SRI CHAITANYA EDUCATIONAL INSTITUTIONS

A.P,TELANGANA,KARNATAKA,TAMILNADU,MAHARASHTRA,DELHI,RANCHI,CHANDIGARH

NEET GRAND TEST-5

Name :..... Hall Ticket No:

INSTRUCTIONS TO CANDIDATES

1. The Model **NEET- 2019** is of **3 Hrs** duration. **Time: 10.00 AM – 1.00 PM**.
2. The question paper for NEET-2019 consists of 180 questions comprising 45 questions in Botany, 45 in Zoology, 45 in Physics and 45 in Chemistry for NEET.
3. All questions are of objective type (Multiple choices only)
4. Each question carries four marks.
5. Negative marking: one mark will be deducted for every wrongly answered question.
6. Total Marks 720.
7. The candidates are prohibited from carrying any paper to the examination hall except **HALL TICKET**.
8. No Calculators, Mini-Cards, Watches with Calculators, Pager, Cell Phone, Slide rules or outer aids to calculation will be allowed in the examination hall.
9. Candidates once admitted will not be allowed to leave the hall till half an hour before the closing of the test.
10. A separate sheet is attached in the middle of this booklet for rough work, you can detach and use it.
11. A detachable answer sheet with 180 question blocks, with 4 circles corresponding to 4 multiple choice for each question will be provided. Use HB Pencil to darken the appropriate circle against the question number provided in the sheet. Answer should be marked only on the answer sheet, but not on the question paper booklet.

01. Systematics is the study of
(1) Kinds of organisms
(2) Their diversities
(3) Relationship among them
(4) All the above

02. Select the incorrect match
(1) Herbarium – quick referral system
(2) Botanical gardens – live collection of plants
(3) Flora – information on any one taxa
(4) Manuals – identification of names of species of any area

03. Which of the following group show most extensive metabolic diversity
(1) Bacteria (2) Fungus
(3) Algae (4) Bryophytes

04. Which of the following is heterotrophic protist
(1) diatoms (2) desmids
(3) slime moulds (4) dinoflagellates

05. Which of the following is coenocytic fungi
(1) *Saccharomyces*
(2) *Mucor*
(3) *Claviceps*
(4) *Usatilago*

06. Potato spindle tuber disease caused by
(1) Viruses
(2) Viroids
(3) Prions
(4) Virusoids

07. Cytotaxonomy is based on
(1) chromosome number
(2) chromosome structure
(3) chromosome behaviour
(4) all the above

08.

Which of the following is not associated with given organism
(1) chl – c
(2) Laminarin
(3) Lack of flagella/cilia
(4) Cellulose & Algin

09. (i) Tracheophyte
(ii) Sporophitic main plant body
(iii) Haplontic life cycle
(iv) Sessile sex organs
(v) Thallus body
(vi) Protonema
(vii) Independent sporophyte
(viii) Elaters
How many are associated with pteridophytes.
(1) 3
(2) 4
(3) 5
(4) 6

10. Most of the algae genera are
(1) Haplontic
(2) Diplontic
(3) Haplodiplontic
(4) Diplohaplontic

11. Which of the following modified root found in *Rhizophora*
(1) Prop root
(2) Stilt root
(3) Pneumatophore
(4) Assimilatory roots

12. Rachis is absent in
(1) Neem
(2) Rose
(3) Dalbergin
(4) Alstonia

13. Parietal placentation present in
(1) chinarose
(2) Argenone
(3) Dianthus
(4) Tomato

14. $\oplus\ \male\ K_{(5)}\ C_{(5)}\ A5\ \underline{G}_{(2)}$
Floral formula is applicable on
(1) Gloriosa
(2) Makoi
(3) Sesbania
(4) Indigofera

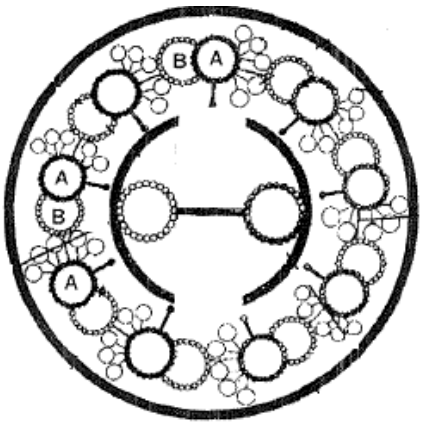
15. (i) Deposition of cellulose, hemicelluloses & pectin
(ii) Often contain chloroplast
(iii) Lack of inter cellular space
(iv) Presence of pits
(v) Universal occurance in plants
How many are true for collenchyma
(1) 2
(2) 3
(3) 4
(4) 5

16. Presence of phloem only toward outer side of xylem is feature of which type of vascular bundle
(1) Radial
(2) Conjoint
(3) Collateral
(4) Bicollateral

17. Annual rings can be observe in
(1) Heart wood
(2) Sap wood
(3) Periderm
(4) Both 1 & 2

18. Glogi complex participate in
(1) Formation of secretory vesicles
(2) Respiration in bacteria
(3) Fatty acid breakdown
(4) Activation of amino acids

19. Given diagram represent to



(1) Basal body
(2) Basal plate
(3) Axoneme
(4) All the above

20. Which of the following is true for nucleolus
(1) It is a membrane bound structure
(2) It take part in spindle formation
(3) Large nucleoli present in dividing cells
(4) It is a site for active r – RNA synthesis

21. $H-\underset{\underset{CH_2OH}{|}}{\overset{\overset{COOH}{|}}{C}}-NH_2$ structure which of the following is incorrect
(1) It is serine
(2) It is substituted methame
(3) It is basic amino acid
(4) It is hydroxy amino acid

22. $S-G+S' \rightarrow S+S'-G$. This type of reaction can be catalysed by
(1) Calss – 1 enzymes
(2) Class – 2 enzymes
(3) Class – 5 enzymes
(4) both 1 & 2

23. Split of centromeres, chromatid separation and movement of chromatids to opposite poles observed in
(1) Anaphase
(2) Anphase – I
(3) anaphase – II
(4) Both 1 & 3

24. In which of the following plant cell value of ψ_w (water potential) is minimum
(1) Root hair cell
(2) Root Pericycle
(3) Vessels of main stem
(4) Midrib xylem cells

25. As compare to amino acids, amides are suitable for translocation in plant body because they have
(1) High C : N
(2) low N : C ratio
(3) High N : C ratio
(4) Both 1 & 3

26. Which of thefollowing is final electron acceptor of 'Z' Scheme
(1) CO_2
(2) NAD^+
(3) $NADP^+$
(4) PS-I

27. During aerobic respiration, which of the following ETC compex doesnot pump any proton
(1) Complex – I
(2) Complex – II
(3) Complex – III
(4) Complex – IV

28. Select out the incorrect match
(1) Auxin – induction of Parthenocarpy
(2) Gibberellins – bolting
(3) Cytokinins – herbicide
(4) Ethylene – Synchronising fruit set in pineapple

29. Which of the following is dioecious plant.
(1) Cucurbits
(2) Coconuts
(3) Papaya
(4) Solanum

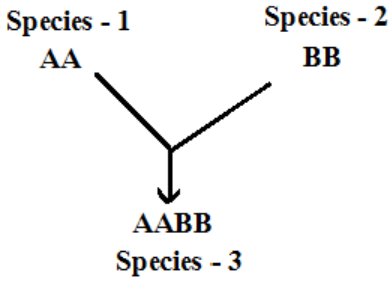
30. Sporopollenin is absent in
(1) Exine
(2) Intine
(3) Germpore
(4) Both 2 and 3

31. Which of the following gene/character can assort independently
(1) genes of same chromosome
(2) genes present on homologens chromosomes
(3) genes present on non homologens chromosomes
(4) all the above

32. If gene A & b showing 30% recombination then what would be type & proportion of gametes in AaBb plant

	AB	ab	Ab	aB
(1)	35	35	15	15
(2)	15	15	35	35
(3)	20	20	30	30
(4)	35	15	15	35

33.



Species (3) is the result of
(1) Autopolyploidy
(2) Allopolyploidy
(3) Autoallopolyploidy
(4) Aneuploidy

34. Lac selection method of screening is applicable on which of the following vector
(1) P^{BR322}
(2) P^{UC8}
(3) Cosmid
(4) All the above

35. In Lac operon which of the following gene is constitutive in function
(1) Promoter
(2) Regulator (i) gene
(3) Operator
(4) Structural genes

36. DNA replication is discontinuous because
(1) Fork moves in both direction
(2) Same DNA polymerase molecule works on both template
(3) DNA polymerase can polymerise only in $5' \rightarrow 3'$ direction
(4) Replication is semiconservative in nature

37. Which of the following variety of Brassica is white rust resistant
(1) Pusa Gaurav
(2) Pusa Swarnim
(3) Pusa Shubra
(4) Pusa Komal

38. Hairy leaves are associated with
(1) resistance to Jassids in cotton
(2) resistence to cereal leaf beetles in wheat
(3) resistance to bollworms
(4) Both 1 & 2

39. Major part of activated sludge is pumped in to
(1) aeration tank
(2) anaerobic sludge digeter
(3) aerobic sludge digester
(4) tertiary treatment

40. The ladybird used to get rid of
(1) aphids
(2) mosquitoes
(3) both 1 & 2
(4) bollworms

41. In P^{BR322}, BamHI is present in
(1) amp^R gene
(2) tet^R gene
(3) rop region
(4) $Kanamycin^R$ gene

42. Gel electrophoresis is used for separation of
(1) DNA
(2) RNA
(3) Protein
(4) All the above

43. For PCR how many types of primers are required
(1) One
(2) Two
(3) Three
(4) Not fixed

44. Out of the critical research areas of biotechnology best catalyst usually provide inform of
(1) microbe
(2) pure enzyme
(3) pure m – RNA
(4) either 1 or 2

45. Cotton bollworms controlled by
(1) Cry I Ac
(2) Cry II Ab
(3) Cry I Ab
(4) both 1 & 2

46. Which part of male reproductive system of human helps in storage, nutrition, physiological maturation of sperms and also aids in attaining motility of sperms?
(1) Vagina
(2) Epididymis
(3) Seminal vesicle
(4) Sertoli cells

47. Identify the sexually transmitted viral infection affecting the sex organs
(1) AIDS
(2) Hepatitis - B
(3) Syphilis
(4) Genital herpes

48. The ancestor of elephant
(1) *Protylopus*
(2) *Jamoytius*
(3) *Moeritherium*
(4) *Sahelanthropus*

49. Sustained high fever, headache, stomach pain and constipation are the symptoms of
(1) Malaria
(2) Typhoid
(3) Ascariasis
(4) Amoebiasis

50. Choose correct pair
(1) Frog – ectothermic animal
(2) Hedge hog – osmoconformer
(3) Pacific salmon – stenohaline animal
(4) Desert lizard – thermoregulator

51. Multiple genes influence this trait in a human
(1) ABO blood types
(2) Sickle cell anaemia
(3) Skin colour
(4) Phenylketonuria

52. Match the contents in column – I with column – II and identify correct answer.

Column – I	Column – II
(A) Kupffer cells	(i) Secretion of HCl
(B) Leydig cells	(ii) Secretion of mucus
(C) Oxyntic cells	(iii) Secretion of renin
(D) JG cells	(iv) Phagocytosis
(E) Brunner's glands	(v) Secretion of androgens

(1) A – iv, B – v, C – i, D – ii, E – iii
(2) A – iv, B – v, C – i, D – iii, E – ii
(3) A – v, B – iv, C – iii, D – i, E – ii
(4) A – iv, B – v, C – ii, D – iii, E – i

53. Statement A: The binding affinity of haemoglobin for O_2 decreases at tissue level.

Statement B: P^{CO_2} is relatively higher in tissues than P^{O_2}.

(1) Both statement A and statement B are true.

(2) Statement A is true and statement B is false.

(3) Statement A is false and statement B is true.

(4) Both statement A and statement B are false.

54. Which of the following joint connects axial skeleton with appendicular skeleton?

(1) Joint between skull and atlas

(2) Joint between heads of ribs and vertebrae

(3) Joint between acetabulum and femur.

(4) Joint between sacrum and coxal bone

55. Conditional reabsorption of Na^+ and water occurs in this part of human nephron.

(1)DCT

(2) Descending limb of loop of Henle

(3) PCT

(4) Collecting duct

56. Lipolytic enzymes play a role in the breakdown of dietary lipids. Which gland does not secrete such enzymes?

(1) Gastric glands

(2) Liver

(3) Intestinal glands

(4) Pancreas

57. The type of association between barnacles and whale is similar to that of

(1) Ticks and dogs

(2) Myxcorrhizae and trees

(3) Star fish and oyster

(4) Clown fish and sea anemone

58. Choose incorrect statement about rods and cones of human eye

(1) Photopigments are found in the membrane discs of outer segment.

(2) Dissociation of retinal from opsin alters membrane permeability

(3) They are absent in blind spot.

(4) They are a type of bipolar neurons.

59. Which of the following set is not a correct match ?

(1) Male *Ascaris* – Copulatory spicules

(2) Female cockroach – boat shaped 7th sternum

(3) Female sea horse – brood pouch

(4) Male frog – Vocal sacs

60. Hermaphrodite with internal fertilisation and indirect development.

(1) *Fasciola*

(2) *Ctenplana*

(3) *Hirudinaria*

(4) *Aedes*

61. Cells of areolar tissue which secrete immunoglobulins

(1) Fibroblast

(2) Mast cells

(3) Plasma cells

(4) Macrophages

62. Which of the following is closest to *Homo sapiens* ?

(1) *Dryopithecus*

(2) *Homo erectus*

(3) *Gorilla*

(4) *Ramapithecus*

63. 'Water Act' was passed by the Government of India in
(1)1986
(2) 1974
(3) 1997
(4) 1982

64. Identify the incorrect statement about tissue grafting.
(1) Cell mediated immune response causes graft rejection
(2) Cyclosporins are used to suppress graft rejection
(3) Autografts are not generally rejected
(4) It requires blood group and tissue incompatability.

65. Choose the set of chromosomal disorders resulting from trisomy of autosomes
(a) Down's syndrome
(b) Turner's syndrome
(c) Cri-du-chat syndrome
(d) Klinefelter's syndrome
(e) Edward's syndrome
(f) Patau syndrome
(1) a, b, d
(2) a, d, e, f
(3) a, e, f
(4) d only

66. The primary producers of aquatic ecosystem
(1) Phytoplankton
(2) Zooplankton
(3) Molluscs
(4) Small fishes

67. Which of the following endocrine gland of human has a duct ?
(1) liver
(2) thyroid
(3) pituitary
(4) pancreas

68. Choose incorrect pair.
(1) Sea hare - radula
(2) Sea pen – cnidoblasts
(3) Sea lion – gills
(4) Sea urchin – spines

69. The primary function of epithelium lining the proximal convoluted tubule of nephron
(1) filtration and absorption
(2) absorption and secretion
(3) protection and secretion
(4) acid base balance and reabsorption of urea

70. Open circulatory system is found in
(1) *Apis*
(2) *Nereis*
(3) *Ichthyophis*
(4) *Bungarus*

71. Gonadotropins secreted by ___A___ act on ___B__. "A' and 'B' represent
(1) A- hypothalamus, B – adenohypophysis
(2) A – adenohypophysis, B – ovary
(3) A – Ovary, B – uterus
(4) A – hypothalamus, B – testis

72. If a couple with normal vision has two colorblind sons and daughter with normal vision the genotypes of the couple will be
(1) ♀ - $X^{+}\ X^{c}$, ♂ - $X^{c}\,Y$
(2) ♀ - $X^{+}\ X^{c}$, ♂ - $X^{+}\,Y$
(3) ♀ - $X^{c}\ X^{c}$, ♂ - $X^{+}\,Y$
(4) ♀ - $X^{+}\ X^{+}$, ♂ - $X^{c}\,Y$

73. Which of the following statements is not related to the 'Y' chromosome of human?
(1) It has 231 genes
(2) It has gene for dystrophin
(3) It determines male sex
(4) It has Y linked and XY linked genes

74. The insect which produces sperms with 'X' or 'Y' chromosome
(1) Human
(2) Honey bee
(3) Grass hopper
(4) *Drosophila*

75. Which contraceptive method has high risk of breast cancer?
(1) CuT
(2) Tubectomy
(3) Implants
(4) Vaults

76. Enterokinase is secreted by
(1) Pancreas
(2) Stomach
(3) Crypts of Lieberkhun
(4) Liver

77. The maximum volume of air expelled after deepest inhalation
(1) TLC
(2) VC
(3) IC
(4) ERV

78. The increase in blood volume causes high venous pressure. The effect of this could be
(1) release of renin by JG cells
(2) secretion of ADH
(3) release of ANF
(4) secretion of aldosterone

79. Choose incorrect pair with reference to chemical defences in plants
(1) *Calotropis* – Cardiac glycosides
(2) *Cinchona* - Quinine
(3) *Rauwolfia* - reserpine
(4) *Vinca* - taxol

80. Sexually transmitted bacterial infection which affects new born through transplacental transmission
(1) AIDS
(2) Syphilis
(3) Genital warts
(4) Trichomoniliasis

81. Semelparity is a reproductive strategy in
(1) Salmon
(2) Beaver
(3) Pigeon
(4) Human

82. Choose correct combination with reference to sarcomere of skeletal muscle fibre.

	Structure	Character	Function
(1)	Thick filament	Polymer of globular proteins	Hydrolysis of ATP
(2)	Z – line	Elastic fibre of A – band	Provides attachment for actin filaments
(3)	Thin filament	Active sites for interaction with myosin	Pulling of thick filaments
(4)	Myosin head	Binding site for actin	Cross bridge formation

83. Which hormone level is relatively low during ovulation in a woman?
(1) Progesterone
(2) Estrogen
(3) FSH
(4) LH

84. SO_2 pollution in thermal power stations can be checked by using

(1) Incinerator

(2) Scrubber

(3) Bag filter

(4) Catalytic converter

85. Sacred groves of Rajasthan

(1) Khasi and Jaintia

(2) Sarguja

(3) Aravalli Hills

(4) Bastar

86. The Himalayan musk deer is an endangered species which is protected at

(1) Kedarnath wild life sanctuary

(2) Keoladeo Ghana national park

(3) Kaziranga national park

(4) Kanha national park

87. Which of the following examples does not explain convergent evolution?

(1) eyes of octopus and cat

(2) flipper of penguins and dolphins

(3) sweet potato and potato

(4) Forelimbs of whale and horse

88. Cytokine barriers used in treatment of cancer

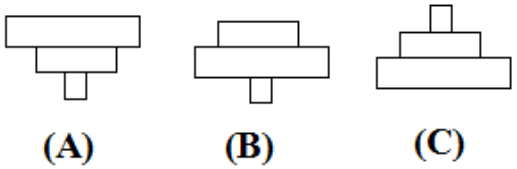
(1) NK cells

(2) Monoclonal antibodies

(3) α - interferons

(4) Taxol

89. Which of the following ecological pyramids A, B and C is correctly matched with the given options.



(1) A - Pyramid of biomass in forest

(2) B - Pyramid numbers of a big tree

(3) C - Pyramid of biomass in sea

(4) A - Pyramid of energy in parasitic food chain

90. Choose incorrect statement about Malpighian tubules of cockroach.

(1) terrestrial adaptation for water conservation

(2) help in osmoregulation and water conservation.

(3) whitish filamentous structures which excrete uric acid

(4) lined by glandular and ciliated cells.

91. $\vec{A}$, $\vec{B}$ and $\vec{C}$ are three orthogonal vectors with magnitudes 3, 4 and 12 respectively. The value of $\left|\vec{A}-\vec{B}+\vec{C}\right|$ will be

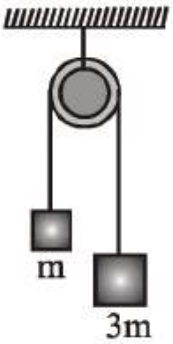
(1) 11

(2) 19

(3) 13

(4) can't be determined

92. If the system is released, then the acceleration of the centre of mass of the system is



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

(2) $\frac{g}{2}$

(3) g

(4) 2g

93. A particle is kept at rest at the top of a sphere of diameter 42 m. When disturbed slightly, it slides down. At what height 'h' from the bottom, the particle will leave the sphere

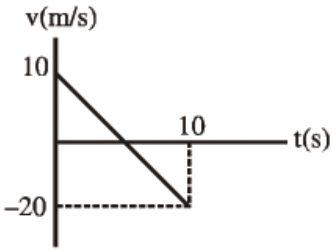
(1) 14 m

(2) 28 m

(3) 35 m

(4) 7 m

94. Velocity-time graph of a particle moving in a straight line is as shown in figure. Mass of the particle is 2 kg. Work done by all the forces acting on the particle in time interval between t = 0 to t = 10 s is



(1) 300 J

(2) –300 J

(3) 400 J

(4) –400 J

95. A thin hollow cylinder is free to rotate about its geometrical axis. It has a mass of 8 kg and a radius of 20 cm. A rope is wrapped around the cylinder. What force must be exerted along the rope to produce an angular acceleration of 3 rad/sec^2 ?

(1) 8.4 N

(2) 5.8 N

(3) 4.8 N

(4) None of these

96. Two wires of the same material and same length but diameters in the ratio 1:2 are stretched by the same force. The potential energy per unit volume of the two wires will be in the ratio

(1) 1 : 2

(2) 4 : 1

(3) 2 : 1

(4) 16 : 1

97. Two pendulums of time period 3 s and 7s respectively start oscillating simultaneously from two opposite extreme positions. After how much least time they will be in phase

(1) $\frac{21}{8}s$

(2) $\frac{21}{4}s$

(3) $\frac{21}{2}s$

(4) $\frac{21}{10}s$

98. The equation of a wave on a string of linear mass density 0.04 kg m^{-1} is given by

$$y = 0.02(m)\sin\left[2\pi\left(\frac{t}{0.04(s)} - \frac{x}{0.50(m)}\right)\right].$$

The tension in the string is

(1) 6.25 N

(2) 4.0 N

(3) 12.5 N

(4) 62.5 N

99. The average kinetic energy of a gas molecule at t^0C is directly proportional to

(1) $\sqrt{t}$

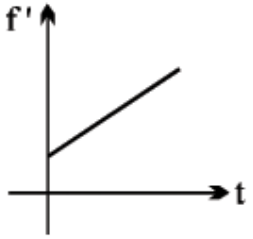
(2) t

(3) $\frac{1}{t}$

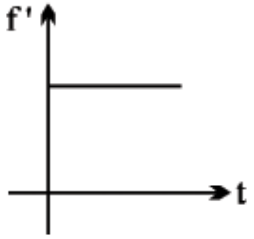
(4) t + 273

100. An observer starts moving with uniform acceleration 'a' towards a stationary sound source of frequency f. As the observer approaches the source, the apparent frequency f' heard by the observer varies with time t as:

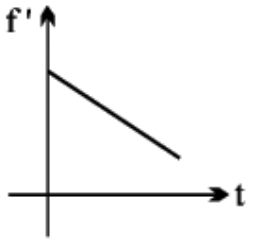
(1)



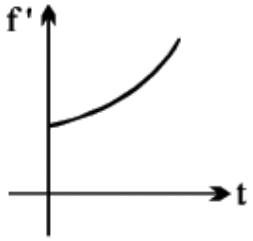
(2)



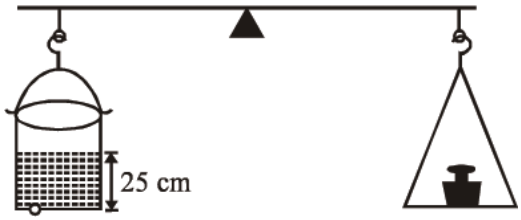
(3)



(4)



101. A cylinder containing water upto a height of 25 cm has a hole of cross-section $\frac{1}{4}cm^2$ in the bottom. It is counterpoised in a balance. What is the initial change in the balancing weight when water begins to flow out?



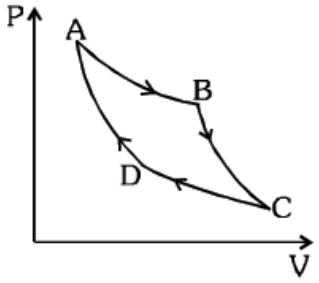
(1) Increase of 12.5 gm-wt

(2) Increase of 6.25 gm-wt

(3) Decrease of 12.5 gm-wt

(4) Decrease of 6.25 gm-wt

102. In the indicator diagram fig. shown of carnot cycle T_a, T_b, T_c, T_d represent temperature of gas at A, B, C, D respectively. Which of the following is correct relation



(1) $T_a = T_b = T_c = T_d$

(2) $T_a = T_c$, $T_b = T_d$

(3) $T_a = T_d$, $T_c = T_b$

(4) $T_a = T_b$, $T_c = T_d$

103. One end of a copper rod of length 1.0 *m* and area of cross-section $10^{-3}m^2$ is immersed in boiling water and the other end in ice. If the coefficient of thermal conductivity of copper is 92 $cal / m\text{-}s\text{-}^oC$ and the latent heat of ice is $8 \times 10^4\ cal / kg$, then the amount of ice which will melt in one minute is

(1) $9.2 \times 10^{-3}\ kg$

(2) $8 \times 10^{-3}\ kg$

(3) $6.9 \times 10^{-3}\ kg$

(4) $5.4 \times 10^{-3}\ kg$

104. One mole of a an ideal gas is heated at constant pressure through 1K work done by the gas is

(1) 1 Joule

(2) $\frac{1}{R}$ Joule

(3) R Joule

(4) 2.5 R Joule

105. A pipe of length 85 cm is closed from one end. Find the number of possible natural oscillations of air column in the pipe whose frequencies lie below 1250 Hz. The velocity of sound in air is 340 m/s.

(1) 6

(2) 4

(3) 12

(4) 8

106. Two bodies, each of mass M are kept fixed with a separation 2L. A particle of mass m is projected from the mid-point of the line joining their centres, perpendicular to the line. The gravitational constant is G. The correct statement(s) is (are)

(a) The minimum initial velocity of the mass 'm' to escape the gravitational field of the two bodies is $4\sqrt{\frac{GM}{L}}$

(b) The minimum initial velocity of the mass 'm' to escape the gravitational field of the two bodies is $2\sqrt{\frac{GM}{L}}$

(c) The minimum initial velocity of the mass 'm' to escape the gravitational field of the two bodies is $\sqrt{\frac{2GM}{L}}$

(d) The energy of the mass m remains constant

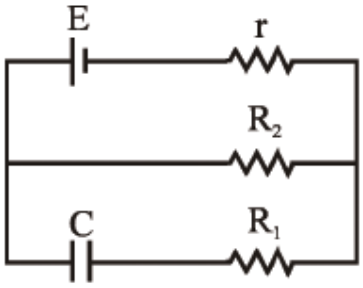
(1) a, b

(2) b, d

(3) a, c

(4) a, d

107. In the given figure each plate of capacitance C has charge



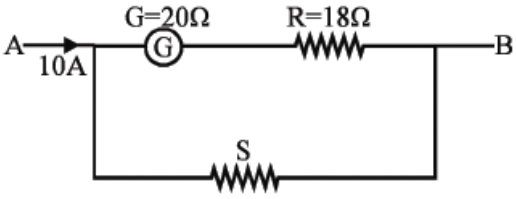
(1) CE

(2) $\frac{CER_1}{R_2 - r}$

(3) $\frac{CER_2}{R_2 + r}$

(4) $\frac{CER_1}{R_2 + r}$

108. Full scale deflection current for galvanometer is 1 Amp. What should be the value of shunt resistance so that galvanometer shows half scale deflection.



(1) 10Ω

(2) 1Ω

(3) 12Ω

(4) 2Ω

109. A bar magnet is held at right angle to a uniform magnetic field. The couple acting on the magnet is to be halved by rotating it from this position. The angle of rotation is

(1) 60°

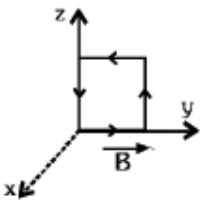
(2) 45°

(3) 30°

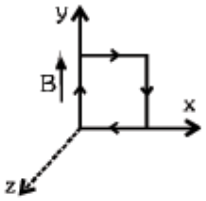
(4) 75°

110. Which of the following loop is in stable equilibrium

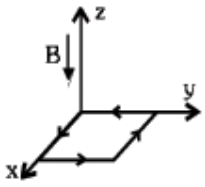
(1)



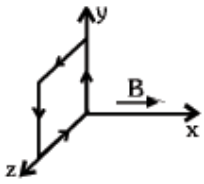
(2)



(3)



(4)



111. The orbit of a geostationary satellite is circular, the time period of satellite depends on

I) mass of the satellite.

II) mass of the earth.

III) radius of the orbit.

IV) height of the satellite from the surface of the earth.

Which of the following option is correct?

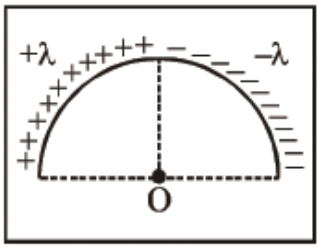
(1) Only I

(2) I and II

(3) I, II and III

(4) II, III and IV

112. For a ring having radius R of uniform linear charge density λ (As shown in figure) its intensity of electric field at its centre equals to



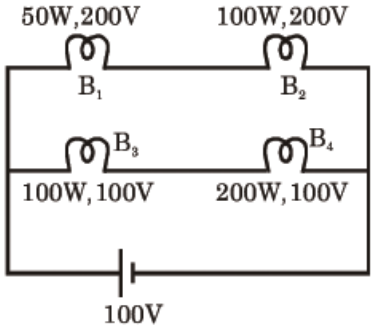
(1) $\frac{2K\lambda}{R}$

(2) $\frac{4K\lambda}{R}$

(3) $\frac{K\lambda}{R}$

(4) Zero

113. Which bulb will be glow brightest in the following circuit diagram?



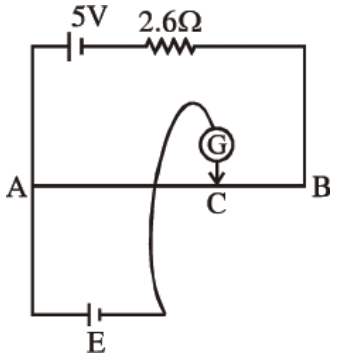
(1) B_1

(2) B_2

(3) B_3

(4) B_4

114. In the potentiometer circuit shown in the figure, *AB* is a uniform wire of length 100 cm and resistance $2.4\,\Omega$. The length AC of the wire for which the galvanometer *G* shows no deflection is 40 cm. The emf of the test cell, ε is



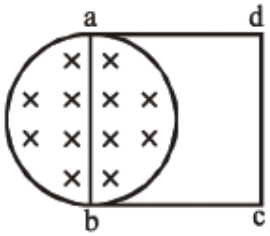
(1) 1.56 V

(2) 0.96 V

(3) 2.77 V

(4) 1.44 V

115. A uniform magnetic field B existas in a cylindrical region of radius 10 cm as shown in figure. A uniform wire of length 80 cm and resistance $4.0\,\Omega$ is bent into a square frame and is placed with one side along a diameter of the cylindrical region. If the magnetic field increases at a constant rate of 0.010 T/s, find the current induced in the frame



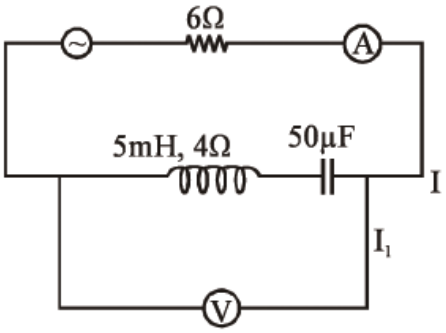
(1) $3.9\times10^{-5}\ A$

(2) $0.2\times10^{-5}\ A$

(4) $0.8\times10^{-5}\ A$

(4) $10\times10^{-5}\ A$

116. In the circuit shown in figure, the AC source gives a voltage V = 20 cos (2000t). Neglecting source resistance, the voltmeter and ammeter readings will be



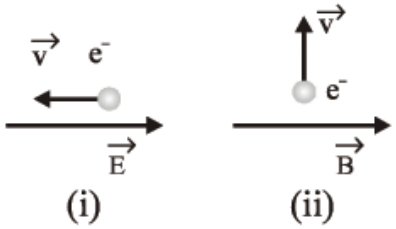
(1) 0 V, 2.0 A

(2) 0 V, 1.4 A

(3) 5.6 V, 1.4 A

(4) 8 V, 2.0 A

117. An electron is moving through a field. It is moving
(i) opposite an electric field
(ii) perpendicular to a magnetic field as shown. For each situation the de-Broglie wave length of electron



(1) Increasing, increasing

(2) Increasing, decreasing

(3) Decreasing, same

(4) Increasing, Same

118. A ray of light incident on an equilateral glass prism shows minimum deviation of 30°. Calculate the speed of light through the prism.

(1) 2.12×10^{8} m/sec

(2) 1.5×10^{8} m/sec

(3) 3.1×10^{8} m/sec

(4) 5×10^{8} m/sec

119. A radioactive nucleus is being produced at a constant rate α per second. Its decay constant is λ. If N_0 are the number of nuclei at time t = 0, then maximum number of nuclei possible are

(1) $\frac{\alpha}{\lambda}$

(2) $N_0 + \frac{\alpha}{\lambda}$

(3) N_0

(4) $\frac{\lambda}{\alpha} + N_0$

120. Electromagnetic wave of intensity 1400 W/m^2 falls normally on metal surface of area 4.5 m^2 and is completely reflected by it. Find out force exerted by beam

(1) 14×10^{-5} N

(2) 14×10^{-6} N

(3) 21×10^{-5} N

(4) 42×10^{-6} N

121. A telescope has an objective lens of focal length 150 cm and an eye piece of focal length 5 cm. If this telescope is used to view a 100 m high tower 3 km away, find the height of the final image when it is formed 25 cm away from the eye piece.

(1) 11 cm

(2) 15 cm

(3) 22 cm

(4) 30 cm

122. The mobility of free electron is greater than that of free holes because

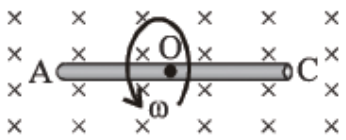
(1) The carry negative charge

(2) They are light

(3) They mutually collide less

(4) They require low energy to continue their motion

123. A conducting rod AC of length $4l$ is rotated about a point O in a uniform magnetic field $\vec{B}$ directed into the paper. AO = l and OC = $3l$. Then



(1) $V_A - V_0 = \frac{B\omega l^2}{2}$

(2) $V_0 - V_C = \frac{7}{2} B\omega l^2$

(3) $V_A - V_C = 4B\omega l^2$

(4) $V_C - V_O = \frac{9}{2} B\omega l^2$

124. An astronomical telescope is able to resolve two stars at an angular separation of 10^{-3} degree. If wavelength of light used is 500nm, then the diameter of the objective of the telescope is

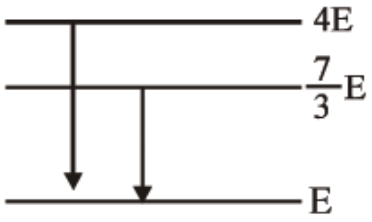
(1) 3.5 cm

(2) 0.35cm

(3) 3.5 m

(4) None

125. The following diagram indicates the energy levels of a certain atom when the system moves from 4E level to E. A photo of wavelength λ_1 is emitted. The wavelength of photon produced during it's transition from $\frac{7}{3}E$ level to E is λ_2. The ratio $\frac{\lambda_1}{\lambda_2}$ will be



(1) $\frac{9}{4}$

(2) $\frac{4}{9}$

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

(4) $\frac{7}{3}$

126. In hydrogen atom, electron makes transition from n = 4 to n = 1 level. Recoil momentum of the H atom will be

(1) 3.4×10^{-27} N-sec

(2) 6.8×10^{-27} N-sec

(3) 3.4×10^{-24} N-sec

(4) 6.8×10^{-24} N/sec

127. Two coherent sources of intensity ratio x^2 interfere that in interference pattern

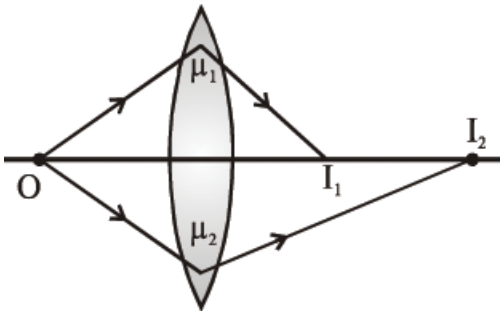
(1) $\frac{I_{max.} - I_{min.}}{I_{max.} + I_{min.}} = \frac{1+X^2}{2\sqrt{X}}$

(2) $\frac{I_{max.} + I_{min.}}{I_{max.} - I_{min.}} = \frac{1+X}{2\sqrt{X}}$

(3) $\frac{I_{max.} - I_{min.}}{I_{max.} + I_{min.}} = \frac{2X}{1+X^2}$

(4) $\frac{I_{max.} + I_{min.}}{I_{max.} - I_{min.}} = \frac{2X}{1+X^2}$

128. A lens made up of different material forms two images of a point object 'O' as shown in figure. Then



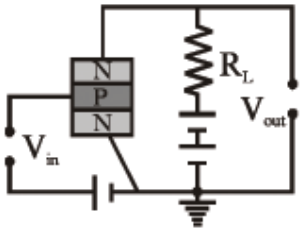
(1) $\mu_1 > \mu_2$

(2) $\mu_1 = \mu_2$

(3) $\mu_2 > \mu_1$

(4) Data insufficient

129. An NPN-transistor circuit is arranged as shown in the figure. It is



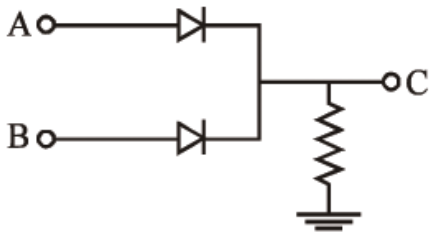
(1) A common base amplifier circuit

(2) A common emitter amplifier circuit

(3) A common collector amplifier circuit

(4) Neither of the above

130. In the circuit below, A and B represents two inputs and C represents the output. The circuit represents



(1) AND gate

(2) NOR gate

(3) OR gate

(4) NAND gate

131. One centimetre on the main scale of vernier calipers is divided into ten equal parts. If 10 divisions of vernier scale coincide with 8 small divisions of the main scale, the least count of the callipers is :-

(1) 0.01 cm

(2) 0.02 cm

(3) 0.05 cm

(4) 0.005 cm

132. An object moving with a speed of $6.25\,ms^{-1}$, is decelerated at a rate given by $\frac{dv}{dt} = -2.5\sqrt{v}$. Where v is the instantaneous speed. The time taken by the object, to come to rest, would be

(1) 1 s

(2) 2 s

(3) 4 s

(4) 8 s

133. A bullet of mass 0.01 kg, is travelling at a speed of 500 m/sec, strikes a block of 2 kg which is suspended by a string of length 5m. The centre of gravity of the block is found to rise a vertical distance of 0.1 m. What is the approximate speed of the bullet after it emerges from the block ?

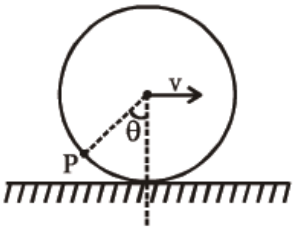
(1) 200 m/s

(2) 220 m/s

(3) 204 m/s

(4) 284 m/s

134. A hoop rolls on a horizontal ground without slipping with linear speed v. Speed of a particle P on the circumference of the hoop at angle θ is :



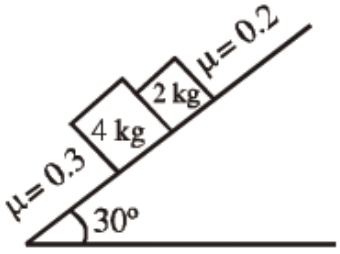
(1) $2v\sin\frac{\theta}{2}$

(2) $v\sin\frac{\theta}{2}$

(3) $2v\cos\frac{\theta}{2}$

(4) $v\cos\frac{\theta}{2}$

135. Two blocks, 4 kg and 2 kg are sliding down an incline plane as shown in the figure. The acceleration of 2 kg block is



(1) 1.66 m/s^2

(2) 2.33 m/s^2

(3) 3.66 m/s^2

(4) 4.66 m/s^2

136. The energy of second Bohr orbit of the hydrogen atom is $-328\,kJ\,mol^{-1}$; hence the energy of fourth Bohr orbit would be

(1) $-82\ kJ\,mol^{-1}$

(2) $-41\ kJ\,mol^{-1}$

(3) $-1312\ kJ\,mol^{-1}$

(4) $-164\ kJ\,mol^{-1}$

137. The set of quantum numbers, n = 3, l = 2, $m_l = 0$

(1) Describes an electron in a 2s orbital

(2) is not allowed

(3) describes an electron in a 3p orbital

(4) describes one of the five orbitals of same energy.

138. At low pressures, van der Waals equation is written as $\left(P+\frac{a}{V^2}\right)V = RT$. The compressibility factor is equal to

(1) $\left(1-\frac{a}{RTV}\right)$

(2) $\left(1-\frac{RTV}{a}\right)$

(3) $\left(1+\frac{a}{RTV}\right)$

(4) $\left(1+\frac{RTV}{a}\right)$

139. 20 mL of methane is completely burnt using 50 mL of oxygen. The volume of the gas left after cooling to room temperature is
(1) 80 mL
(2) 40 mL
(3) 60 mL
(4) 30 mL

140. Which of the following is a buffer solution?
(1) 500 mL of 0.1 N CH_3COOH + 500 mL of 0.1 N $NaOH$
(2) 500 mL of 0.1 N CH_3COOH + 500 mL of 0.1 N HCl
(3) 500 mL of 0.1 N CH_3COOH + 500 mL of 0.2 N $NaOH$
(4) 500 mL of 0.2 N CH_3COOH + 500 mL of 0.1 N $NaOH$

141. Which of the following is most soluble in water?
(1) $Ba_3(PO_4)_2\left(K_{sp} = 6 \times 10^{-39}\right)$
(2) $ZnS\left(K_{sp} = 7 \times 10^{-16}\right)$
(3) $Fe(OH)_3\left(K_{sp} = 6 \times 10^{-38}\right)$
(4) $Ag_3(PO_4)\left(K_{sp} = 1.8 \times 10^{-18}\right)$

142. In an exothermic equilibrium $A + 3B \rightleftharpoons AB_3$ all the reactants and products are in the gaseous state. The formation of AB_3 is favoured at
(1) low temperature and low pressure
(2) low temperature and high pressure
(3) high temperature and high pressure
(4) high temperature and low pressure

143. If the enthalpy change for the transition of liquid water to steam is $30\,kJ\,mol^{-1}$ at 27^0C, the entropy change for the process would be
(1) $10\,J\,mol^{-1}\,K^{-1}$
(2) $1.0\,J\,mol^{-1}\,K^{-1}$
(3) $0.1\,J\,mol^{-1}\,K^{-1}$
(4) $100\,J\,mol^{-1}\,K^{-1}$

144. Elements of which of the following group(s) of periodic table do not form hydrides?
(1) Groups 7, 8, 9
(2) Group 13
(3) Groups 15, 16, 17
(4) Group 14

145. The vapour pressure of two liquids P and Q are 80 and 60 torr respectively. The total vapour pressure of solution obtained by mixing 3 mol of P and 2 mole of Q would be
(1) 68 torr
(2) 20 torr
(3) 140 t orr
(4) 72 torr

146. The oxidation potential of hydrogen electrode at pH = 10 and $P_{H_2} = 1$ is
(1) 0.51 V
(2) 0.00 V
(3) + 0.59 V
(4) 0.059 V

147. E^0 for the cell $Zn|Zn^{2+}(aq)||Ch^{2+}(aq)|Cu$ is 1.10 V at 25^oC, the equilibrium constant for the reaction $Zn + Cu^{2+}(aq) \rightleftharpoons Cu + Zn^{2+}(aq)$ is of the order of

(1) 10^{-28}

(2) 10^{-37}

(3) 10^{+18}

(4) 10^{+17}

148. The rate constant of the reaction $A \rightarrow B$ is $0.6 \times 10^{-3}\ mol\ L^{-1} s^{-1}$. If the concentration of A is 5 M, then concentration of B after 20 minutes is

(1) 3.60 M

(2) 0.36 M

(3) 0.72 M

(4) 1.08 M

149. If AgI crystallises in zinc blende structure with I^- ions at lattice points. What fraction of tetrahedral voids is occupied by Ag^+ ions?

(1) 25 %

(2) 50 %

(3) 100 %

(4) 75 %

150. The number of carbon atoms per unit cell of diamond unit cell is

(1) 1

(2) 4

(3) 8

(4) 6

151. For adsorption of gas on solid surface, the plots of $\log x/m\ vs.\ \log P$ is linear with a slope equal to

(1) k

(2) log k

(3) In k

(4) 1/n

152. The method of zone refining of metals is based on the principle of

(1) Greater mobility of the pure metal than that of impurity

(2) Higher melting point of the impurity than that of the pure metal

(3) Greater noble character of the solid metal than that of the impurity

(4) Greater solubility of the impurity in the molten state than in the solid

153. Which of the following polymers is not correctly matched?

(1) Formation of dacron – Step growth polymerisation

(2) Formation of polytetrafluoroethene – Step growth polymerisation

(3) formation of polythene – Chain growth polymerisation in presence of benzoyl peroxide

(4) formation of Polyacrylonitrile - Chain growth polymerisation in presence of peroxide

154. If one strand of DNA has the sequence ATGCTTGA, the sequence in the complimentary strand would be

(1) TCCGAACT

(2) TACGTAGT

(3) TACGAATC

(4) TACGAACT

155. Which of the following is not a correct statement?

(1) Transparent soaps are made by dissolving the soap in ethanol and then evaporating excess solvent.

(2) Soaps that float in water are made by beating tiny air bubbles before their hardening.

(3) Medicated soaps contain alcohol to prevent rapid drying.

(4) Potassium soaps are soft to the skin than sodium soaps.

156. The vapour pressure of an aqueous solution of sucrose at 373 K is found to be 750 mm Hg. The molarity of the solution at the same temperature will be

(1) 0.26

(2) 0.73

(3) 0.74

(4) 0.039

157. A hypothetical electrochemical cell is shown below: $A\,|\,A^{+}\left(XM\right)\,||\,B^{+}\left(YM\right)\,|\,B$. The e.m.f. measured is + 0.20 V. The cell reaction is

(1) $A+B^{+}\rightarrow A^{+}+B$

(2) $A^{+}+B\rightarrow A+B^{+}$

(3) $A^{+}+B\rightarrow A+B^{+}$

(4) cannot be predicted

158. The photochemical bromination of ethylbenzene with excess of bromine followed by hydrolysis with aqueous KOH gives

(1) PhCHO

(2) $PhCH_2CHO$

(3) $PhCOCH_3$

(4) $PhCHOHCH_3$

159. $C_6H_5{}^{14}COOH$ on heating with Na_2CO_3 releases

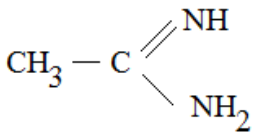
(1) CO_2

(2) ${}^{14}CO_2$

(3) CO

(4) H_2

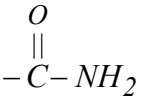
160. The correct order of basicities of the following compounds is



(I)

(II) $CH_3-CH_2-NH_2$

(III) $\left(CH_3\right)_2NH$



(IV)

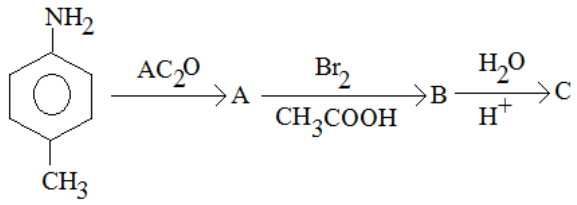
(1) II > I > III > IV

(2) I > III > II > IV

(3) III > I > II > IV

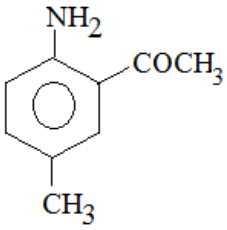
(4) I > II > III > IV

161.

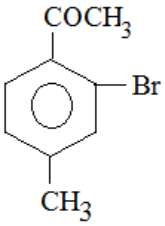


would be

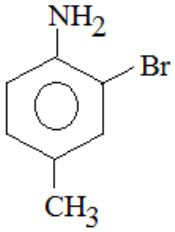
(1)



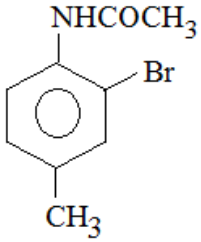
(2)



(3)



(4)



162. Which of the following can oxidise H_2S to S?

(1) $Cr_2O_7^{-2}$

(2) MnO_4^-

(3) Cl_2

(4) All

163. Which of the following is with square pyramidal structure?

(1) XeO_4

(2) XeF_6

(3) XeO_2F_2

(4) $XeOF_4$

164. The inner transition elements with $4f^7 5d^1 6s^2$ and $5f^7 6d^1 7s^2$ configuration are respectively.

(1) Gd, Cm

(2) Gd, Lu

(3) Lu, Cm

(4) Gd, Lw

165. Which of the following is responsible for the high reducing nature of phosphinic acid?

(1) 3 P – OH bonds

(2) 2 P – H bonds

(3) 1 P = O bond

(4) 2 P – OH bonds

166. Regarding sulphur dioxide the incorrect statement is

(1) SO_2 is used as an antichlor, disinfectant and food preservative

(2) Decolourisation of acidified potassium permanganate is the convenient identification test for SO_2

(3) Liquid SO_2 is as good solvent for both organic and inorganic compounds.

(4) In the reaction with water and alkalies the behaviour of SO_2 is very similar to that of carbon monoxide.

167. Statement I: When HCl reacts with finely powdered iron it forms $FeCl_2$ but not $FeCl_3$.

Statement II: Cl_2 oxidises H_2S to SF_6.

(1) Both statement - I and statement - II are true

(2) Statement - I is true, but statement - II is false

(3) Both statement - I and statement - II are false

(4) Statement - I is false, but statement - II is true

168. Methyl halides with highest and least dipole moment values are

(1) CH_3F, CH_3I

(2) CH_3Cl, CH_3I

(3) CH_3Cl, CH_3F

(4) CH_3F, CH_3Br

169. Considering the elements B, C, N, F and Si the correct order of their non metallic character is

(1) B > C > Si > N > F

(2) Si > C > B > N > F

(3) F > N > C > B > Si

(4) F > N > C > Si > B

170. Which of the following order of energies of molecular orbitals of N_2 is correct?

(1) $\pi 2P_y < \sigma 2P_z < \pi^* 2P_x = \pi^* 2P_y$

(2) $\pi 2P_y > \sigma 2P_z > \pi^* 2P_x = \pi^* 2P_y$

(3) $\pi 2P_y < \sigma 2P_z > \pi^* 2P_x = \pi^* 2P_y$

(4) $\pi 2P_y > \sigma 2P_z < \pi^* 2P_x = \pi^* 2P_y$

171. The low solubility of LiF in water is due to __and the low solubility of CsI is due to ___

(1) Low lattice enthalpy, high lattice enthalpy

(2) Low hydration enthalpy, high lattice enthalpy

(3) High lattice enthalpy, low hydration enthalpy

(4) High lattice enthalpy, high hydration enthalpy

172. The dehydration of chlorides of which of the following alkaline earth metal cannot be achieved on heating?

(1) Ba

(2) Ca

(3) Sr

(4) Mg

173. Colourless metal metaborate is

(1) $Co(BO_2)_2$

(2) $Cu(BO_2)_2$

(3) $Cr(BO_2)_3$

(4) $Al(BO_2)_3$

174. Incorrect statement among the following is

(1) Graphite is thermodynamically most stable allotrope of carbon

(2) Tridymite and Cristobalite are the amorphous forms of silica

(3) Kieselghur an amorphous form of silica is used in filtration plants.

(4) A substantial amount of CO_2 is used in the manufacture of urea.

175. The best and latest technique for isolation, purification and separation of organic compounds is

(1) Crystallisation

(2) Distillation

(3) Sublimation

(4) Chromatography

176. The extent of crystal field splitting in octahedral complexes of the given metals with a particular weak field ligand are such that

(1) Ir (III) > Th (III) > Fe (III) > Cr (III)

(2) Ir (III) > Th (III) > Cr (III) > Fe (III)

(3) Cr (III) > Fe (III) > Rh (III) > Ir (III)

(4) Ir (III) > Rh (III) > Cr (III) ≡ Fe (III)

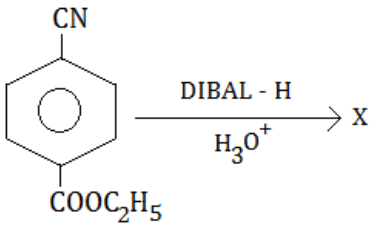
177. $\left[Co\left(NH_3\right)_4\left(NO_2\right)_2\right]Cl$ exhibits

(1) Linkage isomerism, ionization isomerism and geometrical isomerism

(2) Ionization isomerism, geometrical isomerism and optical isomerism

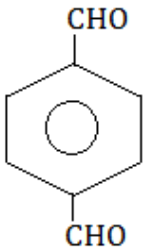
(3) Linkage isomerism, geometrical isomerism and optical isomerism

(4) Linkage isomerism, ionization isomerism and optical isomerism

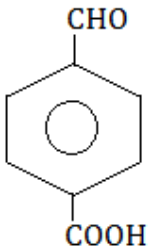
178. 

Which of the following is X?

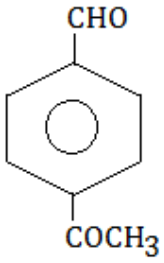
(1)



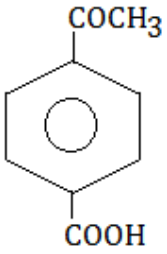
(2)



(3)



(4)



179. Statement I: Dipole moment of NH_3 is greater than the dipole moment of NF_3

Statement II: N – F bond is more polar than N – H bond.

(1) Both statement - I and statement - II are true

(2) Statement - I is true, but statement - II is false

(3) Both statement - I and statement - II are false

(4) Statement - I is false, but statement - II is true

180. Which of the following is optically inactive?

(1) Lactic acid

(2) Meso tartaric acid

(3) Alanine

(4) 2 – butanol

SRI CHAITANYA EDUCATIONAL INSTITUTIONS,INDIA

A.P,TELANGANA,KARNATAKA,TAMILNADU,MAHARASHTRA,DELHI,RANCHI

SR ELITE, AIIMS S60, NEET MPL & MEDICON NEET GRAND TEST – 5 KEY Date : 31-01-2019

BOTANY

1) **4**	2) **3**	3) **1**	4) **3**	5) **2**	6) **2**	7) **4**	8) **3**	9) **2**	10) **1**
11) **3**	12) **4**	13) **2**	14) **2**	15) **2**	16) **3**	17) **4**	18) **1**	19) **3**	20) **4**
21) **3**	22) **4**	23) **4**	24) **4**	25) **3**	26) **3**	27) **2**	28) **3**	29) **3**	30) **4**
31) **3**	32) **2**	33) **2**	34) **2**	35) **2**	36) **3**	37) **2**	38) **4**	39) **2**	40) **1**
41) **2**	42) **4**	43) **2**	44) **4**	45) **4**					

ZOOLOGY

46) **2**	47) **4**	48) **3**	49) **2**	50) **1**	51) **3**	52) **2**	53) **1**	54) **4**	55) **1**
56) **2**	57) **4**	58) **4**	59) **3**	60) **1**	61) **3**	62) **2**	63) **2**	64) **4**	65) **3**
66) **1**	67) **4**	68) **3**	69) **2**	70) **1**	71) **2**	72) **2**	73) **2**	74) **4**	75) **3**
76) **3**	77) **2**	78) **3**	79) **4**	80) **2**	81) **1**	82) **4**	83) **1**	84) **2**	85) **3**
86) **1**	87) **4**	88) **3**	89) **2**	90) **3**					

PHYSICS

91) **3**	92) **1**	93) **3**	94) **1**	95) **3**	96) **4**	97) **1**	98) **1**	99) **4**	100) **1**
101) **3**	102) **4**	103) **3**	104) **3**	105) **1**	106) **2**	107) **3**	108) **4**	109) **1**	110) **4**
111) **4**	112) **1**	113) **3**	114) **2**	115) **1**	116) **3**	117) **3**	118) **1**	119) **1**	120) **4**
121) **4**	122) **4**	123) **3**	124) **1**	125) **2**	126) **2**	127) **3**	128) **1**	129) **2**	130) **3**
131) **2**	132) **2**	133) **2**	134) **1**	135) **2**					

CHEMISTRY

136) **1**	137) **4**	138) **1**	139) **4**	140) **4**	141) **4**	142) **2**	143) **4**	144) **1**	145) **4**
146) **3**	147) **2**	148) **3**	149) **2**	150) **3**	151) **4**	152) **4**	153) **2**	154) **4**	155) **3**
156) **3**	157) **1**	158) **3**	159) **1**	160) **2**	161) **3**	162) **4**	163) **4**	164) **1**	165) **2**
166) **4**	167) **2**	168) **2**	169) **3**	170) **1**	171) **3**	172) **4**	173) **4**	174) **2**	175) **4**
176) **2**	177) **1**	178) **1**	179) **1**	180) **2**					

SOLUTIONS

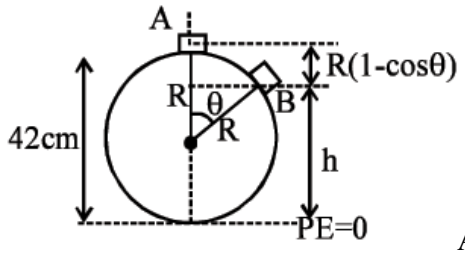
PHYSICS

91. Say $\vec{A} = 3\hat{i}$, $\vec{B} = 4\hat{j}$ and $\vec{C} = 12\hat{k}$ $\qquad \vec{A} - \vec{B} + \vec{C} = 3\hat{i} - 4\hat{j} + 12\hat{k}$

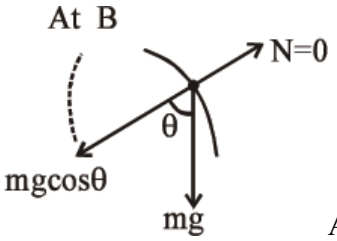
$\Rightarrow \left|\vec{A} - \vec{B} + \vec{C}\right| = \sqrt{3^2 + 4^2 + 12^2} = 13$

92. $a = \dfrac{3m - m}{3m + m} = \dfrac{g}{2}$ Acceleration of centre of mass $= \dfrac{3m \times \frac{g}{2} - \frac{mg}{2}}{3m + m} = \dfrac{g}{4}$

93.



At B, $mg\cos\theta = \dfrac{mv^2}{R}$ $\therefore mv^2 = mgR\cos\theta$



Applying COME from A to B $\qquad \Delta PE = \Delta KE$

$mgR(1 - \cos\theta) = \dfrac{1}{2}mv^2 \quad \Rightarrow mgR(1 - \cos\theta) = \dfrac{1}{2}mgR\cos\theta$

$\Rightarrow 1 - \cos\theta = \dfrac{\cos\theta}{2} \quad \Rightarrow 1 = \dfrac{3}{2}\cos\theta \quad \Rightarrow \cos\theta = \dfrac{2}{3}$

$\therefore$ Height dropped $= R(1 - \cos\theta) = R\left(1 - \dfrac{2}{3}\right) = \dfrac{R}{3}$

Height from bottom $= 2R - \dfrac{R}{3} = \dfrac{5R}{3} = \dfrac{5}{3} \times 21 = 35\,m$

94. From work energy theorem

$W = \Delta KE = K_f - K_i = \dfrac{1}{2}m\left(v_f{}^2 - v_i{}^2\right) = \dfrac{1}{2} \times 2(400 - 100) = 300\,J$

95. $I = MR^2 = 0.32\,kg \times m^2$ $\qquad \tau = I\alpha = 0.96\,N - m$

But $\quad F = \dfrac{\tau}{R} = \dfrac{0.96}{0.2} = 4.8\,N$

96. Strain energy density $(\mu) = \dfrac{1}{2} \times Stress \times Strain = \dfrac{1}{2}Stress \times \dfrac{Stress}{Y} = \dfrac{1}{2}\left(\dfrac{F}{A}\right)^2 \times \dfrac{1}{Y}$

$\Rightarrow \mu \propto \frac{1}{r^4}$

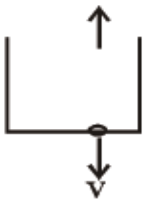
97. Let they will meet in phase after time 't'.

Then $\phi_1 - \phi_2 = \pi$ $\frac{2\pi}{T_1}t - \frac{2\pi}{T_2}t = \pi$ $\Rightarrow t = \frac{21}{8}s$

98. $v = \sqrt{\frac{T}{\mu}} = \frac{\lambda}{T}$

99. $KE \propto T(Kelvine) = (t + 273)$

100. $f' = \left(\frac{V + V_0}{V}\right) f = \left(\frac{V + at}{V}\right) f = f\left(1 + \frac{a}{V}t\right)$



101. $F = \rho a v^2 = 12.5\, gm - \omega t$

102. AB & CD are iso thermal $T_a = T_b$ & $T_c = T_d$

103. $\frac{\Delta Q}{\Delta t} = \frac{KA}{L}(T_H - T_L) \Rightarrow \frac{\Delta Q}{\Delta t} = \frac{92 \times 10^{-3}}{1}[100 - 0]$

$\therefore \frac{\Delta Q}{60} = \frac{92}{10} \Rightarrow \Delta Q = 92 \times 6 = 552\ cal$

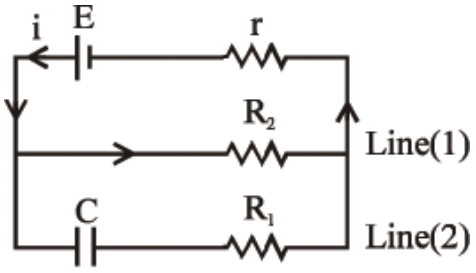
$\Delta Q = mL \Rightarrow 552 = m \times 8 \times 10^4 \Rightarrow m = \frac{552}{8 \times 10^4} = 6.9 \times 10^{-3}\ kg$

104. $W = p\,(v_2 - v_1) = nR\,(T_2 - T_1) = R$ Joule

105. $2P + \left(\frac{v}{4l}\right) \le n$

106. $\frac{-GMm}{L} - \frac{GMm}{L} + \frac{1}{2}mv^2 = 0$

107. In steady state current drawn from the battery $i = \frac{E}{(R_2 + r)}$



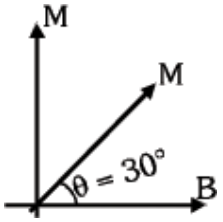
In steady state capacitor is fully charged hence. No current will flow through line (2)

Hence potential difference across line (1) is $V = \frac{E}{(R_2 + r)} \times R_2$ the same potential

difference appears across the capacitor, so charge on capacitor $Q = C \times \frac{ER_2}{(R_2 + r)}$

108. $S = \frac{G_A}{\frac{i}{i_g} - 1} = \frac{38}{\frac{10}{0.5} - 1} = \frac{38}{39} = 2\Omega$

109. $\tau = MB\sin 90^0 = MB$



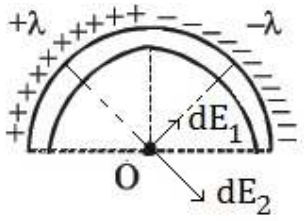
$\frac{MB}{2} = MB\sin\theta \quad \Rightarrow \frac{1}{2} = \sin\theta \quad \Rightarrow \theta = 30^0$

Angle of rotation $90^0 - 30^0 = 60^0$

110. In stable equilibrium, $\overline{M}$ and $\overline{B}$ must be in the same direction.

111. $\frac{GMm}{r^2} = mr\omega^2 \quad \Rightarrow \omega = \sqrt{\frac{GM}{r^3}} \quad \Rightarrow T = 2\pi\sqrt{\frac{r^3}{GM}}$

112. $dE = 2dE_1\sin\theta = 2 \times K.\frac{dq}{R^2}\sin\theta = 2K \times \frac{\lambda R\, d\theta \sin\theta}{R^2}$



$E = \int_0^{\pi/2} \frac{2K\lambda}{R}\sin\theta d\theta = \frac{2K\lambda}{R}$

113. $R = \frac{V^2}{P}$

$R_1 = \frac{(200)^2}{50} = 800\,\Omega; \quad R_2 = \frac{(200)^2}{100} = 400\,\Omega; \quad R_3 = \frac{(100)^2}{100} = 100\,\Omega; \quad R_4 = \frac{(100)^2}{200} = 50\,\Omega$

Current through $R_1 \& R_2 = \frac{100}{200} = \frac{1}{12}A$

Current through $R_3 \& R_4 = \frac{100}{50} = \frac{2}{3}A$

Power dissipated $= P_{max} = \left(i^2 R\right)_{max}$

114. $e = \left(\dfrac{E_p}{r + R_s + R}\right)\dfrac{R}{L} \times l = \dfrac{5}{5}\dfrac{2.4}{100} \times 40 = 0.96\,V$

115. $E_{ind} = \dfrac{d\phi}{dt} = \dfrac{d}{dt}(BA) = A\dfrac{dB}{dt} = \dfrac{\pi r^2}{2} \times \dfrac{dB}{dt} = \dfrac{\pi(0.1)^2}{2} \times 0.01 = \dfrac{\pi}{2} \times 10^{-4}\,V$

$\therefore\ i = \dfrac{E_{ind}}{R} = \dfrac{\pi / 2 \times 10^{-4}}{4} = 3.9 \times 10^{-5}\,A$

116. $X_L = \omega L = 2000 \times 5 \times 10^{-3} = 10\Omega \qquad X_C = \dfrac{1}{\omega C} = \dfrac{1}{2000 \times 50 \times 10^{-6}} = 10\Omega$

$X_L = X_C \quad \Rightarrow Z = R = 4 + 6 = 10\Omega$

(A) reading $= \dfrac{V_{rms}}{Z} = \dfrac{20\sqrt{2}}{10} = 1.4\,A$

(V) reading $= i_{rms} \times 4\Omega \ \ \therefore X_C \text{ and } X_L \text{ cancel out} = 1.4 \times 4 = 5.6\,V$

117. $\lambda = \dfrac{h}{mv}$ since v is increasing in case(i), but it is not changing in case (ii). Hence, in the first case de-Broglie wavelength will change, but it second case, it remain the same.

118. $\mu = \dfrac{\sin\left(\dfrac{A + \delta m}{2}\right)}{\sin\left(\dfrac{A}{2}\right)} = \dfrac{\sin\left(\dfrac{60^0 + 30^0}{2}\right)}{\sin\left(\dfrac{60^0}{2}\right)} = \sqrt{2}$

$\mu = \dfrac{C}{v} \ \Rightarrow v = \dfrac{C}{\mu} = \dfrac{3 \times 10^8}{\sqrt{2}} = 2.12 \times 10^8\ m / sec$

119. Maximum number of nuclei will be present when rate of decay = rate of formation

$\Rightarrow \lambda N = \alpha \ \Rightarrow N = \dfrac{\alpha}{\lambda}$

120. $P = \dfrac{F}{A} = \dfrac{2I}{C} \ \Rightarrow F = \dfrac{2I}{C} \times A = \dfrac{2 \times 1400}{3 \times 10^8} \times 4.5 = 42 \times 10^{-6}\,N$

121. Angle subtended by the 100 m tall tower at 3 km away

$\propto = \dfrac{100}{3 \times 10^3} = \dfrac{1}{30} rad$

h is the height of image of tower formed by objective lens

$$\propto = \frac{h}{f_0} = \frac{h}{150} = \frac{1}{30} \quad \Rightarrow h = 5\,cm$$

magnification produced by the eye piece $m_e = 1 + \frac{D}{f_e} = 1 + \frac{25}{5} = 6$

height of final image = h × m_e = 5 × 6 = 30 cm

122. Conceptual

123. For any rotating conducting rod in a field B, $\Delta V = \frac{1}{2} B\omega l^2$

Here $V_0 - V_A = \frac{1}{2} B\omega (l)^2$, $V_0 - V_C = \frac{1}{2} B\omega (3l)^2 \Rightarrow V_A - V_C = 4B\omega l^2$

124. Limit of resolution of telescope $= \frac{1.22\lambda}{a}$

$$10^{-3} \times \frac{\pi}{180} = \frac{1.22 \times 500 \times 10^{-9}}{a} \quad \Rightarrow a = 3.5\,cm$$

125. Transition from 4E to E $\quad (4E - E) = \frac{hc}{\lambda_1} \Rightarrow \lambda_1 = \frac{hc}{3E}$ .....(i)

Transition from $\frac{7}{3}E$ to E $\quad \left(\frac{7}{3}E - E\right) = \frac{hc}{\lambda_2} \Rightarrow \lambda_2 = \frac{3hc}{4E}$ .....(ii)

From equation (i) and (ii) $\quad \frac{\lambda_1}{\lambda_2} = \frac{4}{9}$

126. Recoil momentum = momentum of photon = $\frac{h}{\lambda}$

$$= hR\left(\frac{1}{n_1^2} - \frac{1}{n_2^2}\right) = \frac{hR \times 15}{16} = 6.8 \times 10^{-27}\ N \times sec$$

127. $$\frac{I_{max} - I_{min}}{I_{max} + I_{min}} = \frac{\left(\sqrt{I_1} + \sqrt{I_2}\right)^2 - \left(\sqrt{I_1} - \sqrt{I_2}\right)^2}{\left(\sqrt{I_1} + \sqrt{I_2}\right)^2 + \left(\sqrt{I_1} + \sqrt{I_2}\right)^2} = \frac{4\sqrt{I_1 I_2}}{2(I_1 + I_2)} = \frac{2\sqrt{\frac{I_1}{I_2}}}{1 + \frac{I_1}{I_2}} = \frac{2x}{1 + x^2}$$

128. $f \propto \frac{1}{(\mu - 1)} \quad f_1 < f_2 \Rightarrow \mu_1 > \mu_2$

129. Conceptual

130. Conceptual

131. One verner division = 0.8/10=0.08 cm; L.C = 1 MSD – 1 VSD = 0.1– 0.08 = 0.02 cm

132. $\frac{dv}{dt} = -2.5\sqrt{v}$ or $\frac{1}{\sqrt{v}}dv = -2.5\sqrt{v}$

On integrating, within limit $\left(u_1 = 6.25\,ms^{-1}\ to\ u_2 = 0\right)$

$$\therefore \int_{v_1=6.25\,ms^{-2}}^{v_2-0} \upsilon^{-1/2}d\upsilon = -2.5\int_0^t dt$$

$$2\times\left[\upsilon^{1/2}\right]_{6.25}^{0} = -(2.5)t \quad \text{or} \quad t = \frac{-2\times(6.25)^{1/2}}{-2.5} = 2s$$

133. Suppose the velocity of the bullet of mass m is u and it strikes the block of mass M. After collision, the linear velocity of the block is V and that of the bullet is *v*'.

Applying law of conservation of linear momentum, we get.

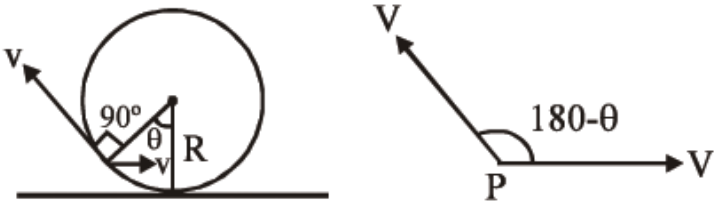
mv = MV + mv' or 500 × 0.01 = 2V = 0.01 v' or 5 = 2V + 0.01 v' .....(i)

By conservation of energy, we get. $\frac{1}{2}MV^2 = Mgh$ or

$$V = \sqrt{2gh} = \sqrt{2\times 9.8\times 0.1} = 1.4\,m/s$$

Putting value of V in eqn. (i), we get 5 = 2 × 1.4 + 0.01 v' or v' = 220 m/s.

134.



$$V_P = 2V\cos\left[\frac{180-\theta}{2}\right] = 2V\sin\frac{\theta}{2}$$

135. $a = \frac{(m_1+m_2)g\sin\theta - \mu_1 m_1 g\cos\theta - \mu_2 m_2\cos\theta}{m_1+m_2}$ On solving a = 2.33 m/sec^2

CHEMISTRY

136. $\frac{E_2}{E_4} = \frac{(n_4)^2}{(n_2)^2}$

138. $\frac{PV}{RT} = Z \quad \therefore \quad Z = 1 - \frac{a}{VRT}$

141. For most soluble slat, solubility should be maximum.

142. Exothermic reactions are favoured at low temperature. As reaction is accompanied by decrease in the number of moles, it is favoured by high pressure.

143. We know that $\Delta G = \Delta H - T\Delta S$ $\Delta H = T\Delta S \quad [\because \Delta G = 0]$

$$\Delta S = \frac{\Delta H}{T} = \frac{30 \times 10^3}{300} = 100\, J\, mol^{-1}\, K^{-1}$$

144. It is called hydride gap.

145. $P_M = P_1^o . X_1 + P_2^o . X_2 = 80 \times \frac{3}{3+2} + 60 \times \frac{2}{3+2} = 72\, torr$

146. $E_{OP} = E_{OP}^0 - \frac{0.059}{1} log \frac{\left[H^+\right]}{P_{H_2}} \quad \because \left[H^+\right] = 10^{-10};\ P_{H_2} = 1 atm \qquad E_{OP} = 0.59 V$

147. $E_{cell}^o = \frac{0.059}{n} log K \quad \Rightarrow log K = \frac{1.10 \times 2}{0.059} = 37.2881 \ or\ K = 10^{-37}$

148. Reaction is zero order as the unit of rate constant.

$\therefore conc.\ of\ B = K.t = 0.6 \times 10^{-3} \times 20 \times 60 = 0.72\, M$

149. In AgI crystal, number of Ag^+ ions is equal to I^- ions. However, the number of tetrahedral voids are twice the number of atoms forming the cubic lattice.

$\therefore$ Number of tetrahedral voids occupied by Ag^+ ion = 50%.

150. In the diamond cubic unit cell, there are eight corner atoms, six face centered atoms and four more atoms inside the structure.

$\therefore$ Number of atoms present in a diamond cubic unit cell = 1 + 3 + 4 + 8 atoms.

151. $log \frac{x}{m} = log k + \frac{1}{n} log P$; this is Freundlich isotherm. Thus slope $= \frac{1}{n}$

153. Polytetrafluoroethene (Teflon) is a chain growth polymer formed by polymerisation of Tetrafluoroethene in presence of persulphate catalyst.

156. Given $P_A = 750\, mm\, Hg$ $\because$ 373 K is boiling point of water.

Thus, $P_A^o = 760\, mm\, Hg$ $m = \left(\frac{P^o - P}{P}\right) \times \frac{1000}{M_{solvent}} \quad \Rightarrow \frac{10}{750} \times \frac{1000}{18} \quad \Rightarrow 0.74$

157. $E_{cell}^o = +ve,$ then $A \rightarrow A^+ + e$ $B^+ + e \rightarrow B$