेंदा में पाया जाता है Q = डायएन्थस तथा प्रिमरोज में पाया जाता है।

(C) P = मटर में पाया जाता है। Q = सूरजमुखी में पाया जाता है।

(D) P = डायएन्थस तथा प्रिमरोज में पाया जाता है Q = गेंदे में पाया जाता है।

3. Identify the flower parts P to T in the given diagram.

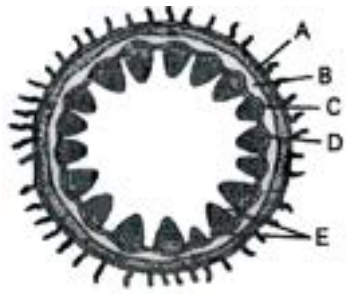
(A) P–Androecium, Q–Gynoecium, R–Corolla, S–Calyx, T–Pedicel

(B) P–Androecium, Q–Gynoecium, R–Corolla, S–Pedicel, T–Calyx

(C) P–Androecium, Q–Gynoecium, R–Pedicel, S–Corolla, T–Calyx

(D) P–Androecium, Q–Gynoecium, R–Calyx, S – Corolla, T–Pedicel

4. Choose the correct option for identification of A to E in the given TS of dicot stem.



(A) A-Hypodermis, B-Chlorenchyma, C-Endodermis, D-Pericycle, E-Medullary rays

(B) A-Hypodermis, B-Parenchyma, C-Endodermis, D-Pericycle, E-Medullary rays

(C) A-Hypodermis, B-Sclerenchyma, C-Endodermis, D-Pericycle, E-Medullary rays

(D) A-Hypodermis, B-Sclerenchyma, C-Endodermis, D-Pericycle, E-Parenchyma

5. Which one is a single celled fungus :-

(A) Penicillium

(B) Aspergillus

(C) Yeast

(D) All the above

6. Stolon is common in :

(A) Banana and jasmine

(B) Mint and jasmine

(C) Mango and jasmine

(D) Maize and jasmine

3. दिये गये चित्र में पुष्प के भाग P से T को पहिचानिए।

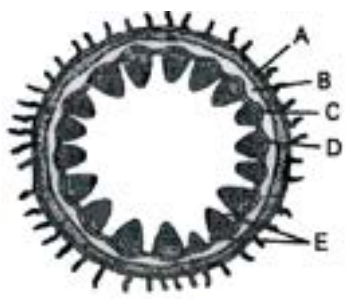
(A) पुमंग – जायांग– कोरोला – केलिक्स – पेड़िसेल

(B) पुमंग– जायांग – कोरोला – पेड़िसेल – केलिक्स

(C) पुमंग – जायांग – पेड़िसेल – कोरोला – केलिक्स

(D) पुमंग – जायांग – केलिक्स – कोरोला – पेड़िसेल

4. द्विबीजपत्री तने की अनुप्रस्थ काट में A से E तक सही विकल्प को पहचानिये।



(A) A-हाइपोडर्मिस, B-क्लोरेन्काइमा, C-एण्डोडर्मिस, D-परिरंभ, E-मेडूलरी किरणें

(B) A-हाइपोडर्मिस, B-पेरेनकाइमा, C-एण्डोडर्मिस, D-परिरंभ, E-मेडूलरी किरणें

(C) A-हाइपोडर्मिस, B-स्केलेरेनकाइमा, C-एण्डोडर्मिस, D-परिरंभ, E-मेडूलरी किरणें

(D) A-हाइपोडर्मिस, B-स्केलेरेनकाइमा, C-एण्डोडर्मिस, D-परिरंभ, E-पेरेनकाइमा

5. निम्न में से कौनसा एककोशकीय कवक है :-

(A) पेनीसीलियम

(B) एस्परजीलस

(C) यीस्ट

(D) उपरोक्त सभी

6. भूस्तारी सामान्यः होते है।

(A) केला तथा चमेली

(B) पुदीना तथा चमेली

(C) आम तथा चमेली

(D) मक्का तथा चमेली

7. Leaves originate from :

(A) Shoot apical meristems and arranged in acropetal order

(B) Shoot apical meristems and arranged in basipetal order

(C) Bark

(D) Root apical meristem

8. Which is normally found in isobilateral leaves

(A) Spongy tissue

(B) Palisade tissue

(C) Both (A) and (B)

(D) None of the above

9. Find the incorrect match w.r.t. aestivation :

(A) Pea and beans – Vexillary

(B) Calotropis – Twisted

(C) Cassia – Imbricate

(D) Lady's finger – Twisted

10. Radish is an example of -

(A) Fusiform root

(B) Napiform root

(C) Conical root

(D) Tuberous root

11. Underground stems of potato, ginger, turmeric, Zamikand and Colocasia are modified to :

(A) Propagate reproductively by asexual methods

(B) Store food

(C) Perform perennation

(D) All are correct

12. In few plants, the leaf or lamina falls off and the petiole modifies into leaf like structure performing photosynthesis called :

(A) Phyllode

(B) Phyllocalde

(C) Cladode

(D) Cladophyll

13. Xylem conducts water from :-

(A) Leaves to roots

(B) Roots to rest of the plant

(C) Tracheids to vessels

(D) Fibres to tracheids

7. पर्ण की उत्पत्ति कहाँ से होती है।

(A) शीर्ष प्ररोह विभाज्योत्तक तथा अग्रभिसारी क्रम में व्यवस्थित होती हैं।

(B) शीर्ष प्ररोह विभज्योत्तक तथा तलाभिसारी क्रम में व्यवस्थित होती है।

(C) छाल से

(D) मूल शीर्ष विभज्योत्तक

8. समद्विपार्श्व पत्तियों में सामान्यतया पाया जाता है :-

(A) स्पंजी ऊतक

(B) खम्भ ऊतक

(C) दोनों (A) व (B)

(D) कोई नहीं

9. पुष्प दल विन्यास के सन्दर्भ में गलत मिलान को छाँटिए

(A) मटर तथा बीन – ध्वजीय (वैक्जीलेरी)

(B) केलोट्रोपिस – व्यावर्तित

(C) केसिया – कोरछादी

(D) भिण्डी – व्यावर्तित

10. मूली (Radish) उदाहरण है -

(A) तर्कु रूप मूल का

(B) कुम्भी रूप मूल का

(C) शंकुरूपी मूल का

(D) गांठदार मूल का

11. आलू, अदरक, हल्दी, जमीकंद तथा अरबी के भूमिगत तने किसके लिए रूपान्तरित हो जाते है

(A) अलेंगिक विधि द्वारा कायिक प्रवर्धन

(B) संचित भोजन

(C) चिरकालिक अंग

(D) सभी सही है

12. कुछ पादपों में, पर्ण या पर्णफलक गिर जाता है तथा पर्णवृन्त पत्ति जैसी प्रकाश संश्लेषण करने वाली संरचना में रूपांतरित हो जाता है इसे कहते है

(A) पर्णाभवृन्त

(B) पर्णाभकाय स्तम्भ

(C) पर्णाभ पर्व

(D) क्लेडोफिल

13. जायलम जल का संवहन करते है

(A) पर्णो से मूलों तक

(B) मूलों से अन्य पादप भागों को

(C) वाहिनिकाओं से वाहिकाओं तक

(D) तंतुओं से वाहिनिकाओं तक

14. Embryo of a seed is made up of -

(A) Meristematic tissue

(B) Parenchyma

(C) Collenchyma

(D) Sclerenchyma

15. Water impermeable, waxy material secreted by endodermal cells in the form of casparian strip is

(A) lignin

(B) suberin

(C) conjuctive tissue

(D) pectin

16. Which one is most important in microscopy :-

(A) Resolving power

(B) Magnification

(C) Study of living cells

(D) Study of biochemicals

17. Genus is a category which comes in between the

(A) Family and Species

(B) Class and Family

(C) Order and Phylum

(D) Kingdom and Class

18. The taxonomic unit 'Phylum' in the classification of animals is equivalent to which hierarchial level in classification of plants?

(A) Class

(B) Order

(C) Division

(D) Family

19. In zoological parks, animals are

(A) Kept and preserved in containers or jars

(B) Preserved in boxes after killing

(C) Kept in protected environments under human care

(D) Stuffed and then preserved

20. Taxonomic keys are generally _____ and are based on _____ characters.

(A) Non-analytical, contrasting

(B) Analytical, non-contrasting

(C) Non-analytical, non-contrasting

(D) Analytical, contrasting

14. एक बीज का भ्रूण (embryo) किस ऊतक का बनता है-

(A) विभज्योतकी ऊतक

(B) मृदूतक

(C) स्थूलकोण ऊतक

(D) दृढ़ोत्तक

15. जल के लिए अपारगम्य, मोम युक्त पदार्थ का स्त्रवण केसपेरियन पट्टीयो के रूप में एण्डोडर्मल कोशिकाओ द्वारा होता है। यह है

(A) लिग्निन

(B) सुबेरिन

(C) संयोजी ऊतक

(D) पेक्टिन

16. माइक्रोस्कॉपी में सबसे महत्वपूर्ण होता है

(A) विभेदन शक्ति

(B) मेग्नीफिकेशन

(C) सजीव कोशिकाओ का अध्ययन

(D) जैवरसारयन का अध्ययन

17. वंश श्रेणी किस के मध्य आती है

(A) कुल तथा जाति

(B) वर्ग तथा कुल

(C) गण तथा संघ

(D) जगत तथा वर्ग

18. जन्तुओं के वर्गीकरण में वर्गिकी इकाई 'संघ', पादपीय वर्गीकरण के कौन-से पदानुक्रम के तुल्य हैं ?

(A) वर्ग

(B) गण

(C) प्रभाग

(D) कुल

19. प्राणी उद्यानों में जन्तुओं को

(A) पात्रों या जार में परिरक्षित रखा जाता है

(B) मारने के बाद डिब्बों में परिरक्षित रखा जाता है

(C) मानव की देख-रेख में सुरक्षित पर्यावरण में रखा जाता है

(D) भराई करके परिरक्षित किया जाता है

20. वर्गिकी कुँजी सामान्यतः _____ है तथा _____ लक्षणों पर आधारित है।

(A) विश्लेषण रहित, विपर्यासी

(B) विश्लेषणात्मक, अविपर्यासी

(C) विश्लेषण रहित, अविपर्यासी

(D) विश्लेषणात्मक, विपर्यासी

21. In Whittaker's "Five kingdom classification", eukaryotes were assigned to :-

(A) Only two of the five kingdoms

(B) Only three of the five kingdoms

(C) Only four of the five kingdoms

(D) All the five kingdoms

22. Mycoplasma is :-

(A) Eukaryotic and multicellular

(B) Prokaryotic and multicellular

(C) Prokaryotic and unicellular

(D) Eukaryotic and unicellular

23. Biochemical resemblance is generally used for the identification of which group of individuals:-

(A) Fungi

(B) Monera

(C) Protista

(D) Plantae

24. Bacterial ribosomes are called :-

(A) Autosomes

(B) Dictyosomes

(C) Centrosomes

(D) Polysomes

25. Mycorrhiza is :-

(A) Symbiotic association of fungus and algae

(B) Symbiotic association of algae and higher plant

(C) Symbiotic association of fungus and root of higher plant

(D) Symbiotic association of bacteria and root of higher plant

26. Penicillin attacks on which part of bacteria and which process is affected to it :-

(A) Ribosome – protein synthesis

(B) Mesosome – wall formation

(C) Nucleoid – cell respiration

(D) Genophore – DNA replication

21. व्हाइटेकर के पाँच जगत वर्गीकरण में यूकैरियोट्स का स्थान है :-

(A) पाँच जगत में से केवल दो

(B) पाँच जगत में से केवल तीन

(C) पाँच जगत में से केवल चार

(D) सभी पाँचों जगत

22. माइकोप्लाज्मा होता है : -

(A) यूकेरियोटिक एवं बहुकोशीय

(B) प्रोकेरियोरिक एवं बहुकोशीय

(C) प्रोकेरियोटिक एवं एककोशीय

(D) यूकेरियोटिक एवं एककोशीय

23. किस वर्ग के जीवधारियों को पहचानने के लिए जैव रासायनिक समानता का उपयोग किया जाता है :-

(A) कवक

(B) मोनेरा

(C) प्रोटिस्टा

(D) प्लाण्टी

24. बैक्टीरियम राइबोसोम कहलाते हैं :-

(A) ओटोसोम

(B) डिक्टियोसोम

(C) सेन्ट्रोसोम

(D) पॉलीसोम

25. माइकोराइजा है:-

(A) कवक व शैवाल में सहजीवी सम्बन्ध

(B) शैवाल व उच्च पादपों में सहजीवी सम्बन्ध

(C) कवक व उच्च पादपों की जड़ो में सहजीवी सम्बन्ध

(D) जीवाणु व उच्च पादपों की जड़ो में सहजीवी सम्बन्ध

26. पेनिसिलिन जीवाणु के किस भाग पर आक्रमण करती है और इससे कौनसा कार्य प्रभावित होता है :-

(A) राइबोसोम - प्रोटीन संश्लेषण

(B) मीजोसोम - भित्ति निर्माण

(C) केन्द्रकाभ - कोशिकीय श्वसन

(D) जीनोफोर - DNA रेप्लिकेशन

27. Which group of organisms are devoid of cell wall in their vegetative stage but develop a wall in reproductive phase :-

(A) Fungi

(B) Blue-green algae

(C) Slime mould

(D) Archaebacteria

28. A group of fungi with septate mycelium in which sexual reproduction is either unknown or lacking are classified under :-

(A) Phycomycetes

(B) Deuteromycetes

(C) Ascomycetes

(D) Basidiomycetes

29. Reserve food material of fungi is :-

(A) Starch

(B) Protein

(C) Glycogen

(D) Glycogen and oil bodies

30. Which of the following is not a fungal disease:-

(A) White rust of crucifers

(B) Black rust of wheat

(C) Red rust of tea

(D) Red rot of sugarcane

31. Which structure is not synthesized by Mycoplasma :

(A) RNA

(B) DNA

(C) Cholesterol

(D) Ribosome

32. Which is not true for virus :-

(A) virus are host specific

(B) virus are mutable

(C) capsid is the structural unit of Capsomeres

(D) first discovered virus was T.M.V

33. Which disease is caused by viroids :-

(A) Potato leaf roll disease

(B) Potato spindle tuber disease

(C) Rice dwarf disease

(D) Tobacco mosaic disease

27. निम्न में से किस वर्ग के जीवधारियों की कायिक अवस्था में कोशिकाभिति अनुपस्थित होती है परन्तु प्रजनन अवस्था में पायी जाती है :-

(A) कवक

(B) नील- हरित शैवाल

(C) स्लाइम मोल्ड

(D) आर्कीबैक्टीरिया

28. कवक का समूह जिसमें कवक जाल पट्टयुक्त होता है और लैंगिक जनन या तो देखा नहीं गया या अनुपस्थित होता है। को वर्गीकृत किया है।

(A) फाइकोमाइसिटीज में

(B) ड्यूट्रोमाइसिटीज में

(C) एस्कोमाइसिटीज में

(D) बेसीडियोमाइसिटीज में

29. कवकों का संचित भोज्य पदार्थ होता है :-

(A) मण्ड

(B) प्रोटीन

(C) ग्लाइकोजन

(D) ग्लाइकोजन तथा तैल काय

30. निम्न में से कौनसा रोग कवक जनित नहीं है:-

(A) क्रूसीफर्स का श्वेत किट्ट

(B) गेहूँ का काला किट्ट

(C) चाय का लाल किट्ट

(D) गन्ने का लाल सड़न

31. माइकोप्लाज्मा के द्वारा कौनसी संरचना संश्लेषित नहीं की जाती है :

(A) आर.एन.ए.

(B) डी.एन.ए.

(C) कॉलेस्टेरॉल

(D) राइबोसोम

32. विषाणु के लिए कौनसा सही नहीं है :-

(A) विषाणु पोषद विशिष्ट होते हैं।

(B) विषाणु उत्परिवर्तनशील होते हैं।

(C) केप्सोमीयर की संरचनात्मक इकाई केप्सिड है

(D) T.M.V प्रथम खोजा गया विषाणु था

33. वाइरोइड के कारण कौनसा रोग होता है :-

(A) पोटेटो लीफ रोल रोग

(B) पोटेटो स्पिंडल ट्यूबर रोग

(C) राइस ड्राफ रोग

(D) टोबेको मोजेक रोग

34. Cauliflower mosaic virus contains :–

(A) ss RNA

(B) ds RNA

(C) ds DNA

(D) ss DNA

35. When does pairing of homologous chromosomes occurs in meiosis :-

(A) Diplotene

(B) Pachytene

(C) Zygotene

(D) Leptotene

34. कॉलीफ्लावर मोजेइक वाइरस में होता है :-

(A) ss RNA

(B) ds RNA

(C) ds DNA

(D) ss DNA

35. मियोसिस में कब समजात गुणसूत्र जोड़े बनाते हैं:-

(A) डिप्लोटीन

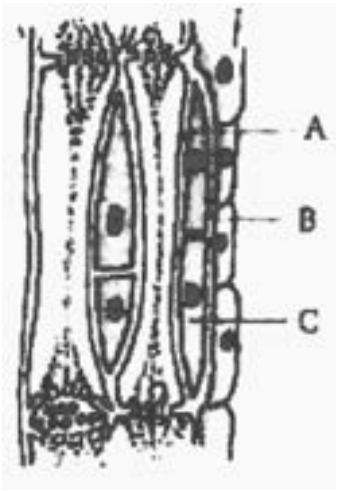
(B) पेकीटीन

(C) जायगोटीन

(D) लेप्टोटीन

PART – I _ SECTION – B _ [BOTANY]

36. Identify A, B and C of pholem:



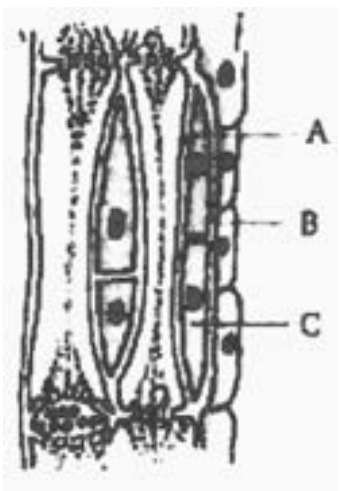
(A) A = Sieve tube, B = Phloem parenchyma, C = Companion cell

(B) A = Companion cell, B = Phloem parenchyma, C = Sieve tube

(C) A = Phloem parenchyma, B = Companion cell, C = Sieve tube

(D) A = Companion cell, B = Sieve tube, C = Phloem parenchyma

36. फ्लोएम के A, B तथा C को पहचानिए।



(A) A = चालनी नलिकाए, B = फ्लोएम मृदुतकए, C = सहचर (सह) कोशिका

(B) A = सहचर (सह) कोशिका, B = फ्लोएम मृदुतक, C = चालनी नलिका

(C) A = फ्लोएम मृदुतक, B = सहचर (सह) कोशिका, C = चालनी नलिका

(D) A =सहचर (सह) कोशिका, B = चालनी नलिका C = फ्लोएम मृदुतक

37. Decomposer protist is :–

(A) Slime mold

(B) Diatoms

(C) Dinoflagellates

(D) Euglenoids

37. अपघटक प्रोटिस्ट है :-

(A) स्लाइम मोल्ड

(B) डायएटम्स

(C) डायनोफ्लेजलेट्स

(D) यूग्लीनॉइड्स

38. 'Pond silk' is the common name of :-

(A) Ulothrix

(B) Spirogyra

(C) Vaucheria

(D) Oedogonium

38. ' पोण्ड सिल्क ' किसका सामान्य नाम है :-

(A) यूलोथ्रिक्स

(B) स्पाइरोगायरा

(C) वाउचेरिया

(D) उडोगोनियम

39. Bulliform cells:

(A) Are large and colourless cells

(B) When turgid help in leaf expansion and when flaccid due to water stress, they make leaves curl inwards to minimise water loss.

(C) Act as motor cells.

(D) All are correct.

39. बुलीफॉर्म कोशिकाऐं होती हैः-

(A) रंगहीन तथा लम्बी कोशिकाए

(B) जब कोशिका जल अवशोषित करके स्फीत हो जाती है तो पत्ती खुल जाती है। जल की कमी से यह सिकूड़ जाती है। जल की हानि को रोकने के लिए यह पत्तियों को मोड़ देती है।

(C) चालन कोशिकाओं के रूप में कार्य करती है।

(D) सभी सही है।

40. Gymnosperms:

(A) Lack sieve tubes and companion cells

(B) Lack albuminous cells and sieve cells

(C) Possess vessels

(D) All of these

41. Which is the largest tissue system :-

(A) Epidermal tissue system

(B) Ground tissue system

(C) Vascular tissue system

(D) All

42. A tracheid is:

(A) Living at maturity

(B) Unicellular

(C) Multicellular

(D) With multinucleate condition

43. Dendrochronology is the study of -

(A) Height of a tree

(B) Diameter of a tree

(C) Age of a tree with the help of annual rings

(D) Counting of the number of branches

44. Lamp brush chromosomes observed during :-

(A) Leptotene

(B) Zygotene

(C) Pachytene

(D) Diplotene

45. Results in meiotic division :-

(A) 4 cells, identical

(B) 2 cells, non identical

(C) 4 cells, non identical

(D) 4 cells, identical

46. "Bouquet-stage" occur in which sub stages of prophase - I:-

(A) Leptotene

(B) Zygotene

(C) Pachytene

(D) Diplotene

40. अनावृतबीजी

(A) चालनी नलिका तथा सहकोशिकाओं रहित होते है

(B) एल्ब्यूमिनस कोशिका तथा चालनी नलिका रहित होते है

(C) वाहिकाऐं युक्त होते है

(D) उपरोक्त सभी

41. सबसे बड़ा उत्तक तंत्र है :-

(A) अधिचर्मीय उत्तक तंत्र

(B) भरण उत्तक तंत्र

(C) संवहन उत्तक तंत्र

(D) सभी

42. एक वाहिनिका

(A) परिपक्वता पर जीवित होती है

(B) एक कोशिकीय होती है

(C) बहुकोशिकीय होती है

(D) बहु केन्द्रकीय अवस्था युक्त होती है

43. वृक्ष कालानुक्रमण में अध्ययन किया जाता है

(A) पेड़ की ऊंचाई का

(B) पेड़ के व्यास का

(C) वार्षिक वलयों की सहायता से पेड़ की आयु का

(D) शाखाओ की संख्याओं को गिन कर पेड़ की आयु का

44. लेम्पब्रश गुणसूत्र दिखाई देते है

(A) लेप्टोटीन में

(B) जायगोटीन में

(C) पेकीटीन में

(D) डिप्लोटीन में

45. अर्द्धसूत्री विभाजन के परिणाम स्वरूप बनती है

(A) 4 कोशिकाए, समान

(B) 2 कोशिकाए, असमान

(C) 4 कोशिकाए, असमान

(D) 4 कोशिकाए, समान

46. "गुलदस्ता अवस्था" प्रोफेज . - I की किस अवस्था में पायी जाती है:-

(A) लेप्टोटीन

(B) जाइगोटीन

(C) पेकीटीन

(D) डिप्लोटीन

47. Major Pigments in Phaeophycae :-

(A) Chlorophyll a

(B) Chlorophyll c

(C) Fucoxanthin

(D) All the above

48. An organism lacking chlorophyll but able to carry on photosynthesis of organic matter has been found among which one of the following:-

(A) Bacteria

(B) Fungi

(C) Viruses

(D) Bacteriophages

49. In five kingdom classification which kingdom incorporates prokaryotes :-

(A) Protista

(B) Monera

(C) Myxophyceae

(D) Myxomycophyta

50. In the life cycle of a fern the meiosis occurs during the :-

(A) Formation of spore

(B) Formation of gametes

(C) Germination of spore

(D) Development of zygote

47. फीयोफाइसी में मुख्य वर्णक है:-

(A) क्लोरोफील a

(B) क्लोरोफील c

(C) फ्यूकोजैथिन

(D) उपरोक्त सभी

48. जीव जिसमें क्लोरोफिल नहीं होता किन्तु इस योग्य है कि वह कार्बनिक पदार्थ के साथ प्रकाश संश्लेषण कर सके, ऐसा जीव निम्न में से कौनसा है :-

(A) जीवाणु

(B) कवक

(C) वायरस

(D) जीवाणुभोजी

49. पाँच किंगडम के वर्गीकरण में प्रोकेरियोट्स को किस किंगडम में रखते हैं :-

(A) प्रोटिस्टा

(B) मोनेरा

(C) मिक्सोफाइसी

(D) मिक्सोमाइकोफाइटा

50. फर्न के जीवन चक्र में,अर्धसूत्रण होता है :-

(A) बीजाणु निर्माण के समय

(B) युग्मक निर्माण के समय

(C) बीजाणु अंकुरण के समय

(D) युग्मनज विकास के समय

PART – II _ SECTION – A _ [ZOOLOGY]

51. One of the following is not hermaphrodite

(A) Earthworm

(B) Leech

(C) Taenia

(D) Ascaris

52. Percentage of water in animal body is-

(A) 20%

(B) 65%

(C) 55%

(D) 15%

53. Nuclear DNA of prokaryotes is :-

(A) ds linear

(B) ss linear

(C) ds circular

(D) ss circular

54. Protoplasm term given by :

(A) Purkinje

(B) Dujardin

(C) Huxley

(D) Corti

55. In which of the following, internal fertilization is present –

(A) Apis, Pleurobrachia

(B) Fasciola, Ancyclostoma

(C) Ascaris, Echinus

(D) Euspongia, ctenoplana

56. Which of the following groups of animals have the following feature ?
I. Diploblastic
II. Radial symmetry

(A) Planaria, Physalia, Aurelia

(B) Star fish, Fasciola, Wuchereria

(C) Adamsia, Pleurobrachia Meandrina

(D) Ophiora, Sycon, Sea walnut

51. निम्न में से कौनसा जंतु उभयलिंगी नहीं होता है -

(A) केंचुआ

(B) जौंक

(C) टीनिया

(D) ऐस्केरिस

52. प्राणी कोशिका में जल का प्रतिशत है-

(A) 20%

(B) 65%

(C) 55%

(D) 15%

53. प्रोकेरियोट्स का केन्द्रकीय DNA होता है :-

(A) ds रेखीय

(B) ss रेखीय

(C) ds वृत्ताकार

(D) ss वृत्ताकार

54. जीवद्रव्य शब्द दिया था :

(A) पुरकिन्जे ने

(B) डूजार्डिन ने

(C) हक्सले ने

(D) कोर्टी ने

55. निम्न में से किसमे आतंरिक निषेचन पाया जाता है -

(A) एपिस, प्लूरोब्रेकिया

(B) फेशिओला, एन्साइक्लोस्टोमा

(C) एस्केरिस, इकाइनस

(D) यूस्पांजिया, टीनोप्लेना

56. निम्न में से किन समूहों के प्राणियों में निम्नलिखित लक्षण पाये जाते है
I द्विस्तरीय
II. अरीय सममिति

(A) प्लेनेरिया, फाइसेलिया, ओरेलिया

(B) स्टार फिश, फेशिओला, वाउचेरेरिया

(C) एडेम्सिया, प्लूरोब्रेकिया, मिएण्ड्रीना

(D) ऑफीओरा, साइकॉन, समुद्री अखरोट

57. Read the following statements.
(a) Metagenesis is observed in Helminths.
(b) Echinoderms are triploblastic and coelomate animals.
(c) Round worms have organ-system level of body organization.
(d) Comb plates present in ctenophores help in digestion.
(e) Water vascular system in characteristic of Echinoderms.
Choose the correct answer form the options given below.

(A) (b), (c) and (e) are correct

(B) (c), (d) and (e) are correct

(C) (a), (b) and (c) are correct

(D) (a), (d) and (e) are correct

57. निम्नलिखित कथनो को ध्यान से पढे।
(a) मेटाजनेसिस हेल्मीन्थस (Helminths) में पाया जाता है।
(b) एकाइनोडर्म त्रिकोरक एवं गुहीय जंतु होते है।
(c) गोलकृमियों में संगठन का स्तर अंग तंत्र होता हैं
(d) टीनोफोर में उपस्थित कंकत पट्टिकाएँ पाचन में सहायता करती हैं।
(e) जल संवहन तंत्र एकाइनोडर्म की विशिष्टता होती है।
निम्न विकल्पों से उचित उत्तर का चयन करो।

(A) (b), (c) तथा (e) सही है

(B) (c), (d) तथा (e) सही है

(C) (a), (b) तथा (c) सही है

(D) (a), (d) तथा (e) सही है

58. Which of the following is correctly matched with its characters ?

(A) Animal—Planaria, Phylum—Platyhelminthes, Character—Regeneration

(B) Animal—Pleurobrachia, Phylum—Cnidaria, Character—Combplate

(C) Animal—Adamsia, Phylum—Annelida, Character—Cnidoblast

(D) Animal—Fasciola, Phylum—Aschelminthes, Character—Flame cell

58. निम्न में से कौन उसके लक्षण के साथ सही मिलान को दर्शाता हैं ?

(A) जंतु—प्लेनेरिया, संघ—प्लेटिहेल्मिन्थीज, लक्षण —पुनरूद्भवन

(B) जंतु—प्ल्यूरोब्रकिया, संघ—निडेरिया , लक्षण —कंकत पट्टिकाए

(C) जंतु—एडमसिया, संघ—एनीलिडा, लक्षण —निडोब्लास्ट

(D) जंतु—फेशिऑला , संघ—ऐस्केल्मिन्थीज, लक्षण —ज्वाला कोशिकाएं

59. Haemoglobin is dissolved in blood plasma of

(A) Frog

(B) Pila

(C) periplanata

(D) Pheretima

59. किसके रक्त प्लाज्मा हीमोग्लोबिन घुलित अवस्था में होता है

(A) मेंढक

(B) पाइला

(C) पेरीप्लेनेटा

(D) फेरेटिमा

60. Choose that which of the following statement is/are **correct** ?
(A) Planaria have a dorsoventrally flattened body and high regeneration capacity.
(B) Polyps produce medusae asexually and medusae form the polyps sexually in obelia.
(C) Locusta is a gregarious pest and have a open circulatory system.
(D) Devil fish have radula is feeding or rasping organ in mouth.

(A) A & B

(B) C & D

(C) B, C & D

(D) A, B, C & D

60. निम्नलिखित मे से कौनसे कथन सही है
(A) प्लेनेरिया का शरीर पृष्ठाधारी चपटा तथा उच्च पुनरूदभवन क्षमता युक्त होता है
(B)ओबेलिया मे पोलिप अलेंगिक रूप से मेडुसा उत्पन्न करते है तथा मेडुसा लेंगिक रूप से पोलिप उत्पन्न करते है
(C) टिड्डिया झुण्ड में रहने वाले कीट है तथा इसमें खुला परिसंचरण तंत्र पाया जाता है
(D) डेविल फिश के मुख मे भोजन के लिए रेती के समान घिसने का अंग रेडुला होता है

(A) A व B

(B) C व D

(C) B, C व D

(D) A, B, C व D

61. Which group of animals belong to the same phylum ?

(A) Sponge, Sea anemone, Starfish

(B) Unio, Hirudinaria, mosquito

(C) Earthworm, Nereis, Tapeworm

(D) Prawn, Scorpion, Locusta

61. निम्नलिखित जंतु-समूहों में से कौन-से एक ही फाइलम के अंतर्गत आते है ?

(A) स्पंज, समुद्री ऐनीमोन, स्टारफिश

(B) यूनियो, हिरूडेनेरिया, मच्छर

(C) केंचुआ, नेरीस, फीताकृमि (टेपवर्म)

(D) झींगा, बिच्छु, लोकस्टा (टिड्डी)

62. Neries is an aquatic animal. Which structure help in their excretion and osmoregulation :-

(A) Parapodia

(B) Nephridia

(C) Malpighian tubules

(D) Flame cells

62. नेरीज एक जलीय जन्तु है। निम्न में से कौनसी संरचना इसमें उत्सर्जन व परासरण नियमन में सहायता करती है।

(A) पेरापोडिया

(B) नेफ्रेडिया

(C) मेलपिगियन नलिकाएँ

(D) ज्वाला कोशिकाए

63. Which of the following is commonly called "**pearl oyster**"?

(A) Limulus

(B) Dentalium

(C) Pinctada

(D) Aurelia

63. निम्न में से किसे सामान्य रूप से "(**पर्ल ओइस्टर**)" कहते हैं

(A) लिमूलस

(B) डेन्टेलियम

(C) पिंक्टाडा

(D) ओरेलिया

64. 3123 the given enzyme belongs to which class of enzymes :-

(A) Ligases

(B) Oxido–reductases

(C) Hydrolases

(D) Isomerases

64. 3123 दिया गया एंजाइम, एंजाइमों के किस वर्ग से सम्बन्धित हैं : -

(A) लाइगेजेज

(B) ओक्सीडो-रिडक्टेजेज

(C) हाइड्रोलेजेज

(D) आइसोमरेजेज

65. Which of the following is not strictly macromolecule :-

(A) Polysaccharide

(B) Protein

(C) Lipid

(D) Nucleic acid

65. निम्न में से कौनसा एक वास्तव (strictly) में वृहद-अणु नहीं है:-

(A) पोलीसेकेराइड

(B) प्रोटीन

(C) लिपिड

(D) न्यूक्लिक अम्ल

66. Protoplasmic elements form :-

(A) Protein and enzyme

(B) Nucleic acid

(C) Lipid

(D) All the above

66. प्रोटोप्लाज्मिक तत्व बनाते हैं :-

(A) प्रोटीन व एन्जाइम

(B) न्यूक्लिक अम्ल

(C) लिपिड

(D) उपरोक्त सभी

67. In protein amino acid, amino group attached at which carbon atom :-

(A) α–carbon

(B) β–carbon

(C) γ–carbon

(D) All the above

67. प्रोटीन अमीनो अम्ल में अमीनो समुह किस कार्बन पर जुड़ा होता है :

(A) α- carbon

(B) β- carbon

(C) γ- carbon

(D) उपरोक्त सभी

68. Which of the following is example of alkaline amino acid :-

(A) Lysine

(B) Aspartic acid

(C) Alanine

(D) Valine

69. $AB \xrightarrow{\boxed{4\,1\,2\,3}} A + B$

The given reaction is catalysed by the enzyme, which belongs to class :

(A) Oxidoreductase

(B) Transferase

(C) Hydrolases

(D) Lyases

70. Sebaceous gland of skin is –

(A) Holocrine

(B) Merocrine

(C) Apocrine

(D) Heterocrine

71. Stratified squamous epithelium is found in –

(A) Oesophagus

(B) Trachea

(C) Intestine

(D) Stomach

72. Rhodophyceae is red coloured due to :-

(A) Xanthophyll

(B) Carotenoids

(C) γ—phycoerythrin

(D) γ—phycocyanin

73. Tetrad formation in meiosis occurs in :-

(A) Leptotene

(B) Zygotene

(C) Pachytene

(D) Diplotene

74. In plants, meiosis can be observed in :-

(A) Root tip

(B) Leaf primordia

(C) Sporangia

(D) Spores

68. निम्न से क्षारीय अमीनो अम्ल का उदाहरण है:-

(A) लाइसीन

(B) एस्पार्टिक अम्ल

(C) एलेनीन

(D) वेलीन

69. $AB \xrightarrow{\boxed{4\,1\,2\,3}} A + B$

दी गई अभिक्रिया को एंजाइम उत्प्रेरित कर रहा है, जो किस कक्षा से संबंधित है

(A) ऑक्सीडोरिडक्टेज

(B) ट्रांसफरेज

(C) हाइड्रोलेजेज

(D) लायजेज

70. त्वचा की सिबेशियस ग्रन्थि होती है-

(A) होलोक्राइन

(B) मिरोक्राइन

(C) एपोक्राइन

(D) हेटेरोक्राइन

71. स्तरित शल्कीय उपकला उत्तक पाया जाता है -

(A) ग्रसिका में

(B) ट्रेकिया में

(C) आंत्र में

(D) आमाश्य में

72. रोडोफाइसी शैवाल लाल रंग के होते हैं :-

(A) जेन्थोफिल के कारण

(B) केरोटिनॉइड्स के कारण

(C) γ—फायकोएरीथ्रिन के कारण

(D) γ—फायकोसायनिन के कारण

73. अर्धसूत्री विभाजन में चतुष्ठ (Tetrad) निर्माण कब होता है:-

(A) लेप्टोटिन में

(B) जाइगोटिन में

(C) पेकाइटिन में

(D) डिप्लोटिन में

74. पादपों में अर्धसूत्री विभाजन देखा जा सकता है

(A) मूल शीर्ष में

(B) पर्ण आद्यक में

(C) बीजाणुधानी में

(D) बीजाणुओं में

75. The longest phase in meiotic division is :-

(A) Prophase - I

(B) Metaphase - I

(C) Prophase - II

(D) Anaphase - I

76. Gymnosperms include :-

(A) Medium sized trees

(B) Tall tree

(C) Shrubs

(D) All the above

77. Life cycle of gymnosperm is -

(A) Haplontic

(B) Haplodiplontic

(C) Diplontic

(D) Diplohaplontic

78. The prokaryotic cell lacks :-

(A) Nuclear material

(B) Nuclear envelope and plastids

(C) DNA and cell membrane

(D) Nucleus and cell membrane

79. Organelles occur in :-

(A) Amoeba

(B) Bacteria

(C) Eukaryotic cell

(D) Both A and C

80. Cell organelles can be separated by method of :–

(A) Autoradiography

(B) Microtomy

(C) Differential centrifugation

(D) X–ray diffraction

81. Middle lamella is made up of

(A) Silica

(B) Calcium carbonate

(C) Ca & Mg

(D) Calcium oxalate

75. अर्धसूत्री विभाजन की सबसे लम्बी अवस्था है:-

(A) प्रोफेज -I

(B) मेटाफेज - I

(C) प्रोफेज - II

(D) एनाफेज -I

76. जिम्नोस्पर्म में सम्मिलित है :-

(A) मध्यम आकार के वृक्ष

(B) लम्बे वृक्ष

(C) झाड़िया

(D) उपरोक्त सभी

77. जिम्नोस्पर्म का जीवन चक्र होता है -

(A) हेप्लोन्टिक

(B) हेप्लोडिप्लोन्टिक

(C) डिप्लोन्टिक

(D) डिप्लोहेप्लोन्टिक

78. प्रोकेरियोटिक कोशिका में किसका अभाव होता है :-

(A) केन्द्रकीय पदार्थ

(B) केन्द्रकीय आवरण व लवक

(C) DNA तथा कोशिका कला

(D) केन्द्रक व कोशिका कला

79. अंगक पाये जाते हैं :-

(A) अमीबा मे

(B) बैक्टीरिया मे

(C) यूकेरियोटिक कोशिका मे

(D) A व C दोनो मे

80. कोशिकांगों को निम्न में से किस प्रक्रिया द्वारा पृथक किया जा सकता है:-

(A) आटोरेडियोग्राफी

(B) माइक्रोटोमी

(C) विभेदी अपकेन्द्रण

(D) X-किरण विवर्तन

81. मध्य पट्लिका किसकी बनी होती हे

(A) सिलिका

(B) केल्शियम कार्बोनेट

(C) Ca तथा Mg

(D) केल्शियम ऑक्जेलेट

82. Which of the following cell organelle forms a network of membranes throughout the cytoplasm in a cell :-

(A) E.R.

(B) Ribosome

(C) Golgibody

(D) Lysosome

83. What is the difference between a primary lysosome and a secondary lysosome :-

(A) Primary lysosome are longer than secondary lysosome

(B) Primary lysosome are active, while secondary lysosome are inactive

(C) Primary lysosome have a low pH, while secondary lysosome have a high pH

(D) Primary lysosome have low level of protons, while secondary lysosome have a high level of protons

84. Which of the following structures controls the transport of the material into and out of living cells

(A) Centrosome

(B) Cell membrane

(C) Cell wall

(D) Ribosome

85. Golgibody is involved in :-

(A) Oxidative phosphorylation

(B) Protein synthesis

(C) Glycosylation

(D) β-oxidation

82. निम्न मे से कौनसा कोशिका अंगक कोशिका द्रव्य में झिल्ली का जाल बनाते है :-

(A) E. R.

(B) राइबोसोम

(C) गोल्गीकाय

(D) लायसोसोम

83. प्राथमिक लायसोसोम व द्वितीयक लायसोसोम में क्या अन्तर है :-.

(A) प्राथमिक लायसोसोम द्वितीयक लायसोसोम से बडे होते हैं

(B) प्राथमिक लायसोसोम सक्रिय होते हैं, जबकि द्वितीयक लायसोसोम निष्क्रिय होते हैं

(C) प्राथमिक लायसोसोम की pH कम व द्वितीयक लायसोसोम की pH अधिक होती है।

(D) प्राथमिक लायसोसोम में प्रोटोन का स्तर कम होता है, जबकि द्वितीयक लायसोसोम में प्रोटोन का स्तर उच्च होता है।

84. निम्न में से कौनसी संरचना जीवित कोशिकाओं में पदार्थो का अन्दर तथा बाहर की ओर परिवहन का नियन्त्रण करती है :-

(A) सेन्ट्रोसोम

(B) कोशिका झिल्ली

(C) कोशिका भित्ति

(D) राइबोसोम

85. गोल्जीकॉय किसमें सम्मिलित होती है:-

(A) ओक्सीकारी फास्फोरिलीकरण

(B) प्रोटीन संश्लेषण

(C) ग्लाइकोसाइलेशन

(D) β-ओक्सीकरण

PART – II _ SECTION – B _ [ZOOLOGY]

86. Match the column-I and column-II

	Column-I		Column-II
a	*Exocoetus*	1	Fighting fish
b	*Clarias*	2	Flying fish
c	*Pterophyllum*	3	Rohu
d	*Betta*	4	Sea horse
e	*Hippocampus*	5	Magur
f	*Labeo*	6	Angel fish

(A) a–2, b–5, c–6, d–1, e–4, f–3

(B) a–1, b–5, c–6, d–2, e–4, f–3

(C) a–2, b–3, c–1, d–6, e–5, f–4

(D) a–3, b–5, c–6, d–1, e–4, f–2

87. Division of centromere occurs in:-

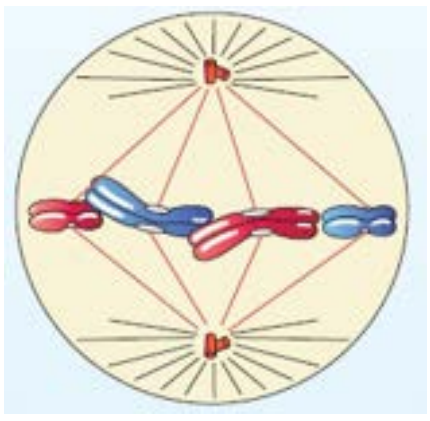
(A) Prophase

(B) Metaphase

(C) Anaphase

(D) Telophase

88. Select the correct option with respect to mitosis



(A) Chromosomes move to the spindle equator and get alingned along equatorial plate in metaphase

(B) Chromatids separate but remain in the centre of the cell in anaphase

(C) Chromatids start moving towards opposite poles in telophase

(D) Golgi complex and endoplasmic reticulum are still visible at the end of prophase

89. Which one of the following organisms bears hollow and pneumatic long bones?

(A) Ornithorhynchus

(B) Neophron

(C) Hemidactylus

(D) Macropus

86. कॉलम-I का मिलान कॉलम-II से किजिए

	कॉलम-I		**कॉलम-II**
a	एक्जोसीट्स	1	फाइटिंग फिश
b	क्लेरियस	2	फ्लाइंग फिश
c	टेरोफाइलम	3	रोहू
d	बेटा	4	सी हॉर्स
e	हिप्पोकेम्पस	5	मागुर
f	लेबियो	6	एन्जिल फिश

(A) a–2, b–5, c–6, d–1, e–4, f–3

(B) a–1, b–5, c–6, d–2, e–4, f–3

(C) a–2, b–3, c–1, d–6, e–5, f–4

(D) a–3, b–5, c–6, d–1, e–4, f–2

87. सेन्ट्रोमीयर का विभाजन कब होता है

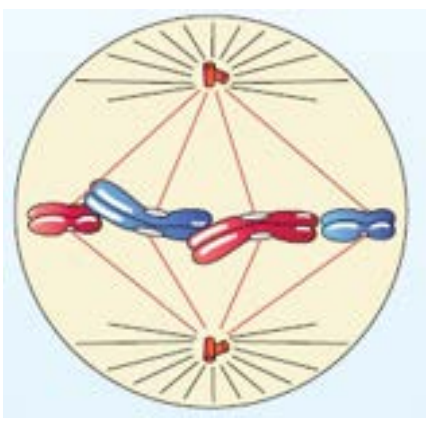
(A) प्रोफेज

(B) मेटाफेज

(C) एनाफेज

(D) टिलोफेज

88. समसूत्री विभाजन के सदर्भ में सही विकल्प का चयन करें



(A) मेटाफेज में गुणसूत्र तर्कु मध्य रेखा की ओर गमन करते है तथा मध्य पट्टिका पर पंक्तिबध हो जाते है

(B) एनाफेज में क्रोमेटिड अलग हो जाते हे परन्तु कोशिका के केन्द्र में ही रहते है

(C) टीलोफेज में क्रोमेटिड्स विपरित ध्रुवों की ओर गमन करना प्रारम्भ कर देते है

(D) प्रोफेज के अन्त तक भी गोल्गी कोम्पलेक्स तथा एन्डोप्लाज्मिक रेटिक्युलम दृश्य होते है

89. निम्न में किस जीव में लम्बी अस्थियाँ खोखली एवं वातिल होती हैं?

(A) औरनिथोरिंकस

(B) निओफ्रॉन

(C) हैमीडेक्टायलस

(D) मैक्रोपस

90. Which of the following represents the correct combination without any exception?

(A) Mouth ventral, gills without operculum; skin with placoid scales; persistent notochord → Chondrichthyes

(B) Sucking and circular mouth; jaws absent, integument without scales; paired appendages →Cyclostomata

(C) Body covered with feathers; skin moist and glandular; fore-limbs form wings; lungs with air sacs → Aves

(D) Mammary gland; hair on body; pinnae; two pairs of Limbs→Mammalia

91. Amphibians share with reptiles all of the following characters **except**

(A) Cloaca

(B) External fertilization and Indirect development

(C) Dioecious and Oviparous

(D) Cold blooded or poikilotherms

92. Tailed amphibian is :-

(A) Icthyophis

(B) Frog

(C) Salamendra

(D) Toad

93. In mammals, yellow elastic fibres are found in

(A) Ear pinna

(B) Tip of nose

(C) Epiglottis

(D) All of the above

94. The most widely distributed connective tissue proper is –

(A) Areolar tissue

(B) Adipose tissue

(C) Collagenous tissue

(D) Reticular tissue

95. Which cartilage is present in larynx :-

(A) Hyaline

(B) Elastic

(C) Fibrous

(D) Calcified

90. निम्नलिखित में से कौन बिना किसी अपवाद के सही संयोजन का प्रतिनिधित्व करता है

(A) अधर मुख, ऑपरकुलम रहित गिल्स, प्लेकॉइड शल्क युक्त त्वचा, नोटोकॉर्ड चिरस्थाई → कॉण्ड्रीक्थीज

(B) चूषक तथा वृताकार मुख, जबड़े अनुपास्थित शल्क रहित अध्यावरण, युग्मित उपांग → सायक्लोस्टोमेटा

(C) त्वचा पंखों से ढकी, नम तथा ग्रंथिल त्वचा, अग्र पाद पंख में निर्मित, वायु कोष युक्त फेफड़े → एवीज

(D) स्तन ग्रंथिया, त्वचा पर रोम पिन्ना, दो जोड़ी पाद → मेमेलिया

91. उभयचर वर्ग के प्राणी सरीसृप वर्ग के प्राणियों से निम्न सभी समानताएँ रखते हैं, सिवाय इसके :

(A) क्लोएका

(B) बाहरी निषेचन एवं अप्रत्यक्ष परिवर्धन

(C) एकलिंगाश्रयी, अण्डज

(D) शीत रूधिर वाले या असमतापी

92. पूँछयुक्त उभयचर (tailed amphibian) है :

(A) इक्थीयोफिस

(B) मेंढक

(C) सेलामेंडर

(D) टोड

93. स्तनधारियों में पीले प्रत्यास्थ तन्तु पाये जाते हैं -

(A) कर्ण पिन्ना में

(B) नाक की tip में

(C) एपीग्लोटिस में

(D) उपरोक्त सभी में

94. सबसे अधिक सब जगह पाए जाने वाला संयोजी ऊतक है -

(A) अंतराली उत्तक

(B) एडिपोज उत्तक

(C) कॉलेजन युक्त उत्तक

(D) रेटीकुलर उत्तक

95. स्वरयन्त्र (larynx) में किस प्रकार की उपास्थि पायी जाती है :-

(A) काचाभ उपास्थि

(B) प्रत्यास्थ उपास्थि

(C) तन्तुमय उपास्थि

(D) केल्सीभूत उपास्थि

96. Oligodendrocytes :-

(A) Carry nerve impulses

(B) Form myelin sheath in CNS

(C) Form myelin sheath around PNS

(D) Perform the function of phagocytosis

97. Which spindle fibre have smallest size :-

(A) Chromosomal fibre

(B) Supporting fibre

(C) Interzonal fibre

(D) Continuous fibre

98. During regeneration the following take place :-

(a) Cell division

(b) Dedifferentiation

(c) Cell movement

(d) Tissue differentiation

the correct sequence is :-

(A) b, a, c, d

(B) a, c, b, d

(C) a, b, c, d

(D) c, b, a, d

99. During anaphasic movements of chromosomes, – ———————— of each chromosome is/are towards the pole and ——————— of the chromosome trail(s) behind.

(A) centromere, arms

(B) arms, centromere

(C) chromatids, centromere

(D) none of these

100. The mitotic spindle disappears in

(A) Prophase

(B) Metaphase

(C) Anaphase

(D) Telophase

96. ओलिगोडेन्ड्रोसाइट्स:-

(A) तन्त्रिका आवेग को ले जाते है

(B) CNS में माईलिन शीथ का निर्माण करते है

(C) PNS में माईलिन शीथ का निर्माण करते है

(D) भक्षण का कार्य करते है

97. कौन से तर्कु तन्तुओ का आकार सबसे छोटा होता है।

(A) गुणसूत्रीय तन्तु

(B) आलम्बन तन्तु

(C) अन्तर क्षेत्रीय तन्तु

(D) सतत तन्तु

98. पुनरुद्भवन के दौरान निम्न प्रक्रियाएँ होती हैं:-

(a) कोशिका विभाजन

(b) निर्विभेदन

(c) कोशिका गति

(d) ऊतक विभेदन

सही क्रम है

(A) b, a, c, d

(B) a, c, b, d

(C) a, b, c, d

(D) c, b, a, d

99. गुणसूत्रों में एनाफेज गतिविधियों के दौरान प्रत्येक गुणसूत्र का_____ध्रुवो की तरफ होता है, और_____ पीछे की ओर होती है

(A) सेन्ट्रोमीयर, भुजाएं

(B) भुजाएं, सेन्ट्रोमीयर

(C) अर्द्धगुणसूत्र, सेन्ट्रोमीयर

(D) इनमें से कोई नहीं

100. समसूत्री तर्कु अदृश्य हो जाता है

(A) पूर्वावस्था में

(B) मध्यावस्था में

(C) पश्चावस्था में

(D) अन्त्यावस्था

PART - III _ SECTION – A _ [PHYSICS]

101. The distance travelled by a particle is proportional to the squares of time, then the particle travels with

(A) Uniform acceleration

(B) Uniform velocity

(C) Increasing acceleration

(D) Decreasing velocity

102. A man in a balloon rising vertically with an acceleration of 4.9 m/sec^2 releases a ball 2 sec after the balloon is let go from the ground. The greatest height above the ground reached by the ball is
(g = 9.8 m/sec^2)

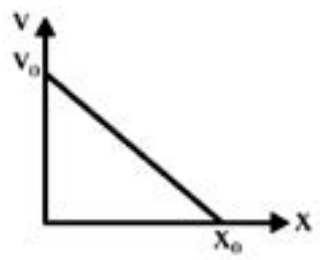
(A) 14.7 m

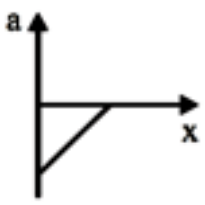
(B) 19.6 m

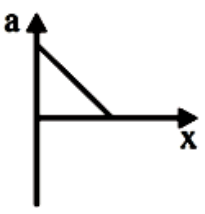
(C) 9.8 m

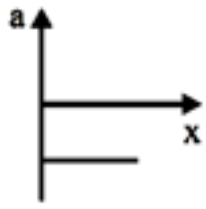
(D) 24.5 m

103. The given graph shows the variation of velocity with displacement. Which one of the graph given below correctly represents the variation of acceleration with displacement :-



(A) 

(B) 

(C) 

(D) None

101. एक कण द्वारा तय की गई दूरी, समय के वर्ग के समानुपाती है, तब कण गति करेगा -

(A) एकसमान त्वरण से

(B) एकसमान वेग से

(C) बढ़ते हुए त्वरण से

(D) घटते हुए वेग से

102. 4.9 m/sec^2 के त्वरण से ऊर्ध्वाधर ऊपर बढ़ रहे एक गुब्बारें में एक आदमी, गुब्बारें को धरातल से ऊपर जाने के 2 सैकण्ड पश्चात एक गेंद को छोड़ता है। गेंद द्वारा प्राप्त धरातल के ऊपर अधिकतम ऊँचाई है (g = 9.8 m/sec^2)

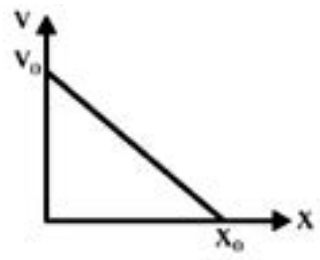
(A) 14.7 m

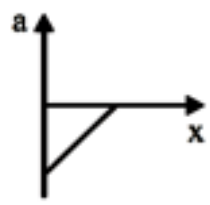
(B) 19.6 m

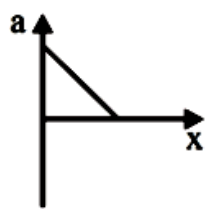
(C) 9.8 m

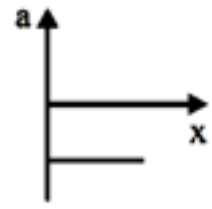
(D) 24.5 m

103. दिये गये ग्राफ में विस्थापन के साथ वेग के परिवर्तन को दिखाया गया है, तो निम्न में से कौनसा ग्राफ सही रूप में विस्थापन के साथ त्वरण में परिवर्तन को दर्शाता है :-



(A) 

(B) 

(C) 

(D) कोई नही

104. A particle moves along x-axis as $x = 4(t-2) + a(t-2)^2$ Which of the following is true ?

(A) The initial velocity of particle is 4

(B) The acceleration of particle is 2a

(C) The particle is at origin at t = 0

(D) None of these

104. एक कण x-अक्ष के अनुदिश $x = 4(t-2) + a(t-2)^2$ के रूप में गति करता है, निम्न में कौन सा सत्य है ?

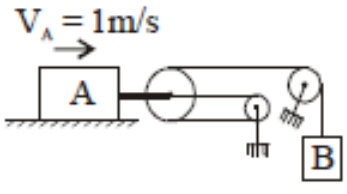
(A) कण का प्रारम्भिक वेग 4 है।

(B) कण का त्वरण 2a है।

(C) t = 0 पर कण मूल बिन्दू पर है।

(D) इनमें से कोई नहीं

105. The value of V_B will be



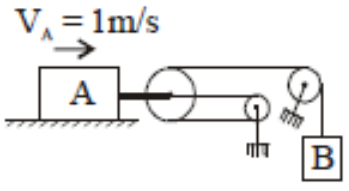
(A) $1\ m/s$

(B) $2\ m/s$

(C) $3\ m/s$

(D) $4\ m/s$

105. V_B का मान होगा -



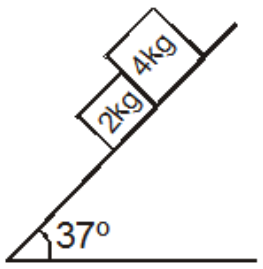
(A) $1\ m/s$

(B) $2\ m/s$

(C) $3\ m/s$

(D) $4\ m/s$

106. Find out the contact force between the 2kg & 4kg block as shown in figure and inclined plane is frictionless.



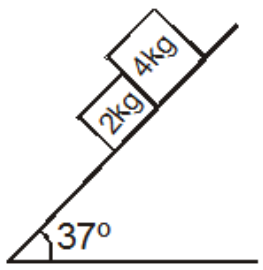
(A) 36 N

(B) 12 N

(C) 40 N

(D) Zero

106. चित्रानुसार 2kg तथा 4kg ब्लॉक के बीच स्पर्श बल ज्ञात करे तथा नततल घर्षणहीन है।



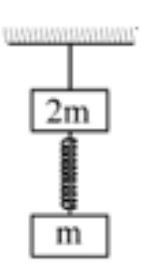
(A) 36 N

(B) 12 N

(C) 40 N

(D) शून्य

107. Two blocks are connected by a spring. The combination is suspended, at rest, from a string attatched to the ceiling, as shown in the figure. The string breaks suddenly. Immediately after the string breaks, what is the initial downward acceleration of the upper block of mass 2m ?



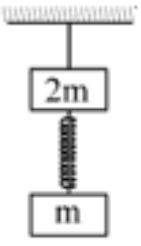
(A) 0

(B) $3g/2$

(C) g

(D) $2g$

107. दो ब्लॉक एक स्प्रिंग द्वारा संयोजित है। इन संयोजन को चित्र में दर्शाये अनुसार छत से जुड़ी एक डोरी से विराम पर लटकाया हुआ है। डोरी अचानके टूट जाती है तथा डोरी टूटने के तुरन्त पश्चात् $2\ m$ द्रव्यमान वाले ऊपरी ब्लॉक का नीचे की ओर प्रारम्भिक त्वरण क्या है ?



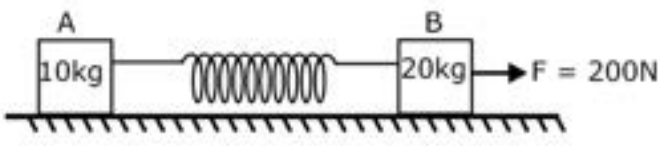
(A) 0

(B) $3g/2$

(C) g

(D) $2g$

108. Two blocks A and B attached to each other by a massless spring, are kept on a rough horizontal surface (μ = 0.1) and pulled by a force F = 200 N as shown in figure. If at some instant the 10 kg mass has acceleration of 12 m/s^2, what is the acceleration of 20 kg mass ?



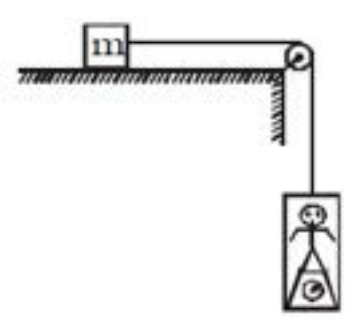
(A) 2.5 m/s^2

(B) 4.0 m/s^2

(C) 3.6 m/s^2

(D) 1.2 m/s^2

109. In the figure, a man of true mass M is standing on a weighing machine placed in a cabin. The cabin is joined by a string with a body of mass m. Assuming no friction, and negligible mass of cabin and weighing machine, the measured mass of man is



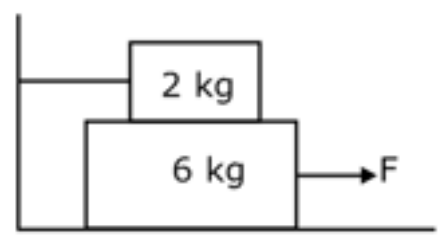
(A) $\frac{Mm}{M+m}$

(B) $\frac{Mm}{M-m}$

(C) M

(D) depends on g

110. With reference to the fig. shown, if the coefficient of friction at all the surfaces is 0.42, then the force required to pull out the 6.0 kg block with an acceleration of 1.50 m/s^2 will be -



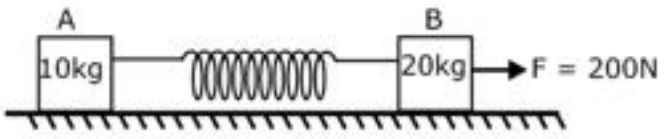
(A) 36 N

(B) 24 N

(C) 84 N

(D) 51 N

108. दो ब्लॉक A तथा B एक द्रव्यमान रहीत स्प्रिंग द्वारा एक दूसरे से जुड़े है तथा एक खुरदरे क्षैतिज सतह $(\mu = 0.1)$ पर रखे हुए है व चित्रानुसार $F = 200\ N$ एक बल द्वारा ढकेले जाते है। यदि किसी क्षण पर $10\ kg$ द्रव्यमान $12\ m/s^2$ का त्वरण रखता है, तब $20\ kg$ द्रव्यमान का त्वरण क्या होगा?



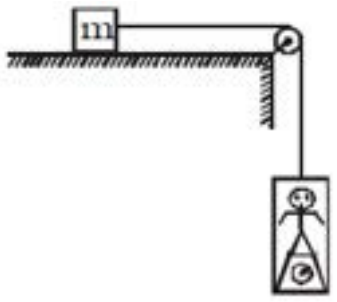
(A) 2.5 m/s^2

(B) 4.0 m/s^2

(C) 3.6 m/s^2

(D) 1.2 m/s^2

109. चित्र में, वास्तविक द्रव्यमान M का एक व्यक्ति एक केबिन में रखी एक भारत्तोलक मशीन पर खड़ा हुआ है। केबिन एक डोरी द्वारा m द्रव्यमान की एक वस्तु से जोड़ा जाता है। मानाकि कोई घर्षण नहीं है तथा केबिन व भारतोलक मशीन के द्रव्यमान नगण्य है, तो व्यक्ति का मापा गया द्रव्यमान है :



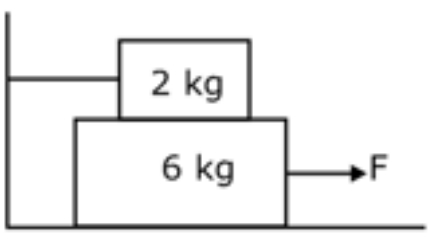
(A) $\frac{Mm}{M+m}$

(B) $\frac{Mm}{M-m}$

(C) M

(D) g पर निर्भर करता है

110. दर्शाये चित्र के सन्दर्भ में, यदि सभी सतहों पर घर्षण गुणांक 0.42 है। तब 1.50 m/s^2 के त्वरण से 6.0 kg ब्लॉक को खींचने के लिए आवश्यक बल होगा-



(A) 36 N

(B) 24 N

(C) 84 N

(D) 51 N

111. A bullet is fired from a cannon with velocity 500 ms^{-1}. If the angle of projection is 15° and g = 10 ms^{-2}, then the range is -

(A) 25 × 10^3 m

(B) 12.5 × 10^3 m

(C) 50 × 10^2 m

(D) 25 × 10^2 m

112. A boat is sailing at a velocity $3\,\hat{i} + 4\hat{j}$ with respect to ground and water in river is flowing with a velocity $-3\,\hat{i} - 4\hat{j}$. Relative velocity of the boat with respect to water is-

(A) 0

(B) $5\sqrt{2}$

(C) $6\hat{i} + 8\hat{j}$

(D) $-6\hat{i} - 8\hat{j}$

113. A helicopter is flying south with a speed of 50 kmh^{-1}. A train is moving with the same speed towards east. The relative velocity of the helicopter as seen by the passengers in the train will be towards.

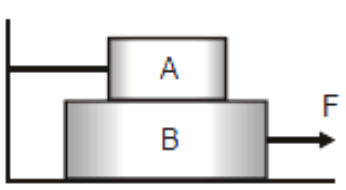
(A) north east

(B) south east

(C) north west

(D) south west

114. Two block A and B placed on a plane surface as shown in the figure. The mass of block A is 100 kg and that of block B is 200 kg. Block A is tied to a stand and block B is pulled by a force F. If the coefficient of friction between the surfaces of A and B is 0.2 and the coefficient of friction between B and the plane is 0.3 then for the motion of B the minimum value of F will be -



(A) 700 N

(B) 1050 N

(C) 900 N

(D) 1100 N

115. Certain neutron stars are believed to be rotating at about 1 rev / sec. If such a star has a radius of 20 km, the acceleration of an object on the equator of the star will be

(A) $20 \times 10^8\,\mathrm{m}/\sec^2$

(B) $8 \times 10^5\,\mathrm{m}/\sec^2$

(C) $120 \times 10^5\,\mathrm{m}/\sec^2$

(D) $4 \times 10^8\,\mathrm{m}/\sec^2$

111. एक तोप से 500 m/s वेग से एक गोला (bullet) दागा जाता है |यदि प्रक्षेपण कोण 15° तथा g = 10 ms^{-2} है तो परास होगी -

(A) 25 × 10^3 m

(B) 12.5 × 10^3 m

(C) 50 × 10^2 m

(D) 25 × 10^2 m

112. एक नाव जमीन के सापेक्ष $3\,\hat{i} + 4\hat{j}$ वेग से पानी में तैर रही है तथा नदी का पानी जमीन के सापेक्ष $-3\,\hat{i} - 4\hat{j}$ के वेग से बह रहा है। पानी के सापेक्ष नाव का सापेक्षिक वेग है -

(A) 0

(B) $5\sqrt{2}$

(C) $6\hat{i} + 8\hat{j}$

(D) $-6\hat{i} - 8\hat{j}$

113. एक हेलिकॉप्टर 50 kmh^{-1} की चाल के साथ दक्षिण की ओर उड़ रहा है एक ट्रेन समान चाल के साथ पूर्व दिशा में गतिशील है ट्रेन में यात्री द्वारा देखे गए हेलिकॉप्टर का सापेक्षिक वेग किस ओर होगा

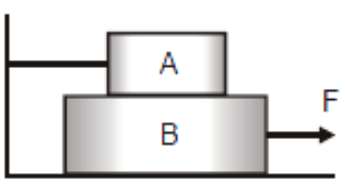
(A) उत्तर पूर्व दिशा में

(B) दक्षिण पूर्व दिशा में

(C) उत्तर पश्चिम दिशा में

(D) दक्षिण पश्चिम दिशा में

114. चित्रानुसार दो ब्लॉक A व B एक तल पर रखे है | ब्लॉक A का द्रव्यमान 100 किग्रा एवं B का 200 किग्रा है | ब्लॉक A को स्टेण्ड से बांधा गया है तथा ब्लॉक B को बल F से खींचा जाता है | यदि ब्लॉक A और B की सतहों के मध्य घर्षण गुणांक 0.2 एवं B व तल के मध्य घर्षण गुणांक 0.3 हो तो B की गति के लिए F का न्यूनतम मान होगा -



(A) 700 N

(B) 1050 N

(C) 900 N

(D) 1100 N

115. माना जाता है कि कुछ निश्चित न्यूटॉन तारे लगभग 1 परिक्रमण/ सेकेण्ड से घूमते है यदि ऐसे तारे की त्रिज्या 20 km है, तब तारे की भूमध्य रेखा पर वस्तु का त्वरण होगा-

(A) $20 \times 10^8\,\mathrm{m}/\sec^2$

(B) $8 \times 10^5\,\mathrm{m}/\sec^2$

(C) $120 \times 10^5\,\mathrm{m}/\sec^2$

(D) $4 \times 10^8\,\mathrm{m}/\sec^2$

116. A circular road of radius 1000 m has banking angle 45°. The maximum safe speed of a car having mass 2000 kg will be, if the coefficient of friction between tyre and road is 0.5

(A) 172 m/s

(B) 124 m/s

(C) 99 m/s

(D) 86 m/s

117. Two masses M and m are attached to a vertical axis by weightless threads of constant length L. They are set in rotational motion in a horizontal plane about this axis with constant angular velocity ω. If the tensions in the threads are the same during motion, the distance of M from the axis is

(A) $\frac{ML}{M+m}$

(B) $\frac{mL}{M+m}$

(C) $\frac{M+m}{M}L$

(D) $\frac{M+m}{m}L$

118. In uniform circular motion, the velocity vector and acceleration vector are

(A) Perpendicular to each other

(B) Same direction

(C) Opposite direction

(D) Not related to each other

119. A mass M is lowered with the help of a string by a distance x at a constant acceleration $\frac{g}{2}$. The work done by the string will be :-

(A) Mgx

(B) $\frac{1}{2}Mgx^2$

(C) $\frac{1}{2}Mgx$

(D) Mgx^2

120. The work done in pulling a body of mass 5 kg along an inclined plane (angle 60º) with coefficient of friction 0.2 through 2 m, will be -
(g=9.8 m/s^2)

(A) 98.08 J

(B) 94.08 J

(C) 90.08 J

(D) 91.08 J

116. 1000 m त्रिज्या की एक वृत्ताकार सड़क का झुकाव (banking) कोण 45° है। 2000 kg द्रव्यमान की कार की अधिकतम सुरक्षित चाल होगी ? यदि पहीये तथा सडक के मध्य घर्षण गुणांक 0.5 है-

(A) 172 m/s

(B) 124 m/s

(C) 99 m/s

(D) 86 m/s

117. दो द्रव्यमान M तथा m नियत लम्बाई L के भारहीन धागों द्वारा एक उर्ध्वाधर अक्ष से जोड़े जाते है। वे नियत कोणीय वेग ω से इस अक्ष के परितः एक क्षैतिज तल में घूर्णन गति में स्थापित किये जाते है। यदि गति के दौरान धागों में तनाव समान है, तब अक्ष से M की दूरी है।

(A) $\frac{ML}{M+m}$

(B) $\frac{mL}{M+m}$

(C) $\frac{M+m}{M}L$

(D) $\frac{M+m}{m}L$

118. एकसमान वृत्तीय गति में, वेग सदिश तथा त्वरण सदिश होते है

(A) एक दूसरे के लम्बवत्

(B) एक ही दिशा में

(C) विपरीत दिशा में

(D) एक-दूसरे से संबंधित नहीं होते है

119. M द्रव्यमान को एक डोरी की सहायता से नियत त्वरण $\frac{g}{2}$ से x दूरी तक नीचे ले जाया जाता है। डोरी द्वारा किया गया कार्य होगा:-

(A) Mgx

(B) $\frac{1}{2}Mgx^2$

(C) $\frac{1}{2}Mgx$

(D) Mgx^2

120. 5 kg द्रव्यमान का पिण्ड़ नत तल पर (कोण 60°) जिसका घर्षण गुणांक 0.2 है, पर 2m तक खींचा जाता है तो किया गया कार्य होगा-
(g=9.8 m/s^2)

(A) 98.08 J

(B) 94.08 J

(C) 90.08 J

(D) 91.08 J

121. A body of mass 2 kg is thrown up vertically with K.E. of 490 joules. If the acceleration due to gravity is 9.8 m/s^2, then the height at which the K.E. of the body becomes half its original value is given by

(A) 50 m

(B) 12.5 m

(C) 25 m

(D) 10 m

122. A body of mass 1 kg is thrown upwards with a velocity 20 m/s. It momentarily comes to rest after attaining a height of 18 m. How much energy is lost due to air friction ? ($g = 10\ m/s^2$) -

(A) 10 J

(B) 20 J

(C) 30 J

(D) 40 J

123. A body of 2 kg mass is moving under a force. The relation between time and displacement is $x = \frac{t^3}{3}$ where x is in meter and t is time in second. Work done in first two seconds is-

(A) 1.6 J

(B) 16 J

(C) 160 J

(D) 1600 J

124. The earth circles the sun once a year. How much work would have to be done on the earth to bring it to rest relative to the sun, (ignore the rotation of earth about-its own axis) Given that mass of the earth is 6×10^{24} kg and distance between sun and earth is 1.5×10^8 km-

(A) 2.7×10^{33}J

(B) 2.7×10^{24} J

(C) 1.9×10^{33} J

(D) 1.9×10^{24} J

125. A stone of mass 0.2 kg is tied to one end of a thread of length 0.1 m whirled in a vertical circle. When the stone is at the lowest point of circle then tension in thread is 52 N, then velocity of the stone will be :-

(A) 4 m/s

(B) 5 m/s

(C) 6 m/s

(D) 7 m/s

121. 2 kg द्रव्यमान की एक वस्तु 490 जूल की गतिज ऊर्जा से ऊर्ध्वाधर ऊपर फेंकी जाती है। यदि गुरूत्वीय त्वरण 9.8 m/s^2 है, तब वह ऊँचाई जिस पर वस्तु की गतिज ऊर्जा, इसके मूल (original) मान की आधी हो जाती है, होगी-

(A) 50 m

(B) 12.5 m

(C) 25 m

(D) 10 m

122. 1 kg द्रव्यमान के एक पिंड को 20 m/s के वेग से ऊपर फेंका गया है। 18 m की ऊँचाई प्राप्त करने पर यह क्षण भर को विराम अवस्था धारण कर लेता है। वायु के घर्षण के कारण कितनी ऊर्जा का ह्रास होता है? ($g = 10\ m/s^2$)

(A) 10 J

(B) 20 J

(C) 30 J

(D) 40 J

123. एक बल के प्रभाव में 2 kg द्रव्यमान का एक पिण्ड गति करता है। पिण्ड की स्थिति एवं समय में निम्न सम्बन्ध $x = \frac{t^3}{3}$ है जहाँ x मीटर में तथा t सेकण्ड में है। पहले दो सेकण्डों में बल द्वारा किया गया कार्य होगा -

(A) 1.6 J

(B) 16 J

(C) 160 J

(D) 1600 J

124. यदि पृथ्वी सूर्य का चक्कर 1 वर्ष में लगाती है, तो पृथ्वी को सूर्य के सापेक्ष विराम में लाने के लिए कितना कार्य करना होगा - (पृथ्वी का अपनी अक्ष के परितः घूर्णन नगण्य मानिए) दिया है-पृथ्वी का द्रव्यमान $= 6 \times 10^{24}\ \text{kg.}$, पृथ्वी व सूर्य के बीच की दूरी $= 1.5 \times 10^8\ \text{km}$

(A) 2.7×10^{33}J

(B) 2.7×10^{24} J

(C) 1.9×10^{33} J

(D) 1.9×10^{24} J

125. एक 0.1 मीटर लम्बी रस्सी के सिरे पर 0.2 किग्रा द्रव्यमान का पत्थर बांध कर उसे उर्ध्व वृत्त में घुमाया जाता हैं। जब पत्थर वृत्त के निम्नतम बिंदु पर होता हैं, तो धागे में तनाव 52 न्यूटन है, तो पत्थर का वेग होगा:-

(A) 4 मी/से

(B) 5 मी/से

(C) 6 मी/से

(D) 7 मी/से

126. Which of the following statement is true ?

(A) the center of mass of an object must lie within the object

(B) all the mass of an object is actually concentrated at its center of mass

(C) the center of mass of an object cannot move if there is zero net force on the object

(D) the total linear momentum of system as observed from centre of mass frame of reference is always zero

126. निम्न कथन (नों) में से कौनसा सही होगा ?

(A) किसी वस्तु का द्रव्यमान केन्द्र वस्तु में होगा |

(B) वस्तु का सम्पूर्ण द्रव्यमान वस्तुतः इसके द्रव्यमान केन्द्र पर केन्द्रित होता है |

(C) किसी वस्तु का द्रव्यमान केन्द्र गति नहीं कर सकता है यदि वस्तु पर कुल (net) बल शून्य है |

(D) निकाय का कुल रेखीय संवेग, द्रव्यमान केन्द्र के निर्देश तंत्र से प्रेक्षित करने पर सदेव शून्य होता है

127. A vehicle of mass m is accelerated on a horizontal frictionless road under a force changing its speed from 'u' to 'v' in the distance s. A constant power 'p' is given by engine of the vehicle, then 'v' is :-

(A) $\left[u^3+\frac{2P}{m}\right]^{1/3}$

(B) $\left[\frac{Ps}{m}+u^3\right]^{1/2}$

(C) $\left[\frac{Ps}{m}+u^3\right]^{1/3}$

(D) $\left[\frac{3\,Ps}{m}+u^3\right]^{1/3}$

127. m द्रव्यमान का वाहन किसी बल के अधीन क्षैतिज घर्षण रहित सड़क पर त्वरित होता है जो इसकी चाल को s दूरी में 'u' से 'v' तक परिवर्तित कर देता है। वाहन के ईंजन द्वारा एक नियत शक्ति 'p' दी जाती है तो 'v' है :-

(A) $\left[u^3+\frac{2P}{m}\right]^{1/3}$

(B) $\left[\frac{Ps}{m}+u^3\right]^{1/2}$

(C) $\left[\frac{Ps}{m}+u^3\right]^{1/3}$

(D) $\left[\frac{3\,Ps}{m}+u^3\right]^{1/3}$

128. The momentum of a 10,000 kg truck whose velocity is 20 m/s will be -

(A) $500\ \mathrm{kg\ m/s}$

(B) $1/500\ \mathrm{kg\ m/s}$

(C) $2\times10^5\ \mathrm{kg\ \ m/s}$

(D) $1/2\times10^5\ \mathrm{kg\ \ m/s}$

128. 10,000 kg का ट्रक, जिसका वेग 20m/s है, का संवेग होगा -

(A) $500\ \mathrm{kg\ m/s}$

(B) $1/500\ \mathrm{kg\ m/s}$

(C) $2\times10^5\ \mathrm{kg\ \ m/s}$

(D) $1/2\times10^5\ \mathrm{kg\ \ m/s}$

129. If similar bullets are fired from two guns out of which , one is lighter and another one is heavier. Which gun will give more violent jerk –

(A) Same by both

(B) Lighter one

(C) Heavier one

(D) Will depend upon the type of gun

129. यदि एकसमान गोलियों को हल्की व भारी बन्दूक से छोड़ा जाए तो कौनसी बन्दूक से तेज झटका लगेगा ?

(A) दोनों से समान झटका

(B) हल्की बन्दूक से

(C) भारी बन्दूक से

(D) बन्दूक के प्रकार पर निर्भर करेगा

130. If the two bodies move together after collision then the nature of the collision will be :-

(A) Perfectly elastic

(B) Partially inelastic

(C) Perfectly inelastic

(D) Partially elastic

130. यदि दो वस्तुए टक्कर के पश्चात् साथ साथ गति करती है तो टक्कर की प्रकृति होगी :-

(A) पूणर्तः प्रत्यास्थ

(B) आंशिक अप्रत्यास्थ

(C) पूर्णतया अप्रत्यास्थ

(D) पूर्णतया प्रत्यास्थ

131. A ball is dropped from height 5m. The time after which ball stops rebounding if coefficient of restitution between ball and ground e = 1/2, is

(A) 1 sec

(B) 2 sec

(C) 3 sec

(D) infinite

131. एक गेंद 5m ऊँचाई से गिराई जाती है | वह समय क्या होगा जिसके पश्चात गेंद उछलना (rebounding) बन्द करती है, यदि जमीन व गेंद के बीच प्रत्यावस्थान गुणांक e = 1/2 है :-

(A) 1 sec

(B) 2 sec

(C) 3 sec

(D) अनन्त

132. A rocket is ejecting the gases at the rate of $10\ \mathrm{kg/s}$ with speed of $5\ \mathrm{m/s}$. The force on the rocket is:-

(A) 10 N

(B) 5 N

(C) 20 N

(D) 50 N

133. What is the moment of inertia of ring about its diameter ?

(A) MR^2

(B) $\frac{MR^2}{2}$

(C) $\frac{3}{4}MR^2$

(D) $\frac{5}{4}MR^2$

134. Moment of inertia of a thin circular disc of mass M and radius R about any diameter is:-

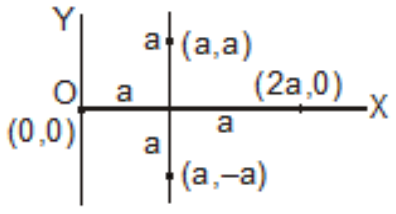
(A) $\frac{MR^2}{4}$

(B) $\frac{MR^2}{2}$

(C) MR^2

(D) $2\ MR^2$

135. Four point masses (each of mass m) are arranged in the X-Y plane the moment of inertia of this array of masses about Y-axis is-



(A) ma^2

(B) $2ma^2$

(C) $4ma^2$

(D) $6ma^2$

132. एक रॉकेट 5 m/s की चाल से 10kg/s की दर से गैसो को उत्सर्जित कर रहा है। रॉकेट पर बल होगा-

(A) 10 N

(B) 5 N

(C) 20 N

(D) 50 N

133. वलय का इसके व्यास के सापेक्ष जड़त्व आघूर्ण क्या होगा ?

(A) MR^2

(B) $\frac{MR^2}{2}$

(C) $\frac{3}{4}MR^2$

(D) $\frac{5}{4}MR^2$

134. द्रव्यमान M तथा त्रिज्या R की एक पतली वृत्तीय चकती का उसके किसी भी (any) व्यास के सापेक्ष जड़त्व आघूर्ण होगा –

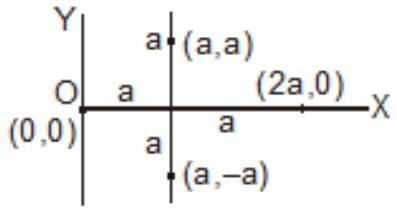
(A) $\frac{MR^2}{4}$

(B) $\frac{MR^2}{2}$

(C) MR^2

(D) $2\ MR^2$

135. चार बिन्दु द्रव्यमान (जिनमें प्रत्येक का द्रव्यमान m है।) X-Y तल में व्यवस्थित है। इस द्रव्यमान समूह का Y-अक्ष के परितः जड़त्व आघूर्ण होगा-



(A) ma^2

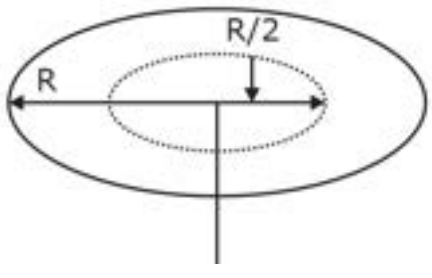
(B) $2ma^2$

(C) $4ma^2$

(D) $6ma^2$

PART - III _ SECTION – B _ [PHYSICS]

136. A dog of mass m is walking on a pivoted disc of radius R and mass M in a circle of radius R/2 with an angular frequency n: the disc will revolve in opposite direction with frequency -



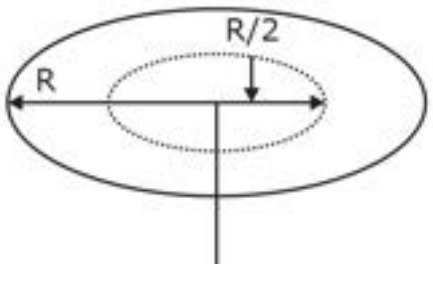
(A) $\frac{mn}{M}$

(B) $\frac{mn}{2M}$

(C) $\frac{2mn}{M}$

(D) $\frac{2Mn}{M}$

136. m द्रव्यमान का एक कुत्ता, M द्रव्यमान तथा R त्रिज्या की एक कीलकीत चकती पर, n कोणीय आवृति से R/2 त्रिज्या के एक वृत में चल रहा है। चकती निम्नलिखित आवृति से विपरीत दिशा में घूमेगी।



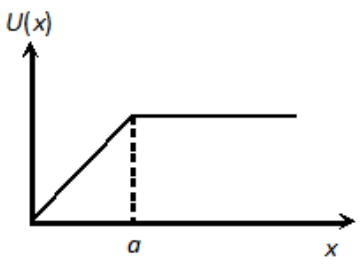
(A) $\frac{mn}{M}$

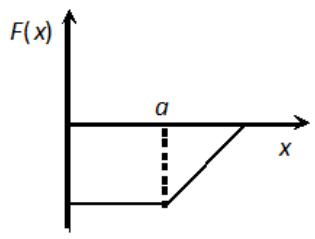
(B) $\frac{mn}{2M}$

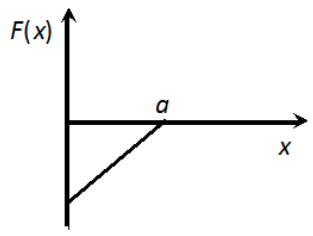
(C) $\frac{2mn}{M}$

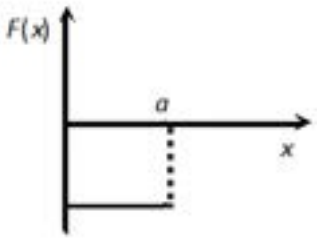
(D) $\frac{2Mn}{M}$

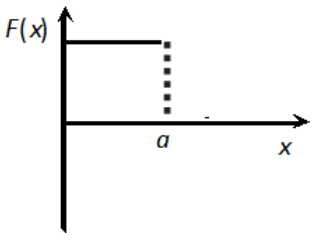
137. The potential energy of a system is represented in the first figure. the force acting on the system will be represented by



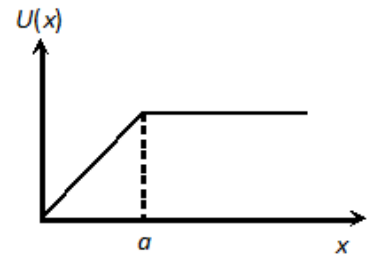
(A)


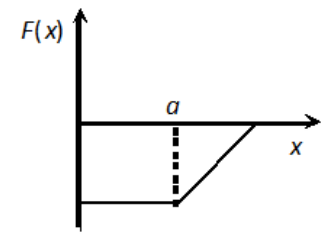
(B)


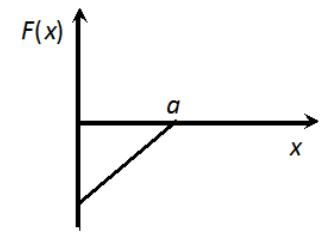
(C)


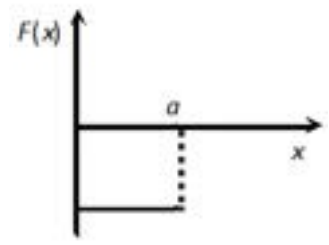
(D)


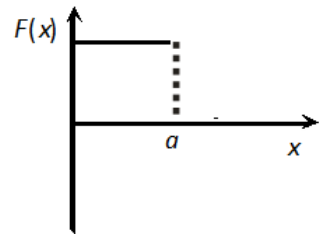
137. एक निकाय की स्थितिज ऊर्जा प्रथम चित्र में निरूपित है। निकाय पर कार्यरत बल निम्न द्वारा निरूपित है-



(A)


(B)


(C)


(D)


138. Two smooth objects with a coefficient of restitution e, collides directly and bounce as shown:-

just before impact ⟶ 3u ⟶ 6u

just after impact ⟶ $2v_1$ ⟶ v_1

Newton's law of restitution gives :-

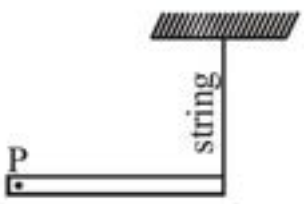
(A) $v_1 = 3\ eu$

(B) $u = 3ev_1$

(C) $v_1 = 2eu$

(D) It cannot be applied as the masses are not known

139. A uniform stick of mass m and length ℓ is hinged at one end and supported in a horizontal position by a string attached to the other end as shown in fig. If the string is cut then the initial angular acceleration of the stick is:-



(A) $g/2\ell$

(B) $3g/\ell$

(C) $\frac{3g}{2\ell}$

(D) $\frac{6g}{\ell}$

140. A tangential force F acts at the rim of a ring of radius R and causes the ring to turn through an angle θ . The work done by the force will be-

(A) $\frac{FR}{\theta}$

(B) FRθ

(C) $FR - \frac{1}{\theta}$

(D) FR – θ

141. A particle of mass m is describing a circular path of radius r with uniform speed. If L is the angular momentum of the particle (about the axis of the circle), then the kinetic energy of the particle is-

(A) $\frac{L^2}{mr^2}$

(B) mr^2L

(C) $\frac{L^2}{2\ mr^2}$

(D) $\frac{L^2r^2}{m}$

138. दो चिकनी वस्तु जिनके प्रत्यावस्थान गुणांक का मान e है, सीधा टकराते है एवं चित्रानुसार वापस लौटते हैं ।

टक्कर से ठीक पहले ⟶ 3u ⟶ 6u

टक्कर से ठीक पश्चात ⟶ $2v_1$ ⟶ v_1

तो न्यूटन का प्रत्यावस्थान गुणांक दर्शाता है

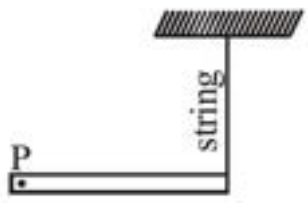
(A) $v_1 = 3\ eu$

(B) $u = 3ev_1$

(C) $v_1 = 2eu$

(D) यदि द्रव्यमान अज्ञात हो तो इसका प्रयोग नहीं कर सकते हैं।

139. m द्रव्यमान की एक समरूप मीटर छड़ एक सिरे से कीलकित की गयी है तथा चित्रानुसार दूसरे सिरे से जुडी एक रस्सी द्वारा एक क्षेतिज स्थिति मे आधार प्रदान किया जाता है। यदि रस्सी को काट दिया जाये तो छड़ का प्रारम्भिक कोणीय त्वरण होगा :-



(A) $g/2\ell$

(B) $3g/\ell$

(C) $\frac{3g}{2\ell}$

(D) $\frac{6g}{\ell}$

140. R त्रिज्या की एक वलय की कोर (rim) पर एक स्पर्श रेखीय बल F कार्यरत है। जिससे वलय एक कोण θ से घूमती है। बल द्वारा किया गया कार्य होगा -

(A) $\frac{FR}{\theta}$

(B) FRθ

(C) $FR - \frac{1}{\theta}$

(D) FR – θ

141. m द्रव्यमान वाला एक कण एक समान चाल से r त्रिज्या के वृत्ताकार पथ पर गति कर रहा है। यदि कण का कोणीय संवेग L है (वृत्त की अक्ष के सापेक्ष),तो कण की गतिज ऊर्जा होगी-

(A) $\frac{L^2}{mr^2}$

(B) mr^2L

(C) $\frac{L^2}{2\ mr^2}$

(D) $\frac{L^2r^2}{m}$

142. The angular momentum of a particle moving in a circular orbit with a constant speed remains conserved about :

(A) Any point on the circumference of the circle

(B) Any point inside the circle

(C) Any point outside the circle

(D) The centre of circle

142. नियत चाल से वृत्ताकर कक्षा मे घुम रहे कण का कोणीय संवेग संरक्षित रहता है

(A) वृत्त की परिधि पर किसी भी बिन्दु के परितः

(B) वृत्त के अन्दर किसी भी बिन्दु के परितः

(C) वृत्त के बाहर किसी भी बिन्दु के परितः

(D) वृत्त के केन्द्र के परितः

143. A disc and a ring of the same mass are rolling to have the same kinetic energy. What is ratio of their velocities of centre of mass

(A) $(4:3)^{1/2}$

(B) $(3 : 4)^{1/2}$

(C) $(2)^{1/2} : (3)^{1/2}$

(D) $(3)^{1/2} : (2)^{1/2}$

143. समान द्रव्यमान की एक चकती व एक वलय लुढ़क रही है तथा उनकी गतिज उर्जा समान हो तो उनके द्रव्यमान केन्द्र के वेगो का अनुपात है -

(A) $(4 : 3)^{1/2}$

(B) $(3 : 4)^{1/2}$

(C) $(2)^{1/2} : (3)^{1/2}$

(D) $(3)^{1/2} : (2)^{1/2}$

144. The moment of inertia of a thin uniform rod of mass M and length ℓ about an axis perpendicular to the rod, through its center is I. The moment of inertia of the rod about an axis perpendicular to the rod through its end point is-

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

(B) $\frac{I}{2}$

(C) 2I

(D) 4I

144. M द्रव्यमान तथा ℓ लम्बाई वाली एक समरूप पतली छड़ का, छड़ के लम्बवत् एवं केन्द्र से गुजरने वाली अक्ष के सापेक्ष जड़त्व आघूर्ण I है। इसके एक किनारे से गुजरने वाली तथा छड़ के लम्बवत् अक्ष के सापेक्ष जड़त्व आघूर्ण होगा-

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

(B) $\frac{I}{2}$

(C) 2I

(D) 4I

145. The pressure of 10^6 dyne/cm^2 is equivalent to -

(A) 10^5 N/m^2

(B) 10^6 N/m^2

(C) 10^7 N/m^2

(D) 10^8 N/m^2

145. 10^6 डाइन/सेमी^{2} दाब बराबर होगा

(A) 10^5 N/m^2

(B) 10^6 N/m^2

(C) 10^7 N/m^2

(D) 10^8 N/m^2

146. $[ML^{-1} T^{-1}]$ stand for dimension of :-

(A) Work

(B) Torque

(C) Linear momentum

(D) Coefficient of viscosity

146. $[ML^{-1} T^{-1}]$ निम्न की विमा है :-

(A) कार्य

(B) बलाघूर्ण

(C) रेखीय संवेग

(D) श्यानता गुणांक

147. One watt-hour is equivalent to

(A) 6.3×10^3 Joule

(B) 6.3×10^{-7} Joule

(C) 3.6×10^3 Joule

(D) 3.6×10^{-3} Joule

147. एक वॉट-घण्टा (watt-hour) बराबर है

(A) 6.3×10^3 जूल

(B) 6.3×10^{-7} जूल

(C) 3.6×10^3 जूल

(D) 3.6×10^{-3} जूल

148. A ball thrown by a boy is caught by another after 2 sec. some distance away in the same level. If the angle of projection is 30, the velocity of projection is

(A) 19.6 m/s

(B) 9.8 m/s

(C) 14.7 m/s

(D) None of these

149. A body of mass m hangs at one end of a light string of length ℓ, the other end of which is fixed. It is given a horizontal velocity at lowest point so that the string would just reach where it makes an angle of 60° with the vertical. The tension in the string at lowest position is :-

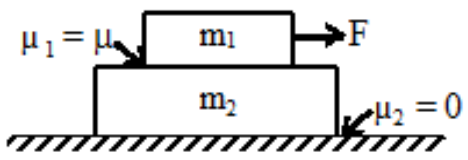
(A) 2mg

(B) mg

(C) 3mg

(D) $\sqrt{3}$ mg

150. In the given figure, the coefficient of friction between m_1 and m_2 is μ and m_2 and horizontal surface is zero –



(A) If $F > \mu m_1 g$, then relative acceleration is found between m_1 and m_2

(B) If $F < \mu m_1 g$, then no relative acceleration is found between m_1 and m_2

(C) If $F > \mu m_1 g$, then both bodies move together

(D) (A) and (B) are correct

148. एक लड़के द्वारा फैंकी गई एक गेद 2 सैकण्ड पष्चात इसी सतह पर कुछ दूरी पर दूसरे लड़के द्वारा पकडी जाती है। यदि प्रक्षेपण कोण 30° है, प्रक्षेपण का वेग है.

(A) 19.6 m/s

(B) 9.8 m/s

(C) 14.7 m/s

(D) इनमें से कोई नहीं

149. m द्रव्यमान का एक पिण्ड, ℓ लम्बाई की डोरी को एक सिरे से बाँधकर लटकाया गया है जबकि दूसरा सिरा स्थिर है। द्रव्यमान को इतना क्षैतिज वेग प्रदान किया जाता है कि इसके द्वारा उर्ध्वाधर से 60° का कोण बनाया जाता है। तब माध्य स्थिति में डोरी का तनाव होगा:-

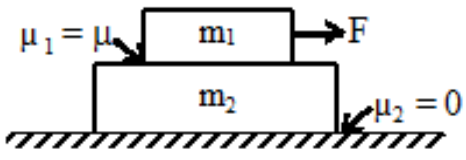
(A) 2 mg

(B) mg

(C) 3 mg

(D) $\sqrt{3}$ mg

150. दिये गये चित्र में m_1 व m_2 के मध्य घर्षण गुणांक μ है। तथा m_2 व क्षैतिज सतह के मध्य घर्षण गुणांक शुन्य है-



(A) यदि $F > \mu m_1 g$, तब m_1 तथा m_2 के मध्य सापेक्षित त्वरण पाया जाता है।

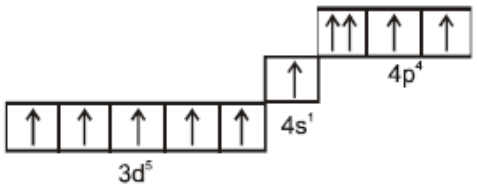
(B) यदि $F < \mu m_1 g$, तब m_1 तथा m_2 के मध्य कोई सोपेशिक त्वरण नहीं पाया जाता

(C) यदि $F > \mu m_1 g$, तब दोनों वस्तुए साथ गति करती है।

(D) (A) तथा (B) सही है।

PART - IV _ SECTION – A _ [CHEMISTRY]

151. In the following electronic configuration, some rules have been violated :



I : Hund II : Pauli's exclusion III : Aufbau

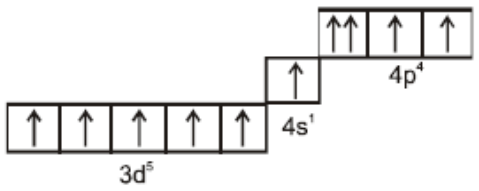
(A) I and II

(B) I and III

(C) II and III

(D) I, II and III

151. निम्न इलेक्ट्रॉनिक विन्यास में कुछ नियमों का उल्लंघन किया गया है। वे हैं :



I : हुण्ड II : पाउली अपवर्जन III : ऑफबाउ

(A) I तथा II

(B) I तथा III

(C) II तथा III

(D) I, II तथा III

152. Which of the following molecule has μ = 0 dipole moment?

(A) IF_5

(B) PCl_3F_2

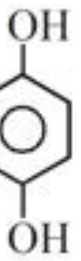
(C) 

(D) Both (B) and (C)

152. निम्न में से किस अणु का द्विध्रुव आघूर्ण μ = 0 होता है ?

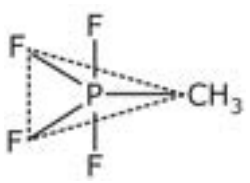
(A) IF_5

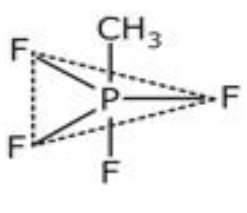
(B) PCl_3F_2

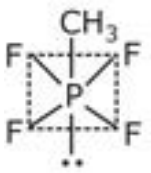
(C) 

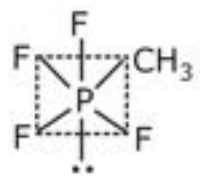
(D) (B) तथा (C) दोनों

153. For the molecule PF_4CH_3, which of the following structures is the most stable, considering that $-CH_3$ is more electropositive than -F ?

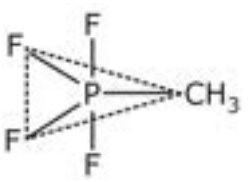
(A) 

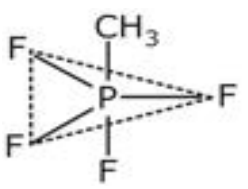
(B) 

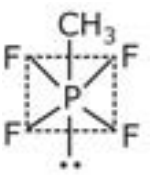
(C) 

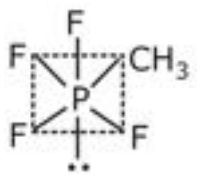
(D) 

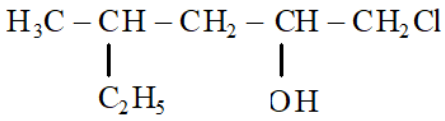
153. PF_4CH_3 अणु की कौनसी संरचना सर्वाधिक स्थायी है, $-CH_3$ को -F से अधिक विद्युत धनात्मक मानते हुए?

(A) 

(B) 

(C) 

(D) 

154. IUPAC name of  is

(A) 1-chloro-4-methylhexan-2-ol

(B) 1-chloro-4-ethylpentan-2-ol

(C) 2-ethyl-5-chloropentan-4-ol

(D) 1-chloro-2-hydroxy-4-methylhexane

155. How many moles of potassium chlorate need to be heated to produce 11.2 litre oxygen at N.T.P. ?

(A) $\frac{1}{2}$ mole

(B) $\frac{1}{3}$ mole

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

(D) $\frac{2}{3}$ mole

156. Mass of sucrose $C_{12}H_{22}O_{11}$ produced by mixing 84 gm of carbon, 12 gm of hydrogen and 56 lit. O_2 at STP according to given reaction, is-
$C(s) + H_2(g) + O_2(g) \rightarrow C_{12}H_{22}O_{11}(s)$

(A) 138.5

(B) 155.5

(C) 172.5

(D) 199.5

157. $FeSO_4$ undergoes decomposition as
$2FeSO_4(s) \rightarrow Fe_2O_3(s) + SO_2(g) + SO_3(g)$
At STP if (7.6 gm) $FeSO_4$ is taken then the volume occupied by the gases at STP-

(A) 22.4 lit

(B) 11.2 lit

(C) 1.12 lit

(D) 2.24 lit

158. One gm equivalent of substance is present in-

(A) 0.25 mole of O_2

(B) 0.5 mole of O_2

(C) 1.00 mole of O_2

(D) 8.00 mole of O_2

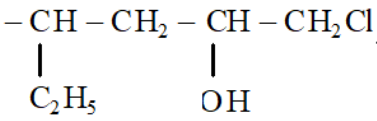
159. 4.0 g of metallic oxide contains 0.8 g of oxygen. The equivalent weight of metallic oxide is :-

(A) 8

(B) 16

(C) 32

(D) 40

154.  का IUPAC नाम है

(A) 1-क्लोरो-4-मेथिलहैक्सेन-2-ऑल

(B) 1-क्लोरो-4-एथिलपेन्टेन-2-ऑल

(C) 2-एथिल-5-क्लोरोपेन्टेन-4-ऑल

(D) 1-क्लोरो-2-हाइड्रोक्सी-4-मेथिलहैक्सेन

155. N.T.P.पर 11.2 लीटर ऑक्सीजन उत्पन्न करने के लिए पौटेशियम क्लोरेट के कितने मोल गर्म किये जाने आवश्यक हैं ?

(A) $\frac{1}{2}$ मोल

(B) $\frac{1}{3}$ मोल

(C) $\frac{1}{4}$ मोल

(D) $\frac{2}{3}$ मोल

156. नीचे दी गई अभिक्रिया के अनुसार STP पर 84 gm कार्बन, 12 gm हाइड्रोजन तथा 56 lit. O_2 के मिश्रण से उत्पादित सुक्रोज $C_{12}H_{22}O_{11}$ का द्रव्यमान होगा -
$C(s) + H_2(g) + O_2(g) \rightarrow C_{12}H_{22}O_{11}(s)$

(A) 138.5

(B) 155.5

(C) 172.5

(D) 199.5

157. $FeSO_4$ निम्न प्रकार विघटित होता है :
$2FeSO_4(s) \rightarrow Fe_2O_3(s) + SO_2(g) + SO_3(g)$
STP पर यदि (7.6 gm) $FeSO_4$ लिया जाता है, तो गैसो द्वारा अधिधारित आयतन होगा -

(A) 22.4 lit

(B) 11.2 lit

(C) 1.12 lit

(D) 2.24 lit

158. एक पदार्थ का 1 ग्राम - तुल्यांक निम्न में उपस्थित होगा-

(A) 0.25 मोल O_2

(B) 0.5 मोल O_2

(C) 1.00 मोल O_2

(D) 8.00 मोल O_2

159. 4.0 ग्राम धात्विक ऑक्साइड में 0.8 ग्राम ऑक्सीजन है। धात्विक ऑक्साइड का तुल्यांकी भार है :-

(A) 8

(B) 16

(C) 32

(D) 40

160. 124 g of P_4 will contain which of the following ?

(A) 4 atoms of Phosphorus

(B) $4N_A$ atoms of Phosphorus

(C) N_A molecules of Phosphorus

(D) 1 molecule of Phosphorus

(A) A and D

(B) B and C

(C) A and C

(D) B and D

161. In a Bohr's model of atom when an electron jumps from n=1 to n=3, how much energy will be absorbed ?

(A) 2.15×10^{-11} erg

(B) 0.1911×10^{-10} erg

(C) 2.389×10^{-12} erg

(D) 0.239×10^{-10} erg

162. If kinetic energy of electron is 13.6 eV, then its total energy is-

(A) – 13.6 eV

(B) – 6.8 eV

(C) 27.2 eV

(D) 6.8 eV

163. For an electron, with n = 3 has only one radial node. The orbital angular momentum of the electron will be

(A) 0

(B) $\sqrt{6}\frac{h}{2\pi}$

(C) $\sqrt{2}\frac{h}{2\pi}$

(D) $3\left(\frac{h}{2\pi}\right)$

164. Number of possible spectral lines which may be emitted in bracket series in H atom if electrons present 9^{th} excited level returns to ground level, are

(A) 21

(B) 6

(C) 45

(D) 5

160. P_4 के 124 g में निम्न में से क्या होगा ?

(A) फॉस्फोरस के 4 परमाणु

(B) फॉस्फोरस के 4 N_A परमाणु

(C) फॉस्फोरस के N_A अणु

(D) फॉस्फोरस का 1 अणु

(A) A तथा D

(B) B तथा C

(C) A तथा C

(D) B तथा D

161. परमाणु के बोहर मॉडल में जब इलेक्ट्रॉन n=1 से n = 3 में जाता है, तब कितनी ऊर्जा का अवशोषित होगी -

(A) 2.15×10^{-11} अर्ग

(B) 0.1911×10^{-10} अर्ग

(C) 2.389×10^{-12} अर्ग

(D) 0.239×10^{-10}e अर्ग

162. यदि इलेक्ट्रॉन की गतिज ऊर्जा 13.6 eV है, तब इसकी कुल ऊर्जा होगी-

(A) – 13.6 eV

(B) – 6.8 eV

(C) 27.2 eV

(D) 6.8 eV

163. n = 3 वाले इलेक्ट्रॉन के लिए केवल एक त्रिज्य नोड है। इलेक्ट्रॉन का कक्षीय कोणीय संवेग होंगा-

(A) 0

(B) $\sqrt{6}\frac{h}{2\pi}$

(C) $\sqrt{2}\frac{h}{2\pi}$

(D) $3\left(\frac{h}{2\pi}\right)$

164. हाइड्रोजन परमाणु की ब्रेकेट श्रेणी के स्पेक्ट्रम के लिए उन संभव स्पेक्ट्रमीय रेखाओं की संख्या क्या होगी, यदि इलेक्ट्रॉन 9वीं उत्तेजित अवस्था से मूल अवस्था में लौटता हो–

(A) 21

(B) 6

(C) 45

(D) 5

165. The process in which oxidation number increases is known as

(A) Oxidation

(B) Reduction

(C) Auto-oxidation

(D) None of the above

165. वह प्रक्रिया जिसमें ऑक्सीकरण संख्या में वृद्धि होती है | कहलाती है-

(A) ऑक्सीकरण

(B) अपचयन

(C) स्व-ऑक्सीकरण

(D) इनमें से कोई नहीं

166. Uncertainty in position is twice the uncertainty in momentum. Uncertainty in velocity is :

(A) $\sqrt{\frac{h}{\pi}}$

(B) $\frac{1}{2m}\sqrt{\frac{h}{\pi}}$

(C) $\frac{1}{2m}\sqrt{\frac{h}{2\pi}}$

(D) $\frac{h}{4\pi}$

166. स्थिति में अनिश्चितता संवेग में अनिश्चितता का दोगुनी है। वेग में अनिश्चितता है-

(A) $\sqrt{\frac{h}{\pi}}$

(B) $\frac{1}{2m}\sqrt{\frac{h}{\pi}}$

(C) $\frac{1}{2m}\sqrt{\frac{h}{2\pi}}$

(D) $\frac{h}{4\pi}$

167. Which of the following changes does not involve either oxidation or reduction ?

(A) $VO^{2+} \rightarrow V_2O_3$

(B) $Na \rightarrow Na^+$

(C) $Zn^{+2} \rightarrow Zn$

(D) $CrO_4^{-2} \rightarrow Cr_2\,O_7^{-2}$

167. निम्न में से किस परिवर्तन में या तो आक्सीकरण या अपचयन शामिल नहीं है ?

(A) $VO^{2+} \rightarrow V_2O_3$

(B) $Na \rightarrow Na^+$

(C) $Zn^{+2} \rightarrow Zn$

(D) $CrO_4^{-2} \rightarrow Cr_2\,O_7^{-2}$

168. When white phosphorus reacts with caustic soda, the products are PH_3 and $NaH_2\,PO_2$. This reaction is an example of –

(A) Oxidation

(B) Reduction

(C) Disproportionation

(D) Neutralisation

168. जब श्वेत फॉस्फोरस, कास्टिक सोडा के साथ क्रिया करता है, तो उत्पाद PH_3 तथा $NaH_2\,PO_2$ बनते है। यह समीकरण किसका एक उदाहरण है–

(A) ऑक्सीकरण

(B) अपचयन

(C) विषमानुपातन

(D) उदासीनीकरण

169. For the redox reaction $Zn + NO_3^- \rightarrow Zn^{2+} + NH_4^+$ in basic medium, coefficients of Zn, NO_3^- and OH^- in the balanced equation respectively are-

(A) 4, 1, 7

(B) 7, 4 , 1

(C) 4 , 1, 10

(D) 1, 4, 10

169. क्षारीय माध्यम में रेडॉक्स अभिक्रिया $Zn + NO_3^- \rightarrow Zn^{2+} + NH_4^+$ के लिये संतुलित समीकरण में Zn, NO_3^- तथा OH^- के गुणांक क्रमश: हैं -

(A) 4, 1, 7

(B) 7, 4 , 1

(C) 4 , 1, 10

(D) 1, 4, 10

170. The elecrton affinity value of halogens are F = 329, Cl = 349, Br = 324, I = 295 kJ mol^{-1}. The higher value for Cl as compared to that of F is due to-

(A) Less electron-electron repulsion in Cl as compare to F

(B) Higher atomic radius of F

(C) Smaller electronegativity of F

(D) More vacant P-subshell in Cl

171. First member of rare earth element is–

(A) Ce

(B) Ac

(C) U

(D) La

172. Among the following options, the sequence of increasing first ionisation potential will be–

(A) B < C < N

(B) B > C > N

(C) C < B < N

(D) N > C > B

173. Arrange S, O and Se in ascending order of electron affinity–

(A) Se < S < O

(B) O < Se < S

(C) S < O < Se

(D) S < Se < O

174. Which of the following relation is correct if EN value is on Mulliken scale and IP & EA are in eV ?

(A) 2 I.P. – E.A. – E.N. = 0

(B) 2 I.P. – E.A. + E.N. = 0

(C) 2 E.N. – I.P. – E.A. = 0

(D) E.N. – I.P. – E.A. = 0

175. Correct order of electronegativity of N, P, C and Si is -

(A) N < P < C < Si

(B) N > C > Si > P

(C) N = P > C = Si

(D) N > C > P > Si

170. हैलोजनों के इलेक्ट्रॉन बंधुता के मान, F = 329, Cl = 349, Br = 324, I = 295 kJ mol^{-1} है। F की तुलना में Cl के लिए उच्च मान का कारण-

(A) F की तुलना में Cl में कम इलेक्ट्रॉन-इलेक्ट्रॉन प्रतिकर्षण है

(B) F की उच्च परमाणु त्रिज्या

(C) F की निम्न विद्युतऋणता

(D) Cl में अधिक रिक्त P-उपकोश

171. दुर्लभ मृदा तत्व का प्रथम सदस्य है–

(A) Ce

(B) Ac

(C) U

(D) La

172. निम्न विकल्पों में से बढ़ता प्रथम आयनन विभव का अनुक्रम होगा–

(A) B < C < N

(B) B > C > N

(C) C < B < N

(D) N > C > B

173. S, O तथा Se को इलेक्ट्रॉन बंधुता के आरोही क्रम में व्यवस्थित कीजिए–

(A) Se < S < O

(B) O < Se < S

(C) S < O < Se

(D) S < Se < O

174. निम्नलिखित में कौनसा सम्बन्ध सहीं है यदि EN मान मुलिकेन माप पर है और IP और EA, eV में है?

(A) 2 I.P. – E.A. – E.N. = 0

(B) 2 I.P. – E.A. + E.N. = 0

(C) 2 E.N. – I.P. – E.A. = 0

(D) E.N. – I.P. – E.A. = 0

175. N, P, C तथा Si की विद्युतऋणता का सही क्रम है-

(A) N < P < C < Si

(B) N > C > Si > P

(C) N = P > C = Si

(D) N > C > P > Si

176. Consider the following species :
CN^+, CN^-, NO and CN
Which one of these will have the highest bond order ?

(A) CN^+

(B) CN^-

(C) NO

(D) CN

177. Assuming the bond direction to be z-axis, which of the overlapping of atomic orbitals of two atom (A) and (B) will result in bonding?
(I) s-orbital of A and p_x orbital of B
(II) s-orbital of A and p_z orbital of B
(III) p_y-orbital of A and p_z orbital of B
(IV) s-orbitals of both (A) and (B)

(A) I and IV

(B) I and II

(C) III and IV

(D) II and IV

178. In which of the following pairs, both the species are not isostructural?

(A) NH_3, PH_3

(B) XeF_4, XeO_4

(C) $SiCl_4$, CCl_4

(D) Diamond, silicon carbide

179. Select the ion having $p\pi-d\pi$ bond–

(A) SO_4^{-2}

(B) PO_4^{-3}

(C) CIO_4^-

(D) All of these

180. Which of the following reaction represents oxidising character of H_2O?

(A) $2Na + 2H_2O \rightarrow 2NaOH + H_2$

(B) $NaH + H_2O \rightarrow NaOH + H_2$

(C) $H_2O + F_2 \rightarrow HF + O_2$

(D) None of these

181. At absolute zero-

(A) Only para hydrogen exist

(B) Only ortho hydrogen exist

(C) Both para & ortho hydrogen exist

(D) None

176. निम्न स्पीशीज पर विचार कीजिएः
CN^+, CN^-, NO तथा CN
इनमें से कौनसा एक उच्चतम बंध क्रम रखेगा?

(A) CN^+

(B) CN^-

(C) NO

(D) CN

177. बन्ध दिशा को z-अक्ष मानते हुए, दो परमाणु (A) तथा (B) के परमाण्विक कक्षको के अतिव्यापन से निम्न में से कौनसे बन्ध में परिणाम होगा ?
(I) A का s-कक्षक तथा B का p_x कक्षक
(II) A का s-कक्षक तथा B का p_z कक्षक
(III) A का p_y - कक्षक B का p_z कक्षक
(IV) (A) तथा (B) दोनों का s-कक्षक

(A) I तथा IV

(B) I तथा II

(C) III तथा IV

(D) II तथा IV

178. किस में दोनों स्पीशीज समसंरचनात्मक नहीं है?

(A) NH_3, PH_3

(B) XeF_4, XeO_4

(C) $SiCl_4$, CCl_4

(D) हीरा, सिलिकॉन कार्बाइड

179. $p\pi-d\pi$ बन्ध वाले आयन का चयन करो–

(A) SO_4^{-2}

(B) PO_4^{-3}

(C) CIO_4^-

(D) उपरोक्त सभी

180. निम्न में से कौनसी अभिक्रिया जल की ऑक्सीकारक प्रवृत्ति दर्शाती है?

(A) $2Na + 2H_2O \rightarrow 2NaOH + H_2$

(B) $NaH + H_2O \rightarrow NaOH + H_2$

(C) $H_2O + F_2 \rightarrow HF + O_2$

(D) इनमे से कोई नहीं

181. परम शुन्य पर :-

(A) केवल पैरा हाइड्रोजन उपस्थित रहता है

(B) केवल ऑर्थो हाइड्रोजन उपस्थित रहता है।

(C) ऑर्थो और पैरा दोनों हाइड्रोजन उपस्थित रहते हैं।

(D) कोई नहीं

182. H_2O_2 restores the colour of old oily paintings, blackened by the action of H_2S gas by–

(A) Converting PbO_2 to Pb

(B) By oxidising PbS to $PbSO_4$

(C) Converting $PbCO_3$ to Pb

(D) Oxidising $PbSO_3$ to $PbSO_4$

182. H_2O_2 किसके द्वारा H_2S गैस की क्रिया के द्वारा खराब हुए पुराने लेड चित्रों के रंग को पुर्नस्थापित करता है–

(A) PbO_2 को Pb में परिवर्तित करके

(B) PbS को $PbSO_4$ में ऑक्सीकृत करके

(C) $PbCO_3$ को Pb में परिवर्तित करके

(D) $PbSO_3$ को $PbSO_4$ में ऑक्सीकृत करके

183. Among the following the pK_a is minimum for :–

(A) C_6H_5OH

(B) HCOOH

(C) C_2H_5OH

(D) $CH_3C \equiv CH$

183. निम्न में से किसके लिए pK_a निम्नतम है:-

(A) C_6H_5OH

(B) HCOOH

(C) C_2H_5OH

(D) $CH_3C \equiv CH$

184. Which statement is incorrect in given statements ?

(A) $CH_3\,O\overset{\oplus}{C}H_2$ is more stable than $CH_3\overset{\oplus}{C}H_2$

(B) $Me_2\overset{\oplus}{C}H$ is more stable than $CH_3\,CH_2\overset{\oplus}{C}H_2$

(C) $CH_2 = CH - \overset{\oplus}{C}H_2$ is more stable than $CH_3\,CH_2\overset{\oplus}{C}H_2$

(D) $CH_2 = \overset{\oplus}{C}H$ is more stable than $CH_3\overset{\oplus}{C}H_2$

184. दिये गये कथनों में से कौनसा कथन गलत है ?

(A) $CH_3\,O\overset{\oplus}{C}H_2$, $CH_3\overset{\oplus}{C}H_2$ से अधिक स्थायी है

(B) $Me_2\overset{\oplus}{C}H$, $CH_3\,CH_2\overset{\oplus}{C}H_2$ से अधिक स्थायी है

(C) $CH_2 = CH - \overset{\oplus}{C}H_2$, $CH_3\,CH_2\overset{\oplus}{C}H_2$ से अधिक स्थायी है

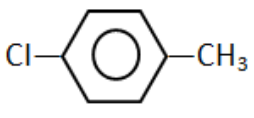
(D) $CH_2 = \overset{\oplus}{C}H$, $CH_3\overset{\oplus}{C}H_2$ से अधिक स्थायी है

185. In which of the following –Cl is not replaceable?

(A) CH_3Cl

(B) $CH_2 = CH—CH_2Cl$

(C) $C_6H_5CH_2Cl$

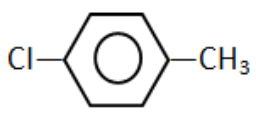
(D) 

185. निम्न मे से किसमे –Cl प्रतिस्थापन योग्य नहीं है ?

(A) CH_3Cl

(B) $CH_2 = CH—CH_2Cl$

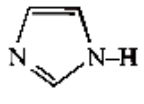
(C) $C_6H_5CH_2Cl$

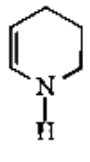
(D) 

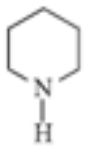
PART - IV _ SECTION – B _ [CHEMISTRY]

186. Which one of the following is least basic in character?

(A) 

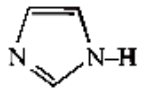
(B) 

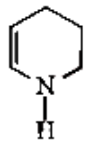
(C) 

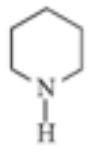
(D) 

186. निम्न मे से कौनसा न्यूनतम क्षारीय लक्षण रखता है ?

(A) 

(B) 

(C) 

(D) 

187. A 1 KW radio transmitter operates at a frequency of 880 Hz. How many photons per second does it emit ?

(A) 1.71×10^{21}

(B) 1.71×10^{33}

(C) 6.02×10^{23}

(D) 2.85×10^{26}

187. एक 1 KW रेडियो ट्रांसमीटर 880 Hz आवृति पर संचालित होता है। यह कितने फोटोन प्रतिसैकण्ड़ उत्सर्जित करता है ?

(A) 1.71×10^{21}

(B) 1.71×10^{33}

(C) 6.02×10^{23}

(D) 2.85×10^{26}

188. The frequency of a wave of light is $12 \times 10^{14} sec^{-1}$. The wave number associated with this light is

(A) 5×10^{7} m

(B) 4×10^{-8} cm^{-1}

(C) 2×10^{-7} m^{-1}

(D) 4×10^{6} cm^{-1}

188. प्रकाश की एक तरंग की आवृत्ति 12×10^{14} sec^{-1} है। इस प्रकाश से संबद्ध तरंग संख्या है -

(A) 5×10^{7} m

(B) 4×10^{-8} cm^{-1}

(C) 2×10^{-7} m^{-1}

(D) 4×10^{6} cm^{-1}

189. The equivalent weight of $MnSO_4$ is half its molecular weight when it is converted to –

(A) Mn_2O_3

(B) MnO_2

(C) MnO_4^-

(D) MnO_4^{2-}

189. $MnSO_4$ का तुल्यांकी भार इसके अणुभार का आधा होता है, जब यह निम्न में परिवर्तित होता है–

(A) Mn_2O_3

(B) MnO_2

(C) MnO_4^-

(D) MnO_4^{2-}

190. Ratio of stoichiometric coefficients of $CrCl_3$ to MnO_4^- in balanced chemical reaction in acidic medium is

$MnO_4^- + CrCl_3 \rightarrow MnCl_2 + Cr_2O_7^{2-} + Cl^-$

(A) $\frac{5}{3}$

(B) $\frac{2}{5}$

(C) $\frac{3}{5}$

(D) 1

190. अम्लीय माध्यम में निम्नलिखित संतुलित रासायनिक अभिक्रिया में $CrCl_3$ तथा MnO_4^- के रससमीकरणमितीय गुणांकों का अनुपात है:

$MnO_4^- + CrCl_3 \rightarrow MnCl_2 + Cr_2O_7^{2-} + Cl^-$

(A) $\frac{5}{3}$

(B) $\frac{2}{5}$

(C) $\frac{3}{5}$

(D) 1

191. On analysis, a certain compound was found to contain iodine and oxygen in the ratio of 254 gm of iodine and 80 gm of oxygen. The atomic mass of iodine is 127 and that of oxygen is 16. Which of the following is the formula of the compound ?

(A) IO

(B) I_2O

(C) I_5O_2

(D) I_2O_5

192. What will be the molarity of solution, which contains 5.85 g NaCl(s) per 500 mL?

(A) 4 mol L^{-1}

(B) 20 mol L^{-1}

(C) 0.2 mol L^{-1}

(D) 2 mol L^{-1}

193. The first ionisation potentials (eV) of Be and B respectively are-

(A) 8.29 eV, 9.32 eV

(B) 9.32 eV, 9.32 eV

(C) 8.29 eV, 8.29 eV

(D) 9.32 eV, 8.29 eV

194. Which of the following has highest metallic character ?

(A) Element-A; I. E.-16.2 eV

(B) Element-B; I. E.-1.5 eV

(C) Element-C; I. E.-12.2 eV

(D) Element-D; I. E.-10.5 eV

195. Among CaH_2, BeH_2, BaH_2, the order of ionic character is :

(A) $BeH_2 < BaH_2 < CaH_2$

(B) $CaH_2 < BeH_2 < BaH_2$

(C) $BeH_2 < CaH_2 < BaH_2$

(D) $BaH_2 < BeH_2 < CaH_2$

196. The correct order of boiling point is :

(A) He > Ne > Ar

(B) $HF < NH_3 < H_2O < H_2O_2$

(C) $CCl_4 > Cl_2$

(D) $ICl \approx Br_2$

191. किसी यौगिक के विश्लेषण से ज्ञात होता है की इसमें 254 ग्राम तथा 80 ग्राम के अनुपात में क्रमश: आयोडीन तथा ऑक्सीजन उपस्थित है, आयोडीन का परमाणु भार 127 तथा ऑक्सीजन का परमाणु भार 16 है, तो निम्न में यौगिक का सूत्र होगा ?

(A) IO

(B) I_2O

(C) I_5O_2

(D) I_2O_5

192. विलयन की मोलरता क्या होगी, जिसमें प्रति 500 mL में 5.85 g NaCl(s) उपस्थित होता है?

(A) 4 mol L^{-1}

(B) 20 mol L^{-1}

(C) 0.2 mol L^{-1}

(D) 2 mol L^{-1}

193. Be तथा B के प्रथम आयनन विभव (eV) क्रमशः हैं-

(A) 8.29 eV, 9.32 eV

(B) 9.32 eV, 9.32 eV

(C) 8.29 eV, 8.29 eV

(D) 9.32 eV, 8.29 eV

194. निम्न में से कौनसा उच्चतम धात्विक गुण रखता है?

(A) तत्व-A; I. E.-16.2 eV

(B) तत्व-B; I. E.-1.5 eV

(C) तत्व-C; I. E.-12.2 eV

(D) तत्व-D; I. E.-10.5 eV

195. CaH_2, BeH_2, BaH_2 की आयनिक प्रकृति का क्रम हैः:

(A) $BeH_2 < BaH_2 < CaH_2$

(B) $CaH_2 < BeH_2 < BaH_2$

(C) $BeH_2 < CaH_2 < BaH_2$

(D) $BaH_2 < BeH_2 < CaH_2$

196. क्वथनांक का सही क्रम हैं :

(A) He > Ne > Ar

(B) $HF < NH_3 < H_2O < H_2O_2$

(C) $CCl_4 > Cl_2$

(D) $ICl \approx Br_2$

197. Out of **list I** select the cation which has less polarizing power than Ca^{2+} and from **list II** select the anion having more polarisability than S^{2-}
List I : Mg^{2+}, Sc^{3+}, K^{+}
List II : O^{2-}, Cl^{-}, P^{3-}

(A) Mg^{2+}, O^{2-}

(B) K^{+}, P^{3-}

(C) Sc^{3+}, P^{3-}

(D) Mg^{2+}, Cl^{-}

198. Potassium carbonate when heated to high temperature –

(A) Gives CO_2

(B) Gives O_2

(C) Gives CO

(D) Gives no gas at all

199. High dipole moment of water justifies that–

(A) It is a universal solvent

(B) It has higher density than ice

(C) It is neutral toward litmus

(D) It is not a linear molecule

200. Which of the following contains three pair of electrons ?

(A) Carbanion

(B) Carbocation

(C) Carbon free radical

(D) None

197. सूची I में से उस धनायन को चुनिये जिसकी ध्रुवीकरण क्षमता Ca^{2+} की तुलना में कम तथा सूची II में से उस ऋणायन को चुनिये जिसकी ध्रुवीयता S^{2-} से अधिक है -

सूची I : Mg^{2+}, Sc^{3+}, K^{+}
सूची II : O^{2-}, Cl^{-}, P^{3-}

(A) Mg^{2+}, O^{2-}

(B) K^{+}, P^{3-}

(C) Sc^{3+}, P^{3-}

(D) Mg^{2+}, Cl^{-}

198. पोटेशियम कार्बोनेट को उच्च ताप पर गर्म करने पर -

(A) CO_2 देता है

(B) O_2 देता है

(C) CO देता है

(D) कोई गैस नहीं देता

199. जल का उच्च द्विध्रुव आघूर्ण प्रदर्शित करता है–

(A) यह सार्वत्रिक विलायक है

(B) इसका घनत्व बर्फ से उच्च होता है

(C) यह लिटमस के प्रति उदासीन होता है

(D) यह रेखीय अणु नहीं है

200. निम्नलिखित किस मध्यवर्ती में तीन इलेक्ट्रॉन युग्म होते हैं ?

(A) कार्बऋणायन

(B) कार्बधनायन

(C) कार्बन मुक्त मूलक

(D) कोई नहीं

Student's Solution Copy

ENTHUSE_SEMI MAJOR TEST-3

13th NEET - Phase 1

KOTA

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

Biology - Section A

1. **Answer:** B

2. **Answer:** B

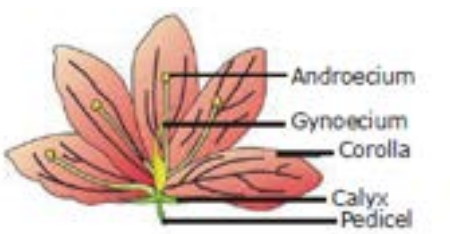
Sol:

Figure-P : Basal placentation is found in marigold, sunflower [asteraceae-family]

figure-Q : Free central placentation is found
in Dianthus and Primrose.

3. **Answer:** A

Sol:



4. **Answer:** B

Sol:

A-Hypodermis, B-Parenchyma, C-Endodermis, D-Pericycle , E-Medullary rays

The outer hypodermis consists of a few layers of collenchymatous cells just below the epidermis, which provide mechanical strength to the young stem. Cortical layers below hypodermis consist of rounded thin walled parenchymatous cells with conspicuous intercellular spaces.

The innermost layer of the cortex is called the endodermis. Pericycle is present on the inner side of the endodermis and above the phloem in the form of semi-lunar patches of sclerenchyma.

They are the radial strips of parenchyma which are present between adjacent vascular bundles. The medullary rays connect the pith with pericycle and cortex.

Thus the right answer is option B.

5. **Answer:** C

6. **Answer:** B

Sol:

Most fungi are multicellular organisms. For example, Aspergillus and Penicillium. However, we have some unicellular fungi too which are generally referred to as yeasts. Saccharomyces cerevisiae (baker's yeast) and Candida species are examples of unicellular fungi.

7. **Answer:** A

8. **Answer:** A

Sol:

Mesophyll is not differentiated into palisade and spongy tissues in isobilateral leaves and thus the tissue are composed of mainly isodiametric cells with intercellular spaces (mostly spongy type).

Hence, the correct answer is **spongy tissue**.

9. **Answer:** B

10. **Answer:** A

Sol:

The modified tap root for storage:

Fusiform roots are thicker in the middle and tapering on both ends. It helps in storage of food. For example: radish.

Fusiform root

Napiform roots become swollen and spherical at upper end and tapering like a thread at their lower end. For example: turnip.

Conical roots are thicker at their upper side and tapering at basal end. For example: carrot.

Tuberous root do not have regular shape and get swollen & fleshy at any portion of roots. For example: mirabilis.

Hence, the correct answer is **fusiform root**.

11. **Answer:** D

12. **Answer:** A

Sol:

Modified stems can be categorized into three types:

Underground – Rhizome, Bulb, Corm, Tuber
Subaerial – Runner, Sucker, Offsets, Stolon
Aerial – Tendrils, Thorn, Bulbils, Cladode, Phylloclade

so , here underground stems of potato, ginger, turmeric, Zamikand and Colocasia are modified to Propagate reproductively by asexual methods,Store food,Perform perennation.

Hence, the correct answer is option D .

13. **Answer:** B

Sol:

Xylem is one of the two types of transport tissue in vascular plants, the other being phloem. The basic function of xylem is to transport water from roots to stems and leaves, but it also transports nutrients.Xylem tissue consists of a variety of specialized, water-conducting cells known as tracheary elements.
Xylem tissue is made up of four different types of cells- tracheids, vessels, xylem parenchyma and xylem fibres.

15. **Answer:** B

Sol:

The Casparian strip is a band of cell wall material deposited in the radial and transverse walls of the root endodermis, and is chemically different from the rest of the cell wall - the cell wall being made of lignin and without suberin - whereas the Casparian strip is made of suberin (waxy material secreted by endodermal cells) and sometimes lignin.

17. **Answer:** A

19. **Answer:** C

Sol:

Certain plants like xerophytic plants are adapted to survive in an environment with little water. In these plant, the leaves are changed into spines. When the petioles become flat and wide and the true leaves become reduced or vanish altogether, then these are known as phyllodes. It is also known as phyllodia or cladophylls. The phyllode functions as the leaf. They are common in the genus *Acacia*.
Thus the right answer is option A.

14. **Answer:** A

Sol:

Seed embryo is the actively dividing tissue that carries the progenitor of shoot and root of the plant and develops into a mature plant by cell division and differentiation. Meristem is the region marked by the presence of active cell growth and the immature, undifferentiated tissues present in meristem are termed as meristematic tissues which are responsible growth and development of a complete plant from embryo thus, the embryo of seed is made up of meristematic tissue.

16. **Answer:** A

18. **Answer:** C

20. **Answer:** D

Sol:

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Sol:

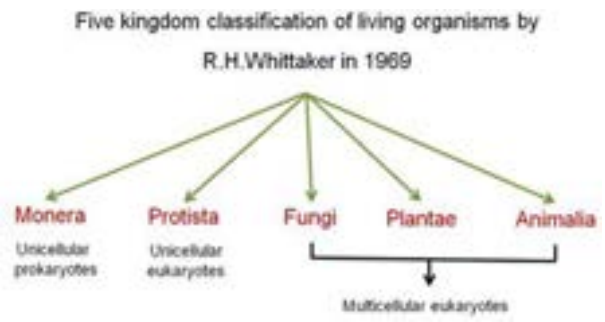
Zoological parks are the places where wild animals are kept in protected environments under human care and which enable us to learn about their food habits and behaviour.

Museums have collections of preserved plant and animal specimens are preserved in the containers or jars in preservative solutions. Insects are preserved in insect boxes after collecting, killing and pinning. Larger animals like birds and mammals are usually stuffed and preserved.

21. **Answer:** C

Sol:

In Whittaker's five kingdom classification, cell type (prokaryote/ eukaryote) was one of the 5 criteria taken into account. The primary distinction between these two types of organisms is that eukaryotic cells have a membrane-bound nucleus and prokaryotic cells do not. Out of the 5 kingdoms, eukaryotes were assigned to 4 of them namely Protista, Mycota, Algae and Plantae. Hence, In Whittaker's "Five kingdom classification", eukaryotes were assigned to only four of the five kingdoms.



22. **Answer:** C

Sol:

Mycoplasmas are prokaryotic single-celled organisms. However, they are different from other bacteria in that they lack a cell wall. Hence, Mycoplasma is prokaryotic and unicellular.

23. **Answer:** B

Sol:

Biochemical resemblance is generally used for the identification of Monera because it has all the prokaryotic cells that do not have well-developed structures. The biochemical characters are used for their identification in order to supplement the characteristic morphological features. The study of their chemical constituents present in these organisms help in the classification and identification of the different organism which are placed in this group.

Fungi, Protista and Plantae have well-developed eukaryotic cells.

24. **Answer:** D

Sol:

Bacterial ribosomes are composed of two subunits with densities of 50S and 30S, as opposed to 60S and 40S in eukaryotic cells. Several ribosomes may attach to a single mRNA and form a chain called polyribosomes or polysome. The ribosomes of a polysome translate the mRNA into proteins.

An autosome is any of the numbered chromosomes, as opposed to the sex chromosomes. Humans have 22 pairs of autosomes and one pair of sex chromosomes (the X and Y). Autosomes are numbered roughly in relation to their sizes.

Dictyosomes are net-like flat, membrane-bound cavity structures called cisternae which comprise the Golgi apparatus. Proteins are stored in the dictyosomes for further transport, modified, sorted, and packed into vesicles.

Centrosome is a microtubule-organizing centre in animal cells. Hence, bacterial ribosomes are called polysomes.

25. **Answer:** C

Sol:

Association between roots of higher plants e.g., pine, birch and fungal hyphae is called mycorrhiza. It exhibits the phenomenon of symbiosis. Here both the organisms in association are mutually benefitted. In this, fungal hyphae take nutrition from the plant and in return increase surface area for absorption of water and minerals for the plant. Hence, Mycorrhiza is Symbiotic association of algae and higher plant.

26. **Answer:** B

Sol:

Mesosomes (Mesosome is a convoluted membranous structure formed in a prokaryotic cell by the invagination of the plasma membrane) help in cell wall formation. They also help in distribution to daughter cells.

Penicillin kills bacteria by inhibiting the proteins which cross-link peptidoglycans in the cell wall. When a bacterium divides in the presence of penicillin. Hence, the correct answer is mesosome wall formation.

27. **Answer:** C

28. **Answer:** B

Sol:

Deuteromycetes are imperfect fungi because sexual reproduction is absent in them. They have septate and branched mycelium. Some members are saprophytic or parasitic; otherwise a large number of them are decomposers.

In phycomycetes, mycelium is aseptate and sexual reproduction is present.

Ascomycetes and basidiomycetes also have septate mycelium and sexual reproduction is present in them.

Hence the correct answer is **Deuteromycetes**.

Sol:

Slime molds belong to kingdom protista. These are distinguished from other by the presence of vegetative phase in their life cycle, which devoid of cell wall and either a free living multinucleate, amoeboid mass of protoplasm (plasmodium) or an aggregation of amoebae (pseudo-plasmodium).

The cell wall of fungi is made up of chitin. Blue green algae belong to kingdom monera. The cell wall is full of peptidoglycan, in a thick layer. Archaebacteria have different cell wall structure and this feature is responsible for their survival in extreme conditions.

Hence, the correct answer is **Slime mould**.

29. **Answer:** D

Sol:

Food reserves of fat, carbohydrate, protein in cells and tissues function as an important store of energy that can be released and used in ATP production when required by the organism. Reserve food material of fungi is glycogen and oil bodies.

Starch is the main reserve food material in plants.

Glycogen is the reserve food material in animals, fungi and bacteria.

Protein is rarely found as reserve food.

30. **Answer:** C

Sol:

Red rust disease of tea is caused by algae of the genus cephaleuros. It is a genus of parasitic simple green algae consisting of fourteen species. Its common name is red rust. Hence the disease caused by it is termed as red rust disease.

White rust of disease in plants caused by the oomycete Albugo candida (phycomycetes). The stem, black rust of wheat are caused by the fungus Puccinia graminis. P. graminis is a member of the phylum basidiomycetes within the kingdom Fungi. Red rot of sugarcane disease is caused by Colletotrichum (deuteromycetes). It is a very serious disease of sugarcane.

Hence, the correct answer is **red rust of tea**.

31. **Answer:** C

32. **Answer:** C

Sol:

Cholesterol is a waxy substance found in your blood. Cholesterol plays a unique role among the many lipids in mammalian cells. This is based in part on its biophysical properties, which allow it to be inserted into or extracted from membranes relatively easily.

Mycoplasma is a genus of bacteria that lack a cell wall around their cell membranes. Prokaryotes are unicellular organisms without membrane-bound organelles. They do not contain nuclear envelope. They contain nucleoid, genetic material without nuclear envelope. The genetic material present in them is DNA and RNA without proteins. They also contain ribosomes in the cytoplasm. Hence, the correct answer is cholesterol.

33. **Answer:** B

Sol:

In 1971 T.O. Diener discovered a new infectious agent that was smaller than viruses and caused potato spindle tuber disease. It was found to be a free RNA; it lacked the protein coat that is found in viruses, hence the name viroid.

Potato leaf roll disease is caused potato leaf roll virus and is transmitted by aphids.

Rice dwarf virus (RDV) is a plant pathogenic virus.

Tobacco mosaic disease is caused by tobacco mosaic virus.

35. **Answer:** C

Sol:

The second stage of prophase I called zygotene. During this stage chromosome start pairing together and this process of association is called synapsis. Such paired chromosomes are called homologous chromosomes. Electron micrographs of this stage indicate that chromosome synapsis is accompanied by the formation of complex structure called synaptonemal complex. The complex formed by a pair of synapsed homologous chromosomes is called a bivalent or a tetrad.

Sol:

The capsid is a protein shell surrounding the genome and is usually composed of protein subunits called capsomeres. The capsid serves to protect and introduce the genome into host cells.

Tobacco mosaic virus is the first discovered virus. Viruses are host-specific because they only can attach to and infect cells of certain organisms. Influenza is also mutable virus and HIV virus was the most mutable virus known because each generation changed its coat to some degree.

Hence, the correct answer is **capsid is the structural unit of Capsomeres**.

34. **Answer:** C

Sol:

Cauliflower mosaic virus is a member of the genus Caulimovirus, one of the six genera in the family Caulimoviridae, which are pararetroviruses that infect plants. Generally in plant viruses, ssRNA is present but in Cauliflower mosaic virus dsDNA is present. Generally in animal viruses, double stranded DNA is present but in some animal viruses, RNA is present and it is single or double stranded. The virus can induce a range of systemic symptoms, such as chlorosis (loss of green leaf color), mosaic (patches of light and dark green on leaves).

Hence, the correct answer is **ds DNA**.

36. **Answer:** A

Sol:

A - Sieve tube elements are long tube like structures, arranged longitudinally and are associated with the companion cells.

B - Phloem parenchyma is made up of elongated, tapering cylindrical cells which have dense cytoplasm and nucleus.

C - The companion cells are specialised parenchymatous cells, which are closely associated with sieve tube elements. It helps in maintaining the pressure gradient in the sieve tubes.

37. **Answer:** A

Sol:

Slime mold or slime mould is an informal name given to several kinds of unrelated eukaryotic organisms that can live freely as single cells, but can aggregate together to form multicellular reproductive structures. Slime molds are considered to be more closely related to plants than fungi since they have cellulose cell walls. They are mostly marine and are decomposers of dead plant material or parasites on plants and algae or some animals.

The members of Division - Bacillariophyta are known as Diatoms. Diatoms means-"Cut in to two".

Dinoflagellates are mainly marine. They are found on the surface of water. These are golden brown in colour.

Euglenoids a flagellated single-celled organism of a group that comprises euglena and its relatives. Hence, decomposer protist is Slime mold.

38. **Answer:** B

Sol:

'Pond silk' is the common name of Spirogyra because it is very slimy. Water silk, mermaid's tresses, and blanket weed are the other common name of Spirogyra.

'Pond wool' is the common name of Ulothrix.

Vaucheria is a genus of Xanthophyceae or yellow-green algae. It is one of only two genera in the family Vaucheriaceae.

Oedogonium, genus of filamentous green algae (family Oedogoniaceae), commonly found in quiet bodies of fresh water. They often are attached to other plants. Hence, pond silk is the common name of spirogyra.

39. **Answer:** D

Sol:

Bulliform cells or motor cells are large, bubble-shaped epidermal cells that occur in groups on the upper surface of the leaves of many monocots. These cells are present on the upper surface of the leaf. They are generally present near the mid-vein portion of the leaf and are large, empty and colorless. They are involved in folding and unfolding of leaf tissue in order to control light intensity and reduce overall water loss.

40. **Answer:** A

Sol:

Gymnosperms lack sieve tubes and companion cells, but they have sieve cells place of sieve tubes.

In gymnosperms and pteridophytes sieve cells are arranged irregularly. Sieve cell have less conspicuous sieve areas located laterally. So, food conduction takes place in Zig-Zag manner. They are narrow elongated cell. They taper at the end or have inclined walls.

41. **Answer:** B

42. **Answer:** B

Sol:

On the basis of division of labour, position & morphology tissue categorised by Sachs (German scientist) into three types of tissue system (The Epidermal tissue system, The Ground tissue system, The Vascular tissue system). Each system usually consists of an association of tissues which perform specific functions.
The Ground tissue system is the largest tissue system. It includes (all the tissue except epidermis and vascular bundles) hypodermis, general cortex, endodermis, pericycle and medullary rays (pith rays). It is also called as fundamental tissue system.

Sol:

The structural elements of xylem are tracheids, vessels or tracheae, xylem fibres, xylem parenchyma and rays.

Tracheid are major xylary element in wood of a gymnospermic plant. Tracheids are unicellular, primitive conducting elements of xylem. A single tracheid is a highly elongated cell with hard, thick and lignified wall and a narrow lumen. The ends of tracheids are tapering or chisel like.

43. **Answer:** C

Sol:

A ring of autumn wood and a ring of springwood are collectively known as the Annual ring. The number of annual rings, formed in a tree gives the idea of the age of the tree. The study of the determination of the age of the plant by this technique is called Dendrochronology.

44. **Answer:** D

Sol:

Lampbrush chromosome (immature eggs) of most animals, except mammals. Chromosomes transform into the lampbrush form during the diplotene stage of meiotic prophase first, due to an active transcription of many genes. They are highly extended meiotic half-bivalents, each consisting of 2 sister chromatids.

The correct answer is option D

45. **Answer:** C

Sol:

Meiosis is also known as reductional division as the number of chromosomes becomes half in the daughter nuclei as compared to the parental nuclei. It involves 2 successive cell divisions or 2 successive nuclear divisions known as meiotic-I and meiotic-II divisions.

Meiosis-I is also known as heterotypic or true reductional division as it produces 2 daughter cells which have half the number of chromosomes is present in the parent nucleus and are different from parent cells while meiosis-II is also called homotypic or equational division as it produces daughter cells which have a same number of chromosomes as present in parent nucleus and are identical to the parent cell.

46. **Answer:** A

Sol:

Leptotene is the first sub-stage of prophase-I in which chromosomes shorten and become visible as single structures. These chromosomes may be irregularly arranged or polarised towards the centriole forming a bouquet. The chromosomes at this stage appear as beaded structures.

Zygonema- In this stage, the homologous pairs of chromosomes to form a Synapse. The pairing or coming together of homologous chromosomes is called synapsis. This is also known as synaptonemal complex.

Pachytene- In this stage, there is the chaismata formation takes place where crossing over occurs. During the crossing over there is actual physical exchange of the segment of the chromosomes takes place. This is known as recombination.

Diplotene- Once the crossing over is accomplished the chromosome pairs begins to separate.

47. **Answer:** D

Sol:

Phaeophycae is also known as brown algae. They are multicellular filamentous. Major pigments found in brown algae are chlorophyll a and c, and fucoxanthin, flavoxanthin, violaxanthin and lutein. Out of these pigment fucoxanthin is brown pigment that masks the traditional green colour of chlorophyll.

In Rhodophyceae, floridean starch is the stored food and the major pigments are chlorophyll a, d and phycoerythrin.

Hence, the correct answer is **all the above**.

48. **Answer:** A

Sol:

Bacteria are prokaryotic and unicellular organisms lacking membrane-bound organelles, and chlorophyll. The most common type of chemotrophic organisms includes both bacteria and fungi. Chemoautotroph is able to synthesize their own organic molecules from the fixation of carbon dioxide. These organisms are able to produce their own source of food, or energy. The energy required for this process comes from the oxidation of inorganic molecules such as iron, sulfur or magnesium. It includes nitrogen fixing bacteria located in the soil, iron oxidizing bacteria located in the lava beds, and sulfur oxidizing bacteria located in deep sea thermal vents.

Hence the correct answer is **Bacteria**.

49. **Answer:** B

50. **Answer:** A

Sol:

In the life cycle of a fern the meiosis occurs during the formation of spore. Fern is a diploid plant body. Meiosis leads to formation of cells that contain half the number of chromosome than parental cells. In ferns, these cells are the spores. So, a spore is the product of meiosis in ferns.

Sol:

R.H. Whittaker gave the five kingdom system of classification. The five kingdoms are kingdom monera, protista, fungi, plantae and animalia. It is based on 5 characters; out of this complexity of cell structure is the basis of prokaryotes and eukaryotes cells. The kingdom monera is prokaryotic, protista is unicellular eukaryotes, fungi are multicellular eukaryotes, plantae is multicellular eukaryotes and animalia is multicellular eukaryotes.

Myxophyceae (Cyanophyceae) are commonly known as blue green algae and Myxomycophyta is slime mould is included in monera and protista. Both are not considered under the kingdom.

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

51. **Answer:** D

Sol:

A hermaphrodite is an organism that has complete or partial reproductive organs and produces gametes normally associated with both male and female sexes.
In Ascaris, the males and females are separate and so, are unisexual and not hermaphrodite.
Earthworm, Leech and Taenia have male and female sex organs in the same organism and so are the hermaphrodite.

52. **Answer:** B

Sol:

The animal body contains water in the form of intracellular fluid and extracellular fluid. The percentage of water in the animal body depends on various factors such as age, gender, weight. It ranges from 50-75%. The water amount is higher in infants, around 75%. However, it decreases in an adult to around 65%.

53. **Answer:** C

Sol:

The DNA in prokaryotes is contained in a central area of the cell called the nucleoid, which is not surrounded by a nuclear membrane. Many prokaryotes also carry small, circular DNA molecules called plasmids, which are distinct from the chromosomal DNA and can provide genetic advantages in specific environments.

54. **Answer:** A

Sol:

J.E. Purkinje (1839) – first introduced the term 'Protoplasm'. J.S. Huxley (1868) – defined protoplasm as 'the physical basis of life'.

55. **Answer:** B

Sol:

Schistosoma is a genus of trematodes, commonly known as blood flukes. Fasciola, commonly known as the liver fluke, is a genus of parasitic trematodes. Dugesia is a genus of dugesiid triclads that contains some common representatives of the class Turbellaria. Asexual reproduction occurs by fission in many freshwater turbellaria. Fertilization is internal but cross-fertilization in trematodes and self-fertilization in cestodes. Parthenogenesis and polyembryony commonly occur trematodes and tapeworms.

56. **Answer:** C

Sol:

Class 11 NCERT pg 50

57. **Answer:** A

Sol:

NCERT 11th Page No.; 50, 54, 52, 51

58. **Answer:** A

Sol:

Among the following options:

Option "1" is correct as Planaria belongs to the phylum Platyhelminthes. They have the ability to regenerate where one single piece of worm body can grow into a new worm in a few days.

Option "2" is incorrect as Pleurobrachia belongs to Ctenophora, and not to Cnidaria. It bears comb plates as it belongs to Ctenophora.

Option "3" is incorrect as Adamsia (Sea-Anemone) belongs to the phylum Coelenterata, not to Annelida. It has Cnidoblast - Secretory organelle.

Option "4" is incorrect as Pheretima (genus of earthworm), belongs to phylum Annelida, not to Ascheliminthes. But Pheretima has flame cells.

Hence, the correct option is "4" - a-iii, b- iv, c-ii, d-i.

59. **Answer:** D

Sol:

Earthworm exhibits a closed type of blood vascular system consisting of blood vessels, capillaries and heart. Blood glands are present in the 4th, 5th and 6th segments. They produce blood cells and haemoglobin, which is dissolved in blood plasma. So, the correct option is D.

60. **Answer:** D

61. **Answer:** D

62. **Answer:** B

Sol:

Nephridia found in pairs and performing a function similar to the vertebrate kidney. Nephridia remove metabolic wastes from an animal's body. :
They are tubular or branched structures in contact with the internal body fluids on one side and open to the environment on the other side.
nephridia filter fluid from the coelom, or body cavity. Beating cilia at the opening of the nephridium draw water from the coelom into a tubule. As the filtrate passes down the tubules, nutrients and other solutes are reabsorbed by capillaries. Filtered fluid containing nitrogenous and other wastes is stored in a bladder and then secreted through a pore in the side of the body.

Malpighian tubules are found lining the gut of some species of arthropods, such as the bee.

Flame cell is the excretory system in Planaria.

63. **Answer:** C

64. **Answer:** C

Sol:

Pearl Oyster is commonly called Pinctada belongs to phylum molusca Pinctada is a genus of saltwater oysters, marine bivalve mollusks .

Limulus (the king crab) is a living fossil belongs to the phylum arthropoda.

Aurelia commonly called moon jellyfish belongs to the ClassScyphozoa of the Phylum Cnidaria

Dentaliumis commonly called the elephant's tusk shell belongs to the phylum Mollusca.

Thus right answer is C.

65. **Answer:** C

Sol:

There are four major classes of biological macro molecules (**carbohydrates**, **lipids**, **proteins**, and **nucleic acids**), and each is an important component of the cell and performs a wide array of functions.And **Lipids** are part of the acid-insoluble fraction, but they are not strictly macro molecules.

66. **Answer:** D

Sol:

According to the enzyme commission the enzyme-catalyzed reactions each have a uniquely assigned classification number.

67. **Answer:** A

Sol:

Protein molecules are long chains of amino acids that are folded into a three-dimensional shape.

Chemically, an amino acid is a molecule that has a carboxylic acid group and an amine group that is each attached to a carbon atom called the α carbon. Each of the 20 amino acids has a specific side chain, known as an R group, that is also attached to the α carbon. The R groups have a variety of shapes, sizes, charges, and reactivities. This allows amino acids to be grouped according to the chemical properties of their side chains. For example, some amino acids have polar side chains that are soluble in water; examples include serine, threonine, and asparagine. Other amino acids avoid water and are called hydrophobic, such as isoleucine, phenylalanine, and valine.

68. **Answer:** A

Sol:

Protoplasm is composed of a mixture of small molecules such as ions, amino acids, monosaccharides, and water, and macromolecules such as nucleic acids, proteins, lipids, and polysaccharides. In eukaryotes, the **protoplasm** surrounding the cell nucleus is known as the cytoplasm and that inside the nucleus as the nucleoplasm.

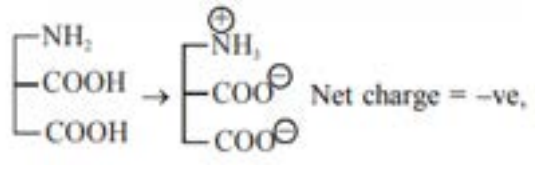
Sol:

Classification of amino acids on the basis of number of carboxylic groups and Amino groups.

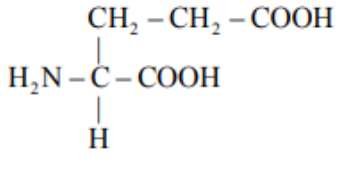
(A) Acidic amino acids

They have one amino and two carboxylic groups in

their structure.

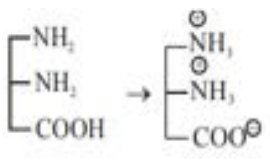


so they move towards anode in electric field.e.g. – Glutamic acid



(B) Alkaline amino acids

They have two amino and one carboxylic group.



Net charge = +ve, so

they move towards cathode in electric field.

e.g. Histidine, Arginine, Lysine.

(C) Neutral Amino Acids

They have one amino and one carboxylic group.

They are present in the form of zwitter ion and show

no movement in electric field.

69. **Answer:** D

Sol:

Lyases: Enzymes that catalyse removal of groups from substrates by mechanisms other than hydrolysis leaving double bonds.

Oxidoreductase/ dehydrogenase: Enzymes which catalyse oxidoreduction between two substrates.

Transferases: Enzymes catalysing a transfer of a group between a pair of substrates.

Hydrolases: Enzymes catalysing hydrolysis of ester, ether, peptide and halides.

70. **Answer:** A

Sol:

Holocrine is a term used to classify the mode of secretion in exocrine glands. Holocrine secretions are produced in the cytoplasm of the cell and released by the rupture of the plasma membrane, which destroys the cell and results in the secretion of the product into the lumen. Holocrine glands include the sebaceous glands of the skin. The sebaceous gland is an example of a Holocrine gland because its secretion (sebum) is released with remnants of dead cells.

Merocrine (or eccrine) is a term used to classify exocrine glands and their secretions in the study of histology.

Apocrine glands in the skin and eyelid are sweat glands. Most apocrine glands in the skin are in the armpits, the groin, and the area around the nipples of the breast.

Heterocrine glands are the glands which have both exocrine and endocrine secretion.

71. **Answer:** A

Sol:

In stratified squamous epithelium, the Innermost layer of cells are of cuboidal. These cells have high mitotic index. They get their nutrition from underlying connective tissue. They divide to from layers of Stratified epithelium so this layer is called as Germinativum layer.
Stratified squamous epithelium are found in –
Buccal cavity or oral cavity of mammals, inner lining of cheeks, lips, hard palate, tonsils, pharynx, oesophagus, anal canal, lining of vagina, cornea of eye.

Simple columnar epithelium is present as gut epithelium from stomach to anus, while pseudostratified columnar epithelium lines the trachea.

72. **Answer:** C

Sol:

The red colour of red algae (Rhodophyta) is due to the abundant formation of phycoerythrin which is a red colour pigment. Phycoerythrin absorbs blue-green wavelengths of light and reflects red light and thus imparts a red colour to algae.

Xanthophyll is found in all young leaves and in etiolated leaves. They are yellow pigments that occur widely in nature and form one of two major divisions of the carotenoid group; the other division is formed by the carotenes.
Carotenoids pigments are found in plants, algae, and photosynthetic bacteria. These pigments produce bright yellow, red, and orange colors in plants, vegetables, and fruits. Carotenoids act as a type of antioxidant for humans.

Phycocyanin is a light-harvesting, pigment-binding protein isolated from algae. It is a non-toxic, water-soluble pigment-protein from microalgae that exhibits antioxidant, anti-inflammatory.

73. **Answer:** C

74. **Answer:** C

Sol:

During pachytene stage, the four chromatids of each bivalent chromosomes become distinct and clearly appears as tetrads. This stage is characterised by the appearance of recombination nodules, the sites at which crossing over occurs between non-sister chromatids of the homologous chromosomes. Crossing over is the exchange of genetic material between two homologous chromosomes. Crossing over is also an enzyme-mediated process and the enzyme involved is called recombinase.

75. **Answer:** A

Sol:

Prophase I is Prophase of the first meiotic division is typically longer and more complex when compared to prophase of mitosis. It has been further subdivided into the following five phases based on chromosomal behaviour, i.e., Leptotene, Zygotene, Pachytene, Diplotene and Diakinesis.

77. **Answer:** C

Sol:

In plants, meiosis can be observed in sporangia. A microsporangium is the part of plant is suitable for the study of meiosis. A typical anther contains four microsporangia. The microsporangia form sacs or locules in the anther. The two separate locules on each side of an anther may fuse into a single locule. Each microsporangium is lined with a nutritive tissue layer called the tapetum and initially contains diploid pollen mother cells. These undergo meiosis to form haploid spores. The spores may remain attached to each other in a tetrad or separate after meiosis. Root tip, Leaf primordia and Spores undergo mitosis division.

76. **Answer:** D

Sol:

Gymnosperms include medium sized trees (Cycas) to tall trees (Pinus) and shrubs (Ephedra); rarely they are woody climbers (Gnetum montanum). There are no herbs in gymnosperms. So, the correct option is D.

78. **Answer:** B

Sol:

Prokaryotic cells have different characteristic features. The characteristics of the prokaryotic cells are mentioned below.

- They lack a nuclear membrane.
- Mitochondria, Golgi bodies, chloroplast, and lysosomes are absent.
- The genetic material is present on a single chromosome.
- The histone proteins, the important constituents of eukaryotic chromosomes, are lacking in them.
- The cell wall is made up of carbohydrates and amino acids.
- The plasma membrane acts as the mitochondrial membrane carrying respiratory enzymes.
- They divide asexually by binary fission. The sexual mode of reproduction involves conjugation.

Sol:

The life cycle of gymnosperms is both haploid and diploid i.e. they reproduce through the alternation of generations. The main body of gymnosperms is sporophytic and diploid. However, their gametes are haploid. Due to this reason, they have a diplontic life cycle.

The gametophyte phase is relatively short. The reproductive organs are usually cones.

Male Cones– These have microsporophylls that contain microsporangia. Microsporangium produces haploid microspores. A few microspores develop into male gametes called pollen grains, and the rest degenerate.

Female Cones– The megasporophylls cluster together to form female cones. They possess ovules containing mega sporangium. It produces haploid megaspores and a megaspore mother cell. The pollen reaches the egg through wind or any other pollinating agent, and the pollen grain releases a sperm. The nuclei of male and female gametophytes fuse together to form zygote are known as fertilisation. The seed appears as scales which can be seen on the cones of the gymnosperm.

The dominant, photosynthetic phase in such plants is the free-living gametophyte. This kind of life cycle is termed as haplontic. Many algae such as Volvox, Spirogyra and some species of Chlamydomonas represent this pattern. Bryophytes and pteridophytes, interestingly, exhibit an intermediate condition (Haplo-diplontic); both phases are multicellular. However, they differ in their dominant phases. Seed plants have a diplohaplontic life cycle which has two phases. The first is a dominant, concurrent sporophyte phase and the second is a brief gametophyte phase; both phases are multicellular so somatic growth follows meiosis and somatic growth follows the union of gametes or syngamy.

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

79. **Answer:** D

80. **Answer:** C

Sol:

Organelles are identified by microscopy, and can also be purified by cell fractionation. There are many types of organelles, particularly in eukaryotic cells. While prokaryotes do not possess eukaryotic organelles, some do contain protein-shelled bacterial microcompartments, which are thought to act as primitive prokaryotic organelles. Only the single-celled organisms of the domains Bacteria and Archaea are classified as prokaryotes
Amoebas are simple in form consisting of cytoplasm surrounded by a cell membrane. The outer portion of the cytoplasm (ectoplasm) is clear and gel-like, while the inner portion of the cytoplasm (endoplasm) is granular and contains organelles, such as a nuclei, mitochondria, and vacuoles.

Sol:

Differential centrifugation (also known as differential velocity centrifugation) is a common procedure in biochemistry and cell biology, which is used to separate organelles and other sub-cellular particles based on their sedimentation rate.

Autoradiography is an imaging technique that uses radioactive sources contained within the exposed sample.

Microtomy is a method for the preparation of thin sections for materials such as bones, minerals and teeth, and an alternative to electropolishing and ion milling.

X-Ray Diffraction (XRD) is a laboratory-based technique commonly used for identification of crystalline materials and analysis of unit cell dimensions. Hence, Cell organelles can be separated by method of differential centrifugation.

81. **Answer:** B

Sol:

The cystolith is a spindle-shaped body composed of concentric layers of longitudinally oriented cellulose microfibrils associated with pectins and other cell wall polysaccharides. At maturity it is heavily impregnated with calcium carbonate.

82. **Answer:** A

Sol:

The Endoplasmic Reticulum is a network of membranous canals filled with fluid. They are the transport system of the cell, involved in transporting materials throughout the cell.
There are two different types of Endoplasmic Reticulum:
- Rough Endoplasmic Reticulum – They are composed of cisternae, tubules, and vesicles, which are found throughout the cell and are involved with protein manufacture.
- Smooth Endoplasmic Reticulum – They are the storage organelle, associated with the production of lipids, steroids, and also responsible for detoxifying the cell.

83. **Answer:** C

84. **Answer:** B

Sol:

Primary lysosomes are membrane-bounded organelles that bud from the Golgi apparatus and contain many enzymes. Primary lysosomes are storage vacuoles. Primary lysosomes are found in rough endoplasmic reticulum (RER). Primary lysosomes do not release its content. Primary lysosomes do not involve in the biosynthesis in the useful materials to the cell. Primary lysosomes contain inactive acid hydrolases. Primary lysosomes do not release waste products.

Secondary lysosomes are the organelles which form the combination of a primary lysosome and a phagosome or pinosome and in which lysis takes place through the activity of hydrolytic enzymes. Secondary lysosomes are formed by the fusion of primary lysosome with a phagosome or a pinosome. Secondary lysosomes are digestive vacuoles. Secondary lysosomes are found in the smooth endoplasmic reticulum (SER). Secondary lysosomes release its content outside into cytoplasm (exocytosis). Secondary lysosomes involved in the biosynthesis are important materials to the cell. Secondary lysosomes contain active acid hydrolases. Secondary lysosomes release waste products through exocytosis.

Sol:

CELL MEMBRANE- Every living cell is externally covered by a thin, electron microscopic, elastic, regenerative and selectively permeable membrane called plasma membrane.

Chemical composition: Lipoproteins, lipid and protein are the major components forming 60% of the plasma membrane. Proteins provide mechanical strength and are responsible for transportation of different substances. Proteins also act as enzymes. Lipids may account 28%-79% depending upon the type of cell and organism involved (in humans, myelin 79%). The lipids of plasma membrane are of three types namely phospholipids, glycolipids and sterols. The sterol found in the membrane may be cholesterol (animals), phytosterol (plants) or ergosterol (microorganisms).

Carbohydrates form 2%-10%. The carbohydrates of plasma membrane are covalently linked to both lipid and protein components.

Ribosomes are macromolecular machines, found within all living cells, that perform biological protein synthesis (mRNA translation).

the centrosome (also called cytocentre) is an organelle that serves as the main microtubule organizing center (MTOC) of the animal cell, as well as a regulator of cell-cycle progression. The centrosome provides structure for the cell.

A cell wall is a structural layer surrounding some types of cells, just outside the cell membrane. It can be tough, flexible, and sometimes rigid. It provides the cell with both structural support and protection, and also acts as a filtering mechanism.

85. **Answer:** C

Sol:

Glycolysation of protein means linking of sugars to proteins which starts in rough endoplasmic reticulum and completed in golgi complex.
The ribosomes are the smallest known organelles without membrane; ribonucleoprotein particles attached either on RER or floating freely in the cytoplasm and are the sites of protein synthesis.
Glyoxysomes contain enzymes for the metabolism of glycolic acid via glyoxylate cycle and bounded by a unit membrane. These also contain enzymes for β-oxidation of fatty acids, producing acetyl CoA. It is metabolised in glyoxylate cycle to produce carbohydrates.
Mitochondria are referred to as "powerhouse" of the cell as they produce 95% of ATP. This energy is produced during the breakdown of food molecules which involve glycolysis, oxidative decarboxylation and oxidative phosphorylation (krebs cycle and respiratory chain).

86. **Answer:** A

87. **Answer:** C

Sol:

Anaphase stage is characterized by the following key events:

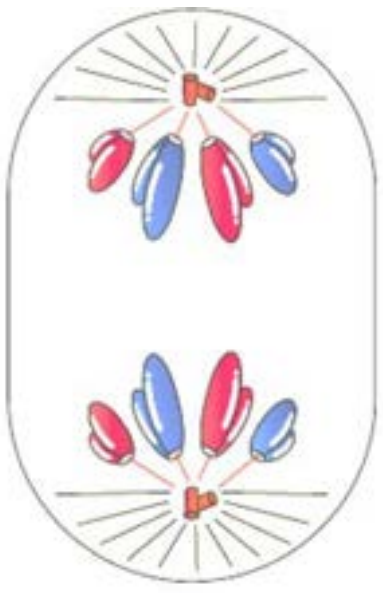
1)Centromeres divide and chromatids separate.

2)Chromatids move to opposite poles.

During prophase, chromosomes are seen to be composed of two chromatids attached together at the centromere.

During metaphase, spindle fibres attach to kinetochores present on the surface of centromere.

During telophase, chromosomes lose their identity as discrete elements.



Anaphase

88. **Answer:** A

Sol:

This diagram represents mitotic metaphase. The key features of metaphase are:

• Spindle fibres attach to kinetochores of chromosomes.

• Chromosomes are moved to spindle equator and get aligned along metaphase plate through spindle fibres to both poles.

During anaphase, centromeres split and chromatids separate. These chromatids then move to opposite poles.

Golgi complex and endoplasmic reticulum are not visible at the end of prophase.

During telophase, nuclear envelope assembles around the chromosome clusters. Nucleolus, golgi complex and ER reform.

89. **Answer:** B

Sol:

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90. **Answer:** A

Sol:

Chondrichthyes have a persistent notochord, placoid scales as the exoskeleton and ventrally positioned mouth. Gill slits are not covered by an operculum. Cyclostomata have sucking and circular mouth without jaws. Median fins (appendages) are present but paired fins (appendages) are absent. Integuments are without scales. In aves, forelimbs are modified into wings for flying and hind limbs are used for walking and running. The body is covered with feathers. Skin is thin, dry and non-glandular in Aves. Lungs have air sacs. In mammals, mammary glands are present for the nourishment of the young ones. Hairs are present on the body. They have 2 pairs of limbs. Pinnae are absent in monotreme (mammals that lay eggs). So, the correct option is A

91. **Answer:** B

Sol:

Amphibians show external fertilization and indirect development while Reptiles show internal fertoilization and direct development.

92. **Answer:** C

Sol:

Salamanders (urodela) are a group of amphibians typically characterized by a lizard-like appearance, with slender bodies, blunt snouts, short limbs projecting at right angles to the body, and the presence of a tail in larvae and adults.

Ichthyophis (**apoda**) are group of **limbless amphibians**

Frog and toad (**anura**) are group of **tail-less amphibians**.

Hence the **correct** option is **C**

93. **Answer:** D

Sol:

Elastic fibres (or yellow fibres) are an essential component of the extracellular matrix composed of bundles of proteins (elastin) which are produced by a number of different cell types including fibroblasts, endothelial, smooth muscle, and airway epithelial cells. It is found in the epiglottis (part of the larynx), the pinnae (the external ear flaps of many mammals) and Tip of nose. Hence, the correct answer is all of the above.

94. **Answer:** A

Sol:

Areolar connective tissue (or loose connective tissue) is the most widely distributed connective tissue type in vertebrates. Areolar connective tissue holds organs in place and attaches epithelial tissue to other underlying tissues. It also serves as a reservoir of water and salts for surrounding tissues. Almost all cells obtain their nutrients from and release their wastes into areolar connective tissue.

Collagen is the main structural protein in the extracellular matrix found in the body's various connective tissues.

Adipose tissue is a specialized connective tissue consisting of lipid-rich cells called adipocytes. The main function of adipose tissue is to store energy in the form of lipids (fat).

Reticular tissue, a type of loose connective tissue in which reticular fibers are the most prominent fibrous component, forms the supporting framework of the lymphoid organs, bone marrow and liver.

Hence, the correct answer is **Areolar tissue.**

95. **Answer:** A

96. **Answer:** B

Sol:

Oligodendrocytes are a type of large glial cell found in the central nervous system. Oligodendrocytes produce the myelin sheath insulating neuronal axons in CNS (analogous to Schwann cells in the peripheral nervous system), although some oligodendrocytes (called satellite oligodendrocytes) are not involved in myelination. Hence, Oligodendrocytes form myelin sheath in CNS.

Sol:

Hyaline cartilage is present in larynx.

Hyaline cartilage is the most widespread and is the type that makes up the embryonic skeleton.

It gives the structures a definite but pliable form.

The presence of collagen fibres makes such structures and joints strong, but with limited mobility and flexibility.

Elastic cartilage is springy, yellow, and elastic and is found in the internal support of the external ear and in the epiglottis. It provides support with moderate elasticity.

Fibrous cartilage has many collagen fibers and is found in the intervertebral discs and pubic symphysis.

In humans, the calcified cartilage is found in the ends of long bones i.e., epiphysis, and in the heads of humerus and femur bone.

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

97. **Answer:** C

Sol:

Spindle fibers are formed from microtubules with many accessory proteins which help guide the process of genetic division. These fibres are made up of 97% tubulin protein and 3% RNA.

They are of 3 types –

- Continuous/ chromosomal fibre (run from pole to pole). It is the longest in size.

- Discontinuous fibre / supporting fibre(run between pole to centromeres).

- Interzonal fibre (run between 2 centromere). Hence, it has the smallest size.

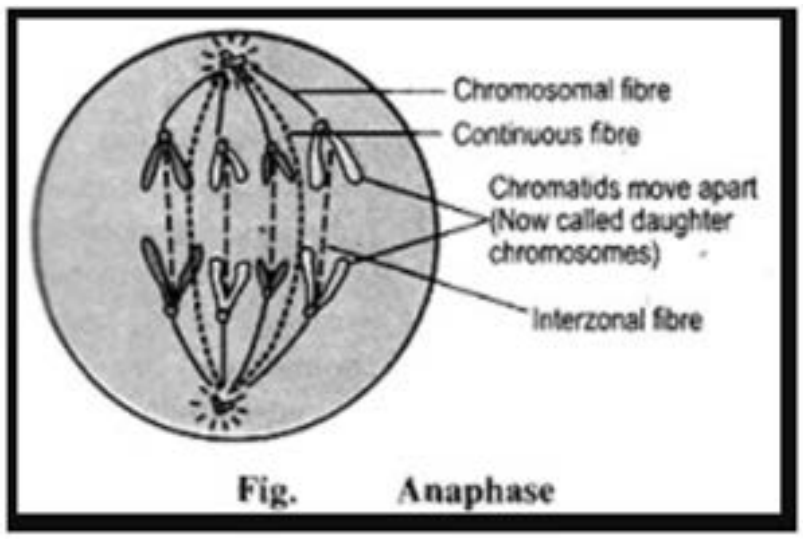


Fig. Anaphase

98. **Answer:** A

Sol:

Regeneration is the capacity of body to produce the lost part by proliferation of cells. This process is carried out by specialized cells called stem cells. It takes place in organisms that have a very simple structure with very few specialized cells.

The cells divide quickly into a large number of cells. Each cell undergoes changes to form various cell types and tissues. This sequential process of changes is known as development. The tissues form various body parts and organs.

(b) Dedifferentiation → a) Cell division → (c) Cell movement → (d) Tissue differentiation

So, correct sequence is (ii),(i),(iii),(iv)

99. **Answer:** A

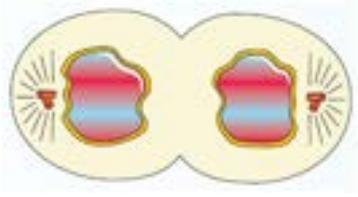
100. **Answer:** D

Sol:

At the onset of anaphase, each chromosome arranged at the metaphase plate is split simultaneously and the two daughter chromatids, now referred to as chromosomes of the future daughter nuclei, begin their migration towards the two opposite poles. As each chromosome moves away from the equatorial plate, the centromere of each chromosome is towards the pole and hence at the leading edge, with the arms of the chromosome trailing behind.

Sol:

During anaphase, sister chromatids are separated at the centromere and are pulled towards opposite poles of the cell by the mitotic spindle. During telophase, chromosomes arrive at opposite poles and unwind into thin strands of DNA, the spindle fibers disappear, and the nuclear membrane reappears. Nucleolus, Golgi complex and ER reform.



The longest phase of mitosis is prophase. During prophase, the cell prepares to divide by tightly condensing its chromosomes and initiates mitotic spindle formation. The chromatin fibers condense into discrete chromosomes. The nucleolus also disappears during early prophase.

In anaphase, the shortest stage of mitosis, the sister chromatids break apart, and the chromosomes begin moving to opposite ends of the cell. By the end of anaphase, the 2 halves of the cell have an equivalent collection of chromosomes.

In metaphase Spindle fibres attach to kinetochores of chromosomes. Chromosomes are moved to spindle equator and get aligned along metaphase plate through spindle fibres to both poles.

101. **Answer:** A

Sol:

$s \propto t^2$ (given)$\therefore\ s = Kt^2$

Acceleration $a = \frac{d^S S}{dt^2} = 2k$ (conastant)

It means the particle travels with uniform acceleration.

102. **Answer:** A

Sol:

Height travelled by ball (with balloon) in 2 sec

$h_1 = \frac{1}{2} a\ t^2 = \frac{1}{2} \times 4.9 \times 2^2 = 9.8\ m$

Velocity of the balloon after 2 sec

v = a t = 4.9 × 2 = 9.8 m/s

Now if the ball is released from the balloon then it acquire same velocity in upward direction

Let it move up to maximum height h_2

$v^2 = u^2 - 2gh_2 \Rightarrow\ 0 = (9.8)^2 - 2 \times (9.8) \times h_2\ \therefore h_2 =$

Greatest height above the ground reached by the ball = $h_1 + h_2$ = 9.8 + 4.9 = 14.7 m

103. **Answer:** A

Sol:

Given line have positive intercept but negative slope. So its equation can be written as

$v = -mx + v_0$ .....(i) [where m = $\tan\theta = \frac{v_0}{x_0}$]

By differentiating with respect to time we get $\frac{dv}{dt} = -m\frac{dx}{dt} = -mv$

Now substituting the value of v from equation (i) we get

$\frac{dv}{dt} = -m\,[-mx + v_0] = m^2x - mv_0 \quad \therefore a = m^2x - mv_0$

i.e. the graph between a and x should have positive slope but negative intercept on a-axis.

Therefore, the correct answer is (A).

104. **Answer:** B

Sol:

$x = 4(t-2) + a(t-2)^2$

$x = 4t - 8 + a(t^2 + 4 - 4t)$

At t = 0 , x = – 8 + 4a = 4a – 8

$v = \frac{dx}{dt} = 4 + 2a(t-2)$

At t = 0 , v = 4 – 4a = 4 (1 –a)

But acceleration, $a = \frac{d^2x}{dt^2} = 2a$

105. **Answer:** C

Sol:

$3\,T(1) - TV_D = 0$

$\therefore V_B = 3\ m/s$

106. **Answer:** D

Sol:

On an incline plane acceleration of the block is independent of mass. So both the blocks will move with the same acceleration (gsin 37º) so the contact force between them is zero.

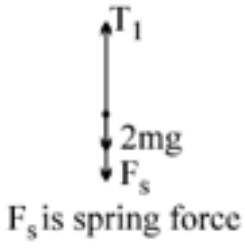
107. **Answer:** B

108. **Answer:** A

Sol:

Before spring is cut

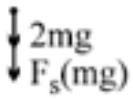
FBD of 2m FBD of m



$T_1 = 3mg$ $F_s = mg$

Just as string is cut, T_1 becomes zero and spring force remains unchanged.

Just now FBD of 2m



acceleration $a = \frac{3mg}{2m} = \frac{3g}{2}$ (downward)

109. **Answer:** A

Sol:

Weighing machine masses the normal reaction

$a = \frac{Mg}{m+M}$

Man $\Rightarrow$ $Mg - N = Ma$

$N = M(g - a) = Mg\left[1 - \frac{M}{m+M}\right]$

$$\boxed{N = \frac{mMg}{m+M}}$$

Measured mass $= \frac{W}{g} = \frac{mM}{m+M}$

110. **Answer:** D

111. **Answer:** B

Sol:

$R = \frac{u^2 \sin 2\theta}{g} = \frac{(500)^2 \times \sin 30^\circ}{10}$

$= 50 \times 500 \times \frac{1}{2} = 50 \times 250$

12500 m or 12.5×10^3m

Therefore, the correct answer is (B)

112. **Answer:** C

Sol:

Given: $\vec{v}_B = 3\hat{i} + 4\hat{j}$

$\vec{v}_W = -3\hat{i} - 4\hat{j}$

$\therefore$ Relative velocity of boat with respect to water is

$\vec{v}_{BW} = \vec{v}_B - \vec{v}_W$

$= 3\hat{i} + 4\hat{j} - \left(-3\hat{i} - 4\hat{j}\right)$

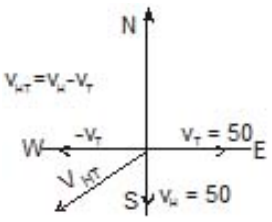
$= 6\hat{i} + 8\hat{j}$

$\therefore$ The correct answer is (C)

113. **Answer:** D

114. **Answer:** D

Sol:



Let the directions be such that

North $\rightarrow \hat{j}$

East $\rightarrow \hat{i}$

$\Rightarrow V_H = V_{Helicopter} = -50\hat{j}$

$V_T = V_{train} = 50\hat{i}$

Velocity of helicopter as seen by passengers on the train (Velocity of holicopter with respect to train) is :

$\vec{V}_{HT} = \vec{V}_H - \vec{V}_T$

$\vec{V}_{HT} = -50\hat{j} - 50\hat{i}$

⇒ Velocity is along south west direction.

∴ correct option is (D)

115. **Answer:** B

Sol:

$a = \omega^2 r = 4\pi^2 n^2 r = 4\pi^2 \times 1^2 \times 20 \times 10^3$

$\therefore\ a = 8 \times 10^5\ m/sec^2$

116. **Answer:** A

Sol:

The maximum velocity for a banked road with friction,

$v^2 = gr\left(\frac{\mu+\tan\theta}{1-\mu\tan\theta}\right)$

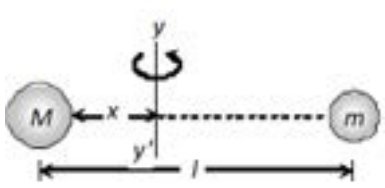
$\Rightarrow v^2 = 9.8 \times 1000 \times \left(\frac{0.5+1}{1-0.5\times1}\right)$

$\Rightarrow\ v = 172\,m/s$

117. **Answer:** B

Sol:

If the both mass are revolving about the axis yy' and tension in both the threads are equal then



$M\omega^2 X = m\omega^2 (L - x)$

$\Rightarrow\ Mx = m(L - x)$

$\Rightarrow\ x = \frac{mL}{M+m}$

118. **Answer:** A

Sol:

In uniform circular motion, tangential acceleration zero.

hence net acceleration = radial acceleration

in uniform circular motion velocity is directed tangentally at any instant.

therefore velocity and acceleration are perpendicular to each other.

Therefore, the correct answer is (A)

119. **Answer:** C

Sol:

work done by conservative force = change in potential energy

$\Delta U = mg\frac{x}{2}$

$\therefore W = \Delta U = \frac{1}{2}mgx$

Therefore, the correct answer is (C)

120. **Answer:** B

Sol:

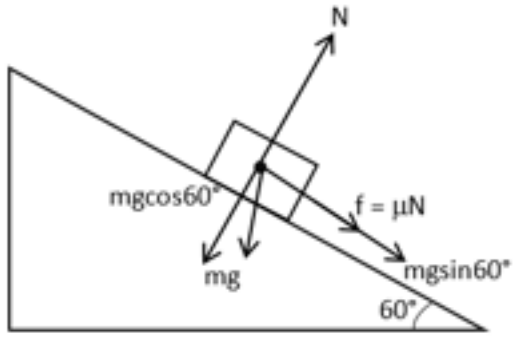
for start of motion

$F \geq 0.2 \times 100\ g + 0.3 \times 300\ g = 1100\ N$

$F_{min} = 1100\ N$

Therefore, the correct answer is (D)

Sol:



Frictional force(f) = $\mu \mathrm{N} = \mu \mathrm{mgcos}\theta$

The minimum force with a body is to be pulled up along the inclined plane is

$\mathrm{mg}\left(\sin\theta + \mu\cos\theta\right)$

distance = 2

work done, $\mathrm{W} = \overrightarrow{\mathrm{F}} . \overrightarrow{\mathrm{d}}$

$\mathrm{W} = \mathrm{Fdcos}\theta$’

$\boxed{\theta' = 0}$

W = F.d

$= \mathrm{mg}\left(\sin\theta + \mu\cos\theta\right) \times \mathrm{d}$

$= 5 \times 9\ .8\ \left(\sin 60^\circ + 0\ .2\ \cos 60^\circ\right) \times 2$

$= 98\left(\sin 60^\circ + 0.2\cos 60^\circ\right)$

$= 98\left(\frac{\sqrt{3}}{2} + 0.2 \times \frac{1}{2}\right)$

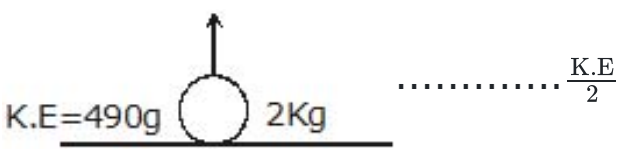
= 98 × 0.966

W = 94.67 J

Therefore, the correct answer is (B).

121. **Answer:** B

Sol:



Energy conservation

$\mathrm{k.E_{ii}} + \mathrm{P.E_i} = \mathrm{K.E_f} + \mathrm{P.E_f}$

$\Rightarrow$ 490+0 =$\frac{\mathrm{K.E}}{2}$+mgh

$\Rightarrow$ 490-$\frac{490}{2}$=mgh

$\Rightarrow$ 490 x$\frac{1}{2}$=2 X 10 X h

$\Rightarrow$ h=$\frac{49}{4}$=12.5 m.

122. **Answer:** B

Sol:

Loss in energy =initial energy - final energy

$= \frac{1}{2}\mathrm{mv}^2 - \mathrm{mgh}$

$= \frac{1}{2} \times 1 \times (20)^2 - 1 \times 10 \times 18$

= 200 –180

= 20J

This enegry loss due to air friction.

Therefore, the correct answer is (B).

123. **Answer:** B

124. **Answer:** A

Sol:

displacement

$x = \frac{t^3}{3}$

speed

$\frac{dx}{dt} = t^2$

at t = 2 sec

$v = \frac{dx}{dt} = 4$

at t = 0, v= 0

by work energy theorem

work done = change in kinetic energy

$W = \frac{1}{2}mv^2 = \frac{1}{2} \times 2 \times 4 \times 4 = 16J$

Therefore, the correct answer is (B).

125. **Answer:** B

Sol:

$T - mg = \frac{mv^2}{r}$

$T = \frac{mv^2}{r} + mg$

$52 = 0.2 \times 10 + \frac{0.2(v^2)}{0.1}$

$2v^2 = 52 - 2$

$v^2 = 25$

$v = 5m/s$

Therefore, the correct answer is (B)

Sol:

time period

$T = (2\pi/\omega)$, so $\omega = 2\pi/(3.15 \times 10^7)$

$= 1.99 \times 10^{-7}$ rad/s

Now speed of rotation of earth around the sun

$v = r\omega = 1.5 \times 10^{11} \times 1.99 \times 10^{-7}$

$\approx 3 \times 10^4$ m/s

Now by work - energy theorem ,

$W = K_f - K_i$

$= 0 - \frac{1}{2}mv^2$

$= -(1/2) \times 6 \times 10^{24} (3 \times 10^4)^2$

$= -2.7 \times 10^{33}$ J

Negative sign means force is opposite to the motion.

Therefore, the correct answer is (A).

126. **Answer:** D

Sol:

(A) Not necessarily. For example,The centre of mass of a circular ring, lies at the ring where there is no contact of the ring.

(B) Total mass of the system is assumed to concentrated at centre of mass of the system but actually it is not.

(C) If the net force on centre of mass is zero then velocity of centre of mass remains constant therefore centre of mass will be in rest or in motion as before.

(D)Momentum of a system from its center of mass frame is zero because, P=mv, where 'v' is the velocity of the centre of mass of the system and velocity of center of mass with respect to center of mass is zero,so P=mv=0

127. **Answer:** D

Sol:

Power P = Fv = $m\left(\frac{dv}{dt}\right)v = mv\left(\frac{dv}{ds}\right)\frac{ds}{dt}$

$v^2dv = = \frac{P}{m}ds$

Integrating $\int_u^v v^2dv = \frac{P}{m}\int_0^s ds$

$v^3 - u^3 = \frac{3Ps}{m}$

$v = \left\{\frac{3Ps}{m} + u^3\right\}^{\frac{1}{3}}$

Therefore, the correct answer is (D)

128. **Answer:** C

Sol:

The momentum of truck, p = mv

$= 10,000 \times 20$

$= 2 \times 10^5$ kg m/s

129. **Answer:** B

Sol:

If the mass of the gun is less then, the velocity of the gun will be more and if the gun is heavier then its velocity will be less. Hence, when two similar bullets are fired from two lighter and heavier guns, the lighter gun will give a more voilent jerk.

Light rifle will hurt the shoulder more because the velocity of bullet is very high due to newton 3rd law of motion.

Therefore, the correct answer (B)

130. **Answer:** C

Sol:

when two bodies move together after collision then the nature of the collision will be perfectly inelastic. Because in this case, the value of coefficient of restitution is zero (e = 0) therfore velocity of seperation will be zero and they will move together.

Therefore, the correct answer is (C)

131. **Answer:** C

Sol:

Time taken by the ball to stop rebounds

$t = \left(\frac{1+e}{1-e}\right)\sqrt{\frac{2h}{g}}$

$t = \left(\frac{1+\frac{1}{2}}{1-\frac{1}{2}}\right)\sqrt{\frac{2\times5}{10}}$

t = 3 sec.

132. **Answer:** D

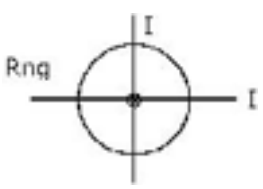
Sol:

$\because F = \frac{d}{dt}(mv)$

$\Rightarrow F = V\frac{dm}{dt} = 5 \times 10 = 50\ N$

133. **Answer:** B

Sol:



From perpendicular axis theorem ,

$I_x + I_y = I_z$

As ring is symmetric about I_x and I_y.

$I + I = mR^2$

$2I = mR^2$

$I = \frac{mR^2}{2}$

Therefore, the correct answer is (B).

134. **Answer:** A

Sol:

We know that moment of inertia of the disc about its axis (I)= $MR^2/2$

Applying the Perpendicular Axis theorem,

$I = I_{xx} + I_{yy}$

As $I_{xx} = I_{yy}$ = For disc due to symmetry

= Moment of inertia about ant diameter

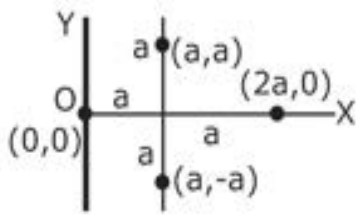
$MR^2/2 = I_{xx} + I_{xx}$

$I_{xx} = MR^2/4$

Therefore, the correct answer is (A)

135. **Answer:** D

Sol:



$I = m \times (0)^2 + m \times a^2 + m \times a^2 + m \times (2a)^2$

$I = ma^2 + ma^2 + 4ma^2$

$I = 6\ ma^2$

136. **Answer:** B

Sol:

Angular-momentum of the system should be zero.

Moment of Inertia of the dog = $\mathrm{m}\left(\frac{\mathrm{R}}{2}\right)^2$

= $\frac{\mathrm{mR}^2}{4}$

Angular-velocity = n

$\therefore$ Angular-Momentum $\mathrm{L} = \mathrm{I}\omega$

$\mathrm{L} = \frac{\mathrm{mR}^2}{4}.\mathrm{n}$ ...(1)

Moment of Inertia of the disc = $\frac{\mathrm{MR}^2}{2}$

Let the disc be rotating with Angular-Velocity ω

$\therefore$ Angular-Momentum = $\frac{\mathrm{MR}^2}{2}.\omega$ .... (2)

From (1) & (2)

$\frac{\mathrm{mR}^2}{4}.\mathrm{n} = \frac{\mathrm{MR}^2}{2}.\omega$

or

$\boxed{\omega = \frac{\mathrm{mn}}{2\mathrm{M}}}$

137. **Answer:** C

Sol:

As slope of problem graph is positive and constant upto certain distance and then it becomes zero.
So from $\mathrm{F} = \frac{-\mathrm{dU}}{\mathrm{dx}}$, up to distance a, F = constant (negative) and becomes zero suddenly

138. **Answer:** A

Sol:

Use restitution formula

$\mathrm{e} = \frac{\bar{\mathrm{v}}_2 - \bar{\mathrm{v}}_1}{\bar{\mathrm{U}}_1 - \bar{\mathrm{U}}_2}$

$\mathrm{e} = \frac{\mathrm{v}_1 - 2\mathrm{v}_1}{3\mathrm{U} - 6\mathrm{U}} = \frac{-\mathrm{v}_1}{-3\mathrm{U}}$

$\mathrm{v}_1 = 3\,\mathrm{eu}$

Therefore, the correct answer is (A)

139. **Answer:** C

Sol:

$\mathrm{I} = \frac{\mathrm{m}\ell^2}{3}$

Torque = force × perpendicular distance

$\tau = \mathrm{mg}\,\frac{\ell}{2}$

after the string breaks

$\alpha = \frac{\tau}{I}$

so

$\alpha = \frac{\mathrm{mg}\,\frac{\ell}{2}}{\frac{\mathrm{m}\ell^2}{3}}$

$\alpha = \frac{3\mathrm{g}}{2\ell}$

140. **Answer:** B

Sol:

Work done by the force

$= \mathrm{F}.\mathrm{r}.\Delta\theta$

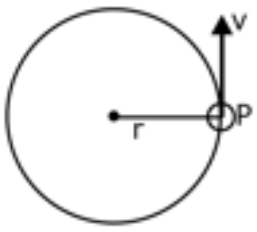
$= \mathrm{Fr}\theta = \mathrm{FR}\theta$

Therefore, the correct answer is (B).

141. **Answer:** C

142. **Answer:** D

Sol:



L = mvr

$mv = \frac{L}{r}$

$K.E = \frac{p^2}{2m}$

$= \frac{\left(\frac{L}{r}\right)^2}{2m}$

$= \frac{L^2}{2mr^2}$

143. **Answer:** A

Sol:

Disk = $\frac{1}{2}I\omega^3 + \frac{1}{2}mv_1{}^2$

$= \frac{1}{2}\frac{MR^2}{2}\frac{v_1{}^2}{R^2} + \frac{1}{2}mv_1{}^2 = \frac{3}{4}mv_1{}^2$

Ring = $\frac{1}{2}I\omega^2 + \frac{1}{2}mv_2{}^2 = \frac{1}{2}mr^2 \times \frac{v_2{}^2}{R^2} + \frac{1}{2}mv_2{}^2$

$= mv_2{}^2$

$\frac{1}{4}mv_1{}^2 = mv_2{}^2$

$\frac{v_1}{v_2} = \left(\frac{4}{3}\right)^{1/2}$

Therefore, the correct answer is (A)

144. **Answer:** D

Sol:

moment of inertia of rod passing through one end

$I' = I_{com} + md^2$

$I' = I + \frac{ml^2}{4}$.....(1)

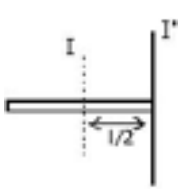
moment of inertia of rod passing throug its centre

$I = \frac{ml^2}{12}$

using this in equation (1)

$I' = I + \frac{12I}{4}$

$I' = 4I$



Therefore, the correct answer is (D).

145. **Answer:** A

Sol:

Given

$P = 10^6$ dyne/cm^2

$n_1u_1 = n_2u_2$

$n_1\left[M_1^1L_1^{-1}T_1^{-2}\right] = 10^6\left[M_2^1L_2^{-1}T_2^{-2}\right]$

$n_1 = 10^6\left[\frac{M_2}{M_1}\right]^1\left[\frac{L_2}{L_1}\right]^{-1}\left[\frac{T_2}{T_1}\right]^{-2}$

$= 10^6\left[\frac{1}{1000}\right]^1\left[\frac{1}{100}\right]^{-1}$

$\Rightarrow 10^6 \times \frac{10^2}{10^3} = 10^5 N/m^2$

146. **Answer:** D

Sol:

∵ Dimension of work,

work = force × distance

[Work] = $[M^1L^2T^{-2}]$

∵ Dimension of Torque

Torque = distance × Force

[Torque] = $[M^1L^2T^{-2}]$

∵ Dimension of linear Momentum,

= mass × velocity

= $M^1 \times L^1T^{-1}$

∵ coefficient of viscosity

$[\eta] = \frac{F}{A.\frac{\Delta v}{\Delta y}} = \frac{\left[M^1L^1T^{-2}\right]}{[L^2][T^{-1}]}$

$[\eta] = \left[M^1L^{-1}T^{-1}\right]$

147. **Answer:** C

Sol:

$P = \frac{W}{T}$

Watt = Joule/sec.

Joule = Watt-sec.

One watt-hour = 1 watt×60×60 sec

1 Hour = 60×60sec. = 3600 watt-sec

= 3600 Joule

= 3.6 × 10^3 Joule

Therefore, the correct answer is (C)

148. **Answer:** A

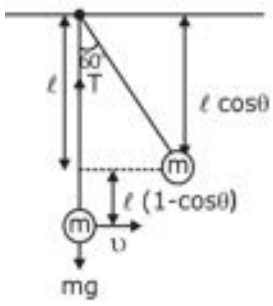
Sol:

$T = \frac{2u \sin\theta}{g}$

$\Rightarrow u = \frac{T \times g}{2 \sin\theta} = \frac{2 \times 9.8}{2 \times \sin 30}$ = 19.6 m/s

149. **Answer:** A

Sol:



Using conservation of energy

$\frac{1}{2}mv^2 = mg\ell\ (1 - \cos\theta)$

$v^2 = 2g\ell\ (1 - \cos\theta)$

$v = \sqrt{2g\ell\ (1 - \cos\theta)}$

∴ Tension at the lowest point

$T = mg + \frac{mv^2}{\ell}$

$T = mg + \frac{m}{\ell}[2g\ell\ (1 - \cos 60°)]$

T = 2mg

Therefore, the correct answer is (A).

150. **Answer:** B

151. **Answer:** C

Sol:

Hund's rule: According to this rule electron pairing in p, d, and f orbitals cannot occur until each orbital of a given subshell contains one electron each or is singly occupied.

Pauli's principle: no two electrons in the same atom can have the same set of all quantum numbers.

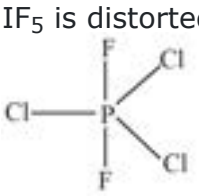
Therefore, the correct option is (3)

152. **Answer:** B

Sol:

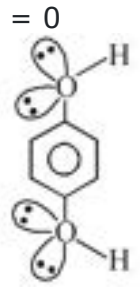
Compound having symmetrical structure with all bond pair moments and lone pair moments resultant μ = 0, will be non polar.
(1) IF_5 is distorted octahedral

(2)



μ_{net} = 0

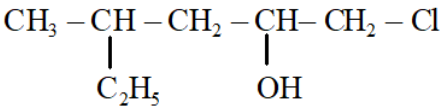
(3)



153. **Answer:** A

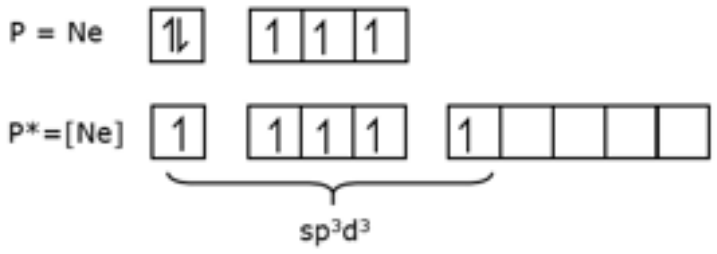
154. **Answer:** A

Sol:



1-chloro.4 methyl hexanol-2

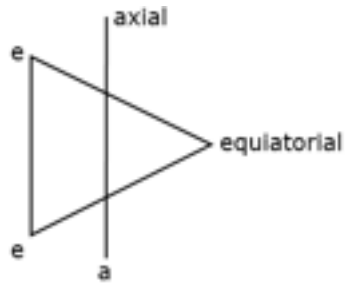
Sol:



sp^3d → trigonal bipyramidal equatorial

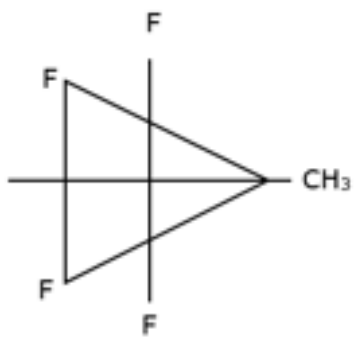
sp^3d → sp^2(axial) + Pd

sp^2 → s-character ↑



– F→ more electronegative (axial position)

– CH_3 → more electropositive (equatorial position)



In an sp^3d hybridised atom, the equitorial bonds are formed from the hybridization of an s orbital, the p_x and p_y orbitals, whereas the axial bonds are formed from the hybridization of the p_z and P_{Z^2} orbitals.

Now, greater the s character of an orbital, it holds the electron more tightly. So, the electron pair is held by the central atom more tightly in the equitorial bonds. This is unfavorable for the electronegative substituent which prefers to attract the bond pair towards itself.

So, the more electronegative substituents prefer the axial position where it faces less competition in displacing the bond pair of electrons towards itself.

155. **Answer:** B

156. **Answer:** B

Sol:

$KClO_3 \rightarrow KCl + \frac{3}{2}O_2$

$\frac{3}{2}$ mole or 33.6 litre O_2 from 1 mole $KClO_3$

11.2 litre of O_2 formed by $\frac{1}{3}$ mole $KClO_3$

Therefore, the correct answer is (B)

157. **Answer:** C

Sol:

$2FeSO_4 \rightarrow Fe_2O_3 + SO_2 + SO_3$

$\frac{7.6}{152}$ $\frac{0.05}{2}$mol $\frac{0.05}{2}$mol

= 0.05 mol $\frac{0.05 \times 22.4}{2}$ $\frac{0.05 \times 22.4}{2}$

= 0.56 lit = 0.56 lit

Total volume of gases = 1.12 lit

158. **Answer:** A

Sol:

Given: gm equivalent of substance = 1

Number of gm equivalnce = $\frac{\text{weight}}{\text{eq. wt.}}$ = mole × v.f.

Valancy factor of O_2 = 4

{Because 1 oxygen atom having valency = 2}

Mole of O_2 = $\frac{\text{No. of gm equivalence}}{\text{Valency}} = \frac{1}{4}$ = 0.25 mole

So, correct option is (A).

159. **Answer:** D

Sol:

wt of the metallic oxide = 4.0 g

wt of oxygen in oxide = 0.8 g

$\therefore$ wt of metal in oxide = 4.0 – 0.8 = 3.2 g

molecular weight (Mw) of oxygen = 16 g mol^{-1}

Equivalent wt of oxygen = $\frac{\text{Mw}}{\text{v.f}} = \frac{16}{2} = 8$

Now by the low of equivalence

Equivalent of metal = Equivalent of oxygen

$\because$ $\text{Equivalent} = \frac{\text{wt.}}{\text{equivalent wt.}}$, $\text{equivalent wt.} = \frac{\text{Mw.}}{\text{n factor}}$

$\therefore$ $\frac{3.2}{E_m} = \frac{0.8}{8}$

$\Rightarrow E_m = \frac{3.2}{0.8} \times 8 = 32$

Mettalic oxide Equivalent wt. = EM + EO

= 32 + 8

= 40

160. **Answer:** B

Sol:

Molecular mass of P_4 = 4 x 31 = 124 amu
$\therefore$ 124 g of P_4 contains 1 mole of P_4 = N_A molecules of Phosphorus.
1 mole of P_4 contains $4N_A$ atoms of P.

161. **Answer:** B

Sol:

$\Delta E = 2.18 \times 10^{-11} \left(\frac{1}{1} - \frac{1}{9}\right)$

$\Delta E = 2.18 \times 10^{-11} \times \frac{8}{9} \Rightarrow 1.94 \times 10^{-11}$

$\Delta E = 0.1911 \times 10^{-10}$ eg

162. **Answer:** A

Sol:

$12\ C(s) + 11\ H_2(g) + \frac{11}{2}O_2(g) \rightarrow C_{12}H_{22}O_{11}(s)$

7 6 2.5

L.R.

$\frac{2.5 \times 2}{11}$

$W_{C_{12}H_{22}O_{11}} = \frac{5}{11} \times 342 = 155.5$ gm

Sol:

$\text{Total energy} = \frac{-KZe^2}{2r}$; $\text{Kinetic energy} = \frac{KZe^2}{2r}$

From the above formula, we can say that

T.E = –K.E

So, if K.E = 13.6eV

Then total energy will be –13.6 eV.

Therefore the correct answer is (A)

163. **Answer:** C

Sol:

Number of radial nodes

$= n-l-1 = 1$

n = 3

$\therefore l = 1$

orbital angular momentum

$= \sqrt{\ell(\ell+1)}\frac{h}{2\pi} = \sqrt{2}\frac{h}{2\pi}$

164. **Answer:** B

Sol:

$n_2 = 10 \rightarrow n_1 = 1$
Brackett series line
$\Rightarrow n_2 - 4$
$\Rightarrow 10 - 4$
$\Rightarrow 6$

165. **Answer:** A

Sol:

Oxidation number increases in the process of oxidation.

166. **Answer:** C

Sol:

$\Delta x = 2\Delta p$

$\Delta P \times \Delta x = \frac{h}{4\pi}$

$2(\Delta P)^2 = \frac{h}{4\pi}$

$(\Delta P)^2 = \frac{h}{8\pi}$

$\Delta P = \frac{1}{2}\sqrt{\frac{h}{2\pi}}$

$\Delta V = \frac{1}{2m}\sqrt{\frac{h}{2\pi}}$

167. **Answer:** D

Sol:

$\overset{(+6)}{Cr}\ \overset{(-2)}{O_4^{-2}} \longrightarrow \overset{(+6)}{Cr_2}\overset{(-2)}{O_7^{-2}}$

Oxidation number of both elementCr & O does not change.

168. **Answer:** C

Sol:

$\overset{0}{P_4} + 6NaOH \longrightarrow \overset{(-3)}{PH_3} + 3\,Na_2\overset{(+1)}{H}PO_2.$

Disproportionation reaction. In this reaction, P element present in intermediate oxidation state and P udergoes both oxidation and reduction.

169. **Answer:** C

Sol:

$Zn \rightarrow Zn^{+2} + 2e^-$

$NO_3^- + 8e^- + 10H^+ \rightarrow NH_4^+ + 3H_2O$

$4Zn + NO_3^- + 10H^+ \rightarrow 4\,Zn^{+2} + NH_4^+ + 3H_2O$

$4Zn + NO_3^- + 10H^+ + 10\,OH^- \rightarrow 4\,Zn^{+2} + NH_4^+ + 10\,OH^- + 3H_2O$

$4Zn + NO_3^- + 7H_2O \rightarrow 4\,Zn^{+2} + NH_4^+ + 10\,OH^-$

170. **Answer:** A

171. **Answer:** A

172. **Answer:** A

173. **Answer:** B

Sol:

On moving down in the group E.A. decreases but due to smaller size of oxygen incoming electron experience more repulsion so E.A. of O is less than S.
S > O > Se

174. **Answer:** C

Sol:

Follow formula given in mulliken scale

175. **Answer:** D

Sol:

N > C > P > Si
Electronegativity order

176. **Answer:** B

Sol:

NO = $(\sigma 1s)^2$, $(\sigma^* 1s)^2$, $(\sigma 2s)^2$, $(\sigma^* 2s)^2(\sigma 2p_z)^2$, $(\pi 2p_x)^2 = (\pi 2p_y)^2$, $(\pi^* 2px)^1$ $(\pi^* 2p_y)^0$

Bond order = $\frac{10-5}{2}$ = 2.5

CN^- = $(\sigma 1s^2)$ $\sigma^* 1s^2$, $\sigma 2s^2$, $\sigma^* 2s^2$, $\pi 2p_x^2 = (\pi 2p_y)^2$ $(\sigma 2p_z)^2$

Bond order = $\frac{10-4}{2}$ = 3

CN = $\sigma 1s^2$, $\sigma^* 1s^2$, $\sigma 2s^2$, $\sigma^* s^2$, $\pi 2p_x^2 = \pi 2p_y^2$ $\sigma 2p_z^1$

Bond order = $\frac{9-4}{2}$ = 2.5

CN^+ = $(\sigma 1s^2)$ $\sigma^* 1s^2$, $\sigma 2s^2$, $\sigma^* 2s^2$, $\pi 2p_x^2 = (\pi 2p_y)^2$

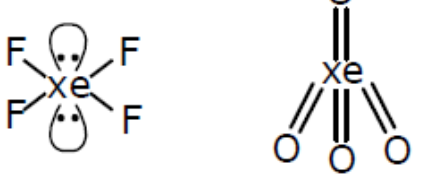
Bond order = $\frac{8-4}{2}$ = 2

species	Total e^-	Bond order
NO	15	2.5
CN^-	14	3
CN^+	12	2
CN	13	2.5

177. **Answer:** D

178. **Answer:** B

Sol:

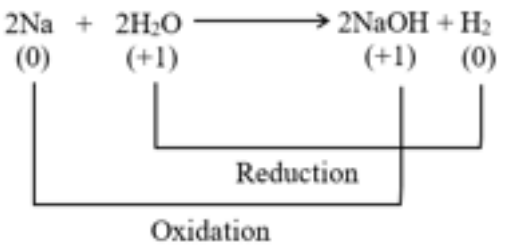


Square planar Tetrahedral
Both are having different structures.

179. **Answer:** C

180. **Answer:** A

Sol:



Hence in this reaction vater act as oxidising 8t set f get reducel.

Therefore the correct option is (A)

181. **Answer:** A

Sol:

The % of para form increases if the temperature is towards & at absolute zero only para form having lowest internal energy exist.

At absolute zero temperature, only para hydrogen exists however at 25°C 75% ortho hydrogen and 25% para hydrogen exists.

Therefore, the correct answer is (A)

182. **Answer:** B

Sol:

$PbS + 4H_2O_2 \rightarrow PbSO_4 + 4H_2O$

183. **Answer:** B

Sol:

For strong acids: pK_a ($\downarrow$) pH ($\downarrow$)

184. **Answer:** D

Sol:

+ve charge on unsaturated carbon is unstable, due to more EN

185. **Answer:** D

Sol:

Due to resonance Cl and benzene have double bond character so the bond order increases

186. **Answer:** A

187. **Answer:** B

Sol:

1KW = 1000 J

v = 880 Hz

E = nhv
$1000 = n \times 6.6 \times 10^{-34} \times 880$

$n = \frac{1000}{880 \times 6.6 \times 10^{-34}} = \frac{10000}{880 \times 66 \times 10^{-34}}$

$n = \frac{10000 \times 10^{34}}{880 \times 66} = 1.71 \times 10^{33}$

$n = 1.71 \times 10^{33}$

188. **Answer:** D

Sol:

$c = \nu\lambda$

$\lambda = \frac{c}{\nu} = \frac{3 \times 10^8}{12 \times 10^{14}} = \frac{1}{4} \times 10^{-6}$

$\bar{\nu} = \frac{1}{\lambda} = 4 \times 10^6 cm^{-1}$

189. **Answer:** B

Sol:

The expression for the equivalent weight is $E = \frac{\text{molar mass}}{\text{n–factor}}$

Here, n-factor represents the net change in oxidation state performula unit oxidation or reluctant.

When $MnSO_4$ converts to MnO_2, the oxidation state changes from +2 to +4.

Hence, the value of n-factor is 2.

The equivalent weight $E = \frac{\text{molar mass}}{\text{n–factor}} = \frac{\text{molar mass}}{2}$

190. **Answer:** A

Sol:

$\overset{+7}{MnO_4^-} + \overset{+3}{CrCl_3} \rightarrow \overset{+2}{MnCl_2} + \overset{+6}{Cr_2O_7^{2-}} + Cl^-$

RHR OHR

$Mn^{+7} + 5e^- \rightarrow Mn^{+2}$ ....(i) × 6

$2Cr+3 \rightarrow Cr_2^{+6} + 6\,e^-$ .... (ii) × 5

$6MnO_4^- + 10\,CrCl_3 + 11H_2O \rightarrow 6\,MnCl_2 + 5Cr_2O_7^{-2} + 18\,Cl^- + 22\,H^+$

$\frac{\text{stoichiometric coefficient of } CrCl_3}{\text{stoichiometric coefficient of } MnO_4^-} = \frac{10}{6} = \frac{5}{3}$

191. **Answer:** D

Sol:

Mole = mass in grams/Atomic mass (g/mol)

Given :

Mass of iodine = 254 grams

Atomic mass of iodine = 127gm/mol

mole of iodine = $\frac{254}{127}$

$= 2\text{mol}$

Mass of oxygen = 80 gm

Atomic mass of oxygen = 16gm/mol

mole of oxygen = $\frac{80}{16}$ = 5 mol

Thus,mole ratio of iodine and oxygen is 2:5.

So, they will form compound I_2O_5.

192. **Answer:** C

Sol:

$M = \frac{5.85 \times 1000}{58.5 \times 500} \Rightarrow 0.2$

193. **Answer:** D

194. **Answer:** B

Sol:

Metallic character $\propto \frac{1}{\text{I.P.}}$

195. **Answer:** C

196. **Answer:** C

Sol:

$BeH_2 < CaH_2 < BaH_2$

(i)Smaller the size of cation, more will be It's polarising power. Hence BeH_2 will be least ionic.
(i)Metallic character of elements increases as moving down the group . As a result, the ionic nature of metal hydrides improves. As a result, BeH_2 will be the least ionic

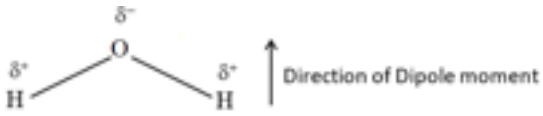
197. **Answer:** B

Sol:

Among Mg^{2+}, Sc^{3+} and K^+ the cation having less polarizing power than Ca^{2+} is K^+ . It is due to less charge and large size than Ca^{2+}
Among O^{2-} , Cl^- , P^{3-} the anion having more polarizibility than S^{2-} is P^{3-} . It is due to More charge and large size of P^{3-} ion than S^{2-}.]

199. **Answer:** D

Sol:



If H_2O linear molecule, the dipole would be zero.

But it has a high dipole moment. Hence, it is non-linear.

Therefore, the correct option is (D).

Sol:

$NH_3 < HF < H_2O < H_2O_2$ Boiling point order
→ Number of hydrogen bonding increases
→ Boiling point increases
→ NH_3 has weakest H-bond
→ As the molecular weight and polarity increases, boiling point increases

198. **Answer:** D

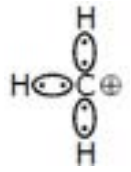
Sol:

K_2CO_3 when heated at a high temperature (892 K) and liquifies. So, there is no release of gas.

Therefore the correct answer is (D)

200. **Answer:** B

Sol:

carbocation 

Three pair electrons.