MERITSTORE

NEET FULL PORTION **TEST ID: Day 27 – Test 4**

Time: 03 hrs **PCB** **Marks : 720**

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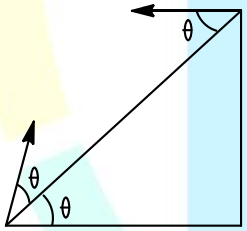
1. Linear momentum and angular momentum have the same dimensions in
   a) Mass and length
   b) Length and time
   c) Mass and time
   d) Mass, length and time
2. The unit of self-inductance is
   a) Weber ampere b) Weber^{-1} ampere
   c) Ohm second d) Farad
3. A car moving with speed of 40 km/h can be stopped by applying brakes after atleast 2 m. If the same car is moving with a speed of 80 km/h, what is the minimum stopping distance
   a) 8 m b) 2 m c) 4 m d) 6 m
4. From an inclined plane two particles are projected with same speed at same angle θ, one up and other down the plane as shown in figure, which of the following statements is/are correct?



   a) The time of flight of each particle is the same
   b) The particles will collide the plane with same speed
   c) Both the particles strike the plane perpendicularly
   d) The particles will collide in mid air if projected simultaneously and time of flight of each particle is less than of collision
5. A body crosses the topmost point of a vertical circle with critical speed. Its centripetal acceleration, when the string is horizontal will be
   a) 6 g b) 3 g c) 2 g d) g
6. In the first second of its flight, rocket ejects 1/60 of its mass with a velocity of 2400 ms^{-1}. The acceleration of the rocket is
   a) 19.6 ms^{-2} b) 30.2 ms^{-2}
   c) 40 ms^{-2} d) 49.8 ms^{-2}
7. A body sitting on the topmost berth in the compartment of a train which is just going to stop on a railway station, drops an apple aiming at the open hand of his brother sitting vertically below his hands at a distance of about 2 m. The apple will fall
   a) Precisely on the hand of his brother
   b) Slightly away from the hand of his brother in the direction of motion of the train
   c) Slightly away from the hand of his brother in the direction opposite to the direction of motion of the train
   d) None of the above
8. Four smooth steel balls of equal mass at rest are free to move along a straight line without friction. The first ball is given a velocity of 0.4 m/s. It collides head on with the second elastically, the second one similarly with the third and so on. The velocity of the last ball is
   a) 0.4 m/s b) 0.2 m/s c) 0.1m/s d) 0.05 m/s
9. A gas molecule of mass m strikes the wall of the container with a speed v at an angle θ with the normal to the wall at the point of collision. The impulse of the gas molecule has a magnitude
   a) $3mv$ b) $2mv\cos\theta$
   c) mv d) Zero
10. A solid homogeneous sphere is moving on a rough horizontal surface partly rolling and partly sliding. During this kind of motion of the sphere
    a) Total kinetic energy is conserved
    b) The angular momentum of the sphere about the point of contact with the plane is conserved
    c) Only the rotational kinetic energy about the centre of mass is conserved
    d) Angular momentum about the centre of mass is conserved

11. Two satellites of mass m and $9m$ are orbiting a planet in orbit of radius R. Their periods of revolution will be in the ratio of
a) 1:3 b) 1:1 c) 3:1 d) 9:1

12. The force required to stretch a steel wire of 1 cm^2 cross-section to 1.1 times its length would be ($Y = 2 \times 10^{11} Nm^{-2}$)
a) 2×10^6 N b) 2×10^3 N
c) 2×10^5 N d) 2×10^{-6} N

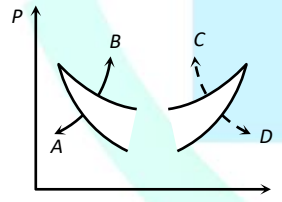
13. For a liquid which is rising in a capillary, the angle of contact is
a) Obtuse b) 180° c) Acute d) 90°

14. The pressure on a swimmer 20 m below the surface of water at sea level is
a) 1.0 atm b) 2.0 atm c) 2.5 atm d) 3.0 atm

15. On a new scale of temperature (which is linear) and called the W scale, the freezing and boiling points of water are $39°W$ and $239°W$ respectively. What will be the temperature on the new scale, corresponding to a temperature of 39°C on the Celsius scale
a) $200°W$ b) $139°W$ c) $78°W$ d) $117°W$

16. Ten moles of an ideal gas at constant temperature 600 K is compressed from 100 L to 10 L. The work done in the process is
a) 4.11×10^4 J b) -4.11×10^4J
c) 11.4×10^4J d) -11.4×10^4J

17. Four curves A, B, C and D are drawn in the adjoining figure for a given amount of gas. The curves which represent adiabatic and isothermal changes are



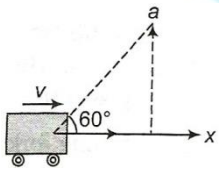
a) C and D respectively b) D and C respectively
c) A and B respectively d) B and A respectively

18. Kinetic theory of gases provide a base for
a) Charle's law
b) Boyle's law
c) Charle's law and Boyle's law
d) None of these

19. The amplitude of a damped oscillator becomes half in one minute. The amplitude after 3 $minute$ will be $\frac{1}{X}$ times the original, where X is
a) 2×3 b) 2^3 c) 3^2 d) 3×2^2

20. The time period of a mass suspended from a spring is 5 s. The spring is cut into four equal parts and the same mass is now suspended from one of its parts. The period is now
a) 5 s
b) 2.5 s
c) 1.25 s
d) $\frac{1}{16}s$

21. A car is moving along x-axis with a velocity v=20 m/s. it sounds a whistle of frequency 660 Hz. If the speed of sound is 340 m/s, the apparent frequency heard by the observer O (shown in the figure) is



a) 680 Hz b) 640 Hz c) 700 Hz d) 720 Hz

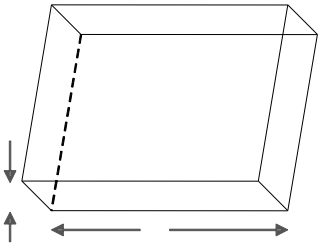
22. Identify the wrong statement in the following. Coulomb's law correctly describes the electric force that
a) Binds the electrons of an atom to its nucleus
b) Binds the protons and neutrons in the nucleus of an atom
c) Binds atoms together to form molecules
d) Binds atoms and molecules together to form solids

23. A parallel plate condenser has a capacitance $50\mu F$ in air and $110\mu F$ when immersed in an oil. The dielectric constant 'k' of the oil is
a) 0.45 b) 0.55 c) 1.10 d) 2.20

24. A sphere of radius 1 m encloses a charge of 5 μC. Another charge of -5 μC is placed inside the sphere. The net electric flux would be
a) Double b) Four times
c) Zero d) None of these

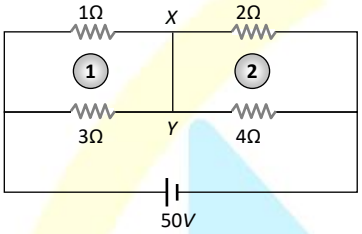
25. The electric resistance of a certain wire of iron is R. If its length and radius are both doubled, then
a) The resistance will be doubled and the specific resistance will be halved
b) The resistance will be halved and the specific resistance will remain unchanged
c) The resistance will be halved and the specific resistance will be doubled
d) The resistance and the specific resistance, will both remain unchanged

26. Consider a thin square sheet of side L and thickness t, made of a material of resistivity ρ. The resistance between two opposite faces, shown by the shaded areas in the figure is



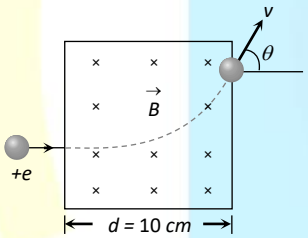
a) Directly proportional to L
b) Directly proportional to t
c) Independent of L
d) Independent of t

27. Current through wire XY of circuit shown is



a) 1 A b) 4 A c) 2 A d) 3 A

28. A proton accelerated by a potential difference 500 KV moves though a transverse magnetic field of 0.51 T as shown in figure. The angle θ through which the proton deviates from the initial direction of its motion is



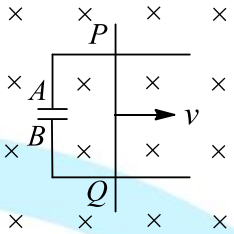
a) 15° b) 30° c) 45° d) 60°

29. A magnetic needle lying parallel to a magnetic field requires W units of work to turn it through 60°. The torque required to keep the needle in this position will be
a) $2W$ b) W c) $\frac{W}{\sqrt{2}}$ d) $\sqrt{3}W$

30. An iron rod of volume $10^{-4}m^3$ and relative permeability 1000 is placed inside a long solenoid wound with 5 $turns/cm$. If a current of 0.5 A is passed through the solenoid, then the magnetic moment of the rod is
a) 10 Am^2 b) 15 Am^2 c) 20 Am^2 d) 25 Am^2

31. The primary winding of transformer has 500 turns whereas its secondary has 5000 turns. The primary is connected to an ac supply of 20 V, 50 Hz. The secondary will have an output of
a) 200 V, 50 Hz b) 2 V, 50 Hz
c) 200 V, 500 Hz d) 2 V, 5 Hz

32. A conducting rod $PQ of length L = 1.0$ m is moving with a uniform speed $v = 2.0$ ms^{-1} in a uniform magnetic field $= 4.0$ T directed into the paper. A capacitor of capacity $C = 10\ \mu F$ is connected as shown in figure. Then,



a) $q_A = -80\mu C and q_B = +80\mu C$
b) $q_A = +80\mu C and q_B = -80\mu C$
c) $q_A = 0 = q_B$
d) Charge stored in the capacitor increases expotentially with time

33. The natural frequency (ω_0) of oscillations in L-C circuit is given by
a) $\frac{1}{2\pi}\frac{1}{\sqrt{LC}}$ b) $\frac{1}{2\pi}\sqrt{LC}$ c) $\frac{1}{\sqrt{LC}}$ d) $\sqrt{LC}$

34. X-rays are produced by jumping of
a) Electrons from lower to higher energy orbit of atom
b) Electrons from higher to lower energy orbit of atom
c) Protons from lower to higher energy orbit of nucleus
d) Proton from higher to lower energy orbit of nucleus

35. Refractive index of the material of a prism is 1.5. If $\delta_m = A$, what will be a value of angle of the given prism?
(where δ_m = minimum deviation; A = angle of prism)
a) 82.8° b) 41.4° c) 48.6° d) 90°

36. Microscope is an optical instrument which
a) Enlarges the object
b) Increases the visual angle formed by the object at the eye
c) Decreases the visual angle formed by the object at the eye
d) Brings the object nearer

37. Which of following can not be polarized
a) Radio waves b) Ultraviolet rays
c) Infrared rays d) Ultrasonic waves

38. In Milikan's experiment, an oil drop having charge q gets stationary on applying a potential difference V in between two plates separated by a distance $'d'$. The weight of the drop is

a) qVd b) $q\frac{d}{V}$ c) $\frac{q}{Vd}$ d) $q\frac{V}{d}$

39. An oil drop carrying a charge q has a mass m kg. It is falling freely in air with terminal speed v. The electric field required to make the drop move upwards with the same speed is
a) $\frac{mg}{q}$ b) $\frac{2mg}{q}$ c) $\frac{mgv}{q^2}$ d) $\frac{2mgv}{q}$

40. Of the following transition in the hydrogen atom, the one which gives an emission line of the highest frequency is
a) $n=1$ to $n=2$ b) $n=2$ to $n=1$
c) $n=3$ to $n=10$ d) $n=10$ to $n=3$

41. The ratio of molecular mass of two radioactive substances is $3/2$ and the ratio of their decay constants is $4/3$. Then, the ratio of their initial activity per mole will be
a) 2 b) $4/3$ c) $\frac{8}{9}$ d) $9/8$

42. A radioactive substance has a half-life of four months. Three-fourth of the substance will decay in
a) 3 months b) 4 months
c) 8 months d) 12 months

43. If I_1, I_2, I_3 are the lengths of the emitter, base and collector of a transistor then
a) $I_1 = I_2 = I_3$ b) $I_3 < I_2 > I_1$
c) $I_3 < I_1 < I_2$ d) $I_3 > I_1 > I_2$

44. For maximum power transfer to the load, impedance of the detecting device must be equal to characteristic impedance of the transmission line
a) True
b) False
c) Sometimes true and sometimes false
d) Cannot say

45. A laser is a coherent source because it contains
a) Many wavelengths
b) Uncoordinated wave of a particular wavelength
c) Coordinated wave of many wavelengths
d) Coordinated waves of a particular wavelength

46. The empirical formula of a compound is CH_2. One mole of this compound has a mass of 56 g. its molecular formula is
a) C_3H_6 b) C_4H_8 c) CH_2 d) C_2H_2

47. The mass of nitrogen per gram hydrogen in the compound hydrazine is exactly one and half times the mass of nitrogen in the compound ammonia. The fact illustrates the
a) Law of conservation of mass
b) Multiple valency of nitrogen
c) Law of multiple proportions
d) Law of definite proportions

48. Uncertainty in the position of an electron (mass $= 9.1 \times 10^{-31}$kg) moving with a velocity 300ms^{-1}, accurate upon 0.001% will be
($h = 6.63 \times 10^{-34}$ Js)
a) 19.2×10^{-2}m b) 5.76×10^{-2}m
c) 1.92×10^{-2}m d) 3.84×10^{-2}m

49. In the ground state of Cu^+, the number of shell occupied, sub-shells occupied, fillied orbitals and unpaired electrons respectively are
a) 4,8,15,0 b) 3,6,15,1
c) 3,6,14,0 d) 4,7,14,2

50. Increase in atomic size down the group is due to
a) Increase in number of electrons
b) Increase in number of protons and neutrons
c) Increase in number of protons
d) Increase in number of protons, neutrons and electrons

51. In O_2^-, O_2 and O_2^{2-} molecular species, the total number of antibonding electrons respectively are
a) 7 , 6, 8 b) 1, 0, 2 c) 6, 6, 6 d) 8, 6, 8

52. The species having pyramidal shape is
a) SO_3
b) BrF_3
c) SiO_3^{2-}
d) OSF_2

53. Based on kinetic theory of gases following laws can be proved
a) Boyle's law b) Charles' law
c) Avogadro's law d) All of these

54. Among the following which is true for mole of liquid?
a) $C_p \approx C_V$ b) $C_p - C_V = R$
c) $C_p - C_V > R$ d) $C_p < C_V$

55. Which one of the following is not a state function?
a) Enthalpy b) Entropy
c) Work d) Free energy

56. In qualitative analysis, in III group NH_4Cl is added before NH_4OH because
a) To increase the concentration of NH_4^+ ions
b) To increase the concentration of Cl^- ions

c) To reduce the concentration of OH^- ions
d) To increase the concentration of OH^- ions

57. The reaction,
$Ag^{+2}(aq) + Ag(s) \rightleftharpoons 2Ag^{+}(aq)$
is an example of
a) Reduction b) Oxidation
c) Disproportionation d) None of these

58. The oxidation states of iodine in HIO_4, H_3IO_5 and H_5IO_6 are respectively
a) +1,+3,+7 b) +7,+7,+3
c) +7,+7,+7 d) +7,+5,+3

59. $TiH_{1.73}$ is an example of which type of the hydride?
a) Metallic b) Ionic
c) Covalent d) Polymeric

60. Milk of magnesia is used as
a) Antichlor b) Antacid
c) Antiseptic d) Food preservative

61. Which of the following oxides is strongly basic?
a) Tl_2O b) B_2O_3 c) Al_2O_3 d) Ga_2O_3

62. Butter of tin is
a) $SnCl_2 \cdot 5H_2O$ b) $SnCl_2 \cdot 2H_2O$
c) $SnCl_4 \cdot 4H_2O$ d) $SnCl_4 \cdot 5H_2O$

63. Which types of isomerism is shown by 2, 3-dichlorobutane?
a) Structural b) Geometric
c) Optical d) Diastereo

64. By which one of the following compounds both CH_4 and $CH_3 - CH_3$ can be prepared in one step?
a) CH_3I b) CH_3OH
c) CH_3CH_2I d) C_2H_5OH

65. TEL is a compound used as
a) Antibiotic b) Antiseptic
c) Antiknocking d) Antioxidant

66. DDT is
a) Biodegradable pollutant
b) Non biodegradable pollutant
c) Not a pollutant
d) An antibiotic

67. Which one of the following is a covalent crystal?
a) Rock salt b) Ice
c) Quartz d) Dry ice

68. The first order reflection ($n = 1$) from a crystal of the X-ray from a copper anode tube ($\lambda = 1.54$ Å)occurs at an angle of 45°. What is the distance between the set of plane causing the diffraction?
a) 0.1089 nm b) 0.1089 m
c) 0.905 Å d) 1.089×10^{-9}m

69. Osmotic pressure of a solution at a given temperature
a) Increases with concentration
b) Decreases with concentration
c) Remains same
d) Initially increases and then decreases

70. The density (in g mL^{-1}) of a 3.60 M sulphuric acid solution that is 29% H_2SO_4 (molar mass = 98 g mol^{-1}) by mass will be
a) 1.64 b) 1.88 c) 1.22 d) 1.45

71. In acidic medium MnO_4^- is converted to Mn^{2+}. The quantity of electricity in faraday required to reduce 0.5 mole of MnO_4^- to Mn^{2+} would be
a) 2.5 b) 5 c) 1 d) 0.5

72. The unit and value of rate constant and that of rate of reaction are same for
a) Zero order b) First order
c) Second order d) Third order

73. The velocity constant of a reaction at 290 K was found to be $3.2 \times 10^{-3} s^{-1}$. When the temperature is raised to 310 K, it will be about
a) 6.4×10^{-3} b) 3.2×10^{-4}
c) 9.6×10^{-3} d) 1.28×10^{-2}

74. Multimolecular colloids are present in
a) Soap solution b) Sol of proteins
c) Sol of gold d) All of these

75. Corundum is
a) Cu_2Cl_2 b) $CaCl_2$
c) SrO_2 d) Al_2O_3

76. Gallium arsenide is purified by
a) van-Arkel method
b) Zone-refining method
c) Electrolytic method
d) Liquation

77. Which one is the anhydride of $HClO_4$?
a) ClO_2 b) Cl_2O_7 c) Cl_2O d) Cl_2O_6

78. Of the ions Zn^{2+}, Ni^{2+} and Cr^{3+}, (atomic number of Zn=30, Ni=28, Cr=24)
a) All three are coloured
b) All three are colourless
c) Only Zn^{2+} is colourless and Ni^{2+} and Cr^{3+} are coloured
d) Only Ni^{2+} is coloured and Zn^{2+} and Cr^{3+} are colourless

79. Knowing that the chemistry of lanthanoids

(Ln) is dominated by its +3 oxidation state, which of the following statements is incorrect?

a) Because of the large size of the Ln (III) ions the bonding in its compounds is predominantly ionic in character.

b) The ionic sizes of Ln (III) decrease in general with increasing atomic number.

c) Ln (III) compounds are generally colourless.

d) Ln(III) hydroxide are mainly basic in character.

80. What is the EAN of nickel in $[Ni(CN)_4]^{2-}$?

a) 32 b) 35 c) 34 d) 36

81. $CH_3Br + O\bar{H} \rightarrow CH_3OH + Br^-$ reaction proceeds by S_N2 mechanism. Its rate is dependent on the concentration of

a) $CH_3Br, O\bar{H}$ b) CH_3Br only

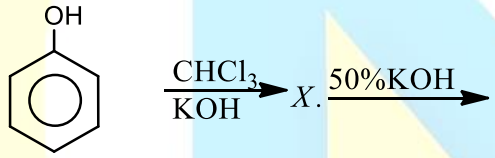
c) $O\bar{H}$ only d) CH_3Br, CH_3OH

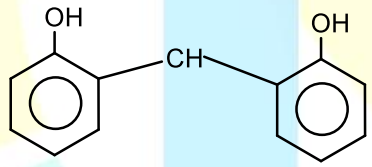
82. To distinguish between salicylic acid and phenol one can use

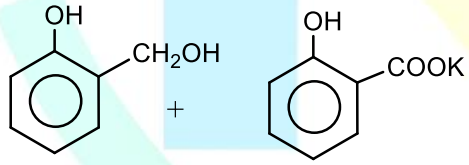
a) $NaHCO_3$ solution b) 5% NaOH solution

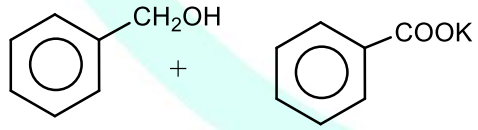
c) Neutral $FeCl_3$ d) Bromine water

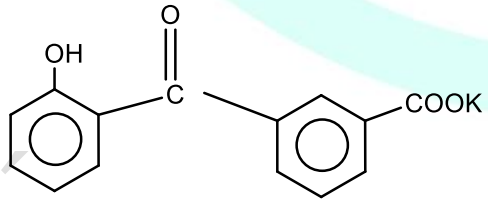
83. The final product of the following reaction is/are



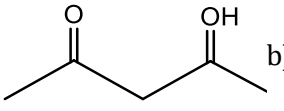
a) 

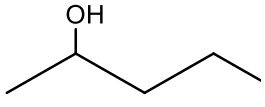
b) 

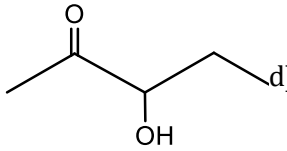
c) 

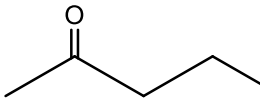
d) 

84. Which of the following will be most readily dehydrated under acidic conditions?

a) 

b) 

c) 

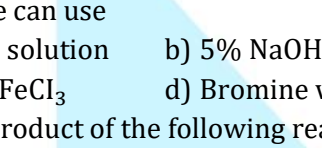
d) 

85. An aliphatic nitro compound turns red with the addition of a concentrated NaOH solution, followed by the addition of an excess of an $NaNO_2$ solution and then dilute H_2SO_4. The colour disappears with the addition of the excess of an acid but reappears if the solution is made alkaline. The aliphatic nitro compound is

a) $CH_3CH_2NO_2$ b) $(CH_3)_2CHNO_2$

c) $(CH_3)_3CNO_2$ d) All of these

86. RNH_2 reacts with $C_6H_5SO_2Cl$ in aqueous KOH to give a clear solution. On acidification a precipitate is obtained which is due to the formation of

a) 

b) $R - N^-SO_2C_6H_5K^+$

c) $C_6H_5SO_2NH_2$

d) $R - NH - SO_2 - C_6H_5$

87. Which functional group participates in disulphide bond formation in proteins?

a) Thiolacetone b) Thiol

c) Thioether d) Thioester

88. Nylon 6,6 is not a

a) Condensation polymer

b) Polyamide

c) Homopolymer

d) Copolymer

89. Which of the following alkenes is most reactive towards cationic polymerization?

a) $CH_2 = CHCH_3$ b) $H_2C = CHCl$

c) $H_2C = CHC_6H_5$ d) $H_2C = CHCO_2CH_3$

90. Anti-allergy drugs are

a) Antimicrobials b) Antihistamines

c) Antivirals d) Antifungals

91. The genus *Felis* includes

a) Tiger b) Fish c) Cat d) Frog

92. Species are consider as

a) Artificial concept of human mind which cannot be defined in absolute terms

b) Real units of classification devised by taxonomists

c) Real basic units of classification

d) The lowest units of classification

93. Arrange the following in ascending similar

characteristic

I. Family II. Genus III. Class IV. Species

a) Class < Family < Genus < Species
b) Family < Class < Genus < Species
c) Species < Genus < Family < Class
d) Class < Genus < Species < Family

94. Plant like nutrition is present in
a) *Amoeba* b) *Paramecium*
c) *Euglena* d) *Plasmodium*

95. Dikaryophase of fungus occurs in
a) Ascomycetes and Basidiomycetes
b) Phycomycetes and Acomycetes
c) Phycomycetes and Basidiomycetes
d) Basidiomycetes and Deuteromycete

96. Which of the following is the amphibians of the plant kingdom?
a) Angiosperms b) Pteridophytes
c) Gymnosperm d) Byrophytes

97. In pteridophytes, gametophytes require …A… to grow
a) Cool, damp and shady places
b) Dry places
c) Terrestrial area d) Water

98. Frog's tadpole is
a) Uricotelic b) Ureotelic
c) Ammonotelic d) Aminotelic

99. In *Hydra*, reproduction occurs in favourable conditions by
a) Budding b) Gametes
c) Gemmules d) Binary fission

100. Choose the respiratory organ that are not present in phylum-Arthropoda
a) Tracheal system b) Gills
c) Water vascular system d) Book lungs

101. Which one of the following is a pseudocarp?
a) Apple b) Guava
c) Tomato d) Banana

102. In Duranta, the nature of vasculated defensive structures represent the modification of
a) Axillary bud as in *Bougainvillea*
b) Terminal bud as in *Carissa*
c) Stipules as in *Acacia*
d) Apical bud as in *Artabotrys*

103. The bladder of *Utricularia* and pitchers of *Nepenthes* are modification of
a) Stems b) Leaves c) Roots d) Flowers

104. Pineapple (ananas) fruit develops from a
a) Unilocular polycarpellary flower
b) Multipistillate syncarpous flower
c) Cluster of compactly borne flowers on a common axis
d) Multilocular monocarpellary flower

105. In roots the
a) Protoxylem lies towards the periphery
b) Metaxylem lies towards the pith (centre)
c) Both (a) and (b)
d) Endarch condition is found

106. Bamboo and grasses elongate by the activity of
a) Secondary meristem b) Lateral meristem
c) Apical meristem d) Intercalary meristem

107. In which of the following segments of earthworm, septal nephridia is present?
a) 15-last
b) 8-15
c) 18-last
d) 15-17

108. Which of the following is the characteristic feature of the earthworm?
a) Aquatic
b) Cave dwellers
c) Burrowing
d) Nest making

109. Okazaki fragments are produced during the synthesis of
a) *m*RNA b) Protein c) *t*RNA d) DNA

110. Thread like protoplasmic projections on the free surface of absorptive cells (such as intestinal cells) are called
a) Plasmodesmata b) Microfilaments
c) Cilia d) None of these

111. Why living state cannot afford to reach equilibrium?
a) Due to insufficiency of biomolecules
b) To remain active all the time
c) To save the energy
d) None of the above

112. Lipid are found in acid insoluble fraction during the analysis of chemical composition of tissues. Given the reason
a) It has very high molecular weight
b) It is polymer
c) It has low molecular weight
d) On grinding, the biomembranes are broken into pieces and form insoluble vesicles

113. The non-sister chromatids twist around

and exchange segments with each other during

a) Diplotene b) Diakinesis
c) Leptotene d) Pachytene

114. What is the approximate duration of cell cycle for a mammalian cell?

a) 90 min b) 24 hrs
c) 24 days d) 12 hrs

115. Some elements like calcium are not remobilised because they are

a) Structural component
b) Heavy metals
c) Less charged
d) Macromolecules

116. In plants; which of the following are/is translocated through phloem?

a) Hormones b) Amino acids
c) Sugars d) All of these

117. During water absorption from the soil, the water potential of the root cell is…..than the soil

a) Higher b) Lower
c) Slightly higher d) Slightly lower

118. Nitrifying bacteria

a) Convert free nitrogen to nitrogen compounds
b) Convert proteins into ammonia
c) Reduce nitrates to free nitrogen
d) Oxidize ammonia to nitrates

119. The function of leghaemoglobin during biological nitrogen fixation in root nodules of legumes is to

a) Convert atmospheric nitrogen to ammonia
b) Convert ammonia to nitrite
c) Transport oxygen for activity of nitrogenase
d) Protect nitrogenase from oxygen

120. What is true for photosynthesis?

a) Carbon dioxide is oxidised and water is reduced
b) Carbon dioxide is reduced and water is oxidised
c) Both carbon dioxide and water are reduced
d) Both carbon dioxide and water are oxidised

121. Chloroplasts without grana are known to occur in

a) Bundle-sheath cells of C_3-plants
b) Mesophyll cells of C_4-plants
c) Bundle-sheath cells of C_4-plants
d) Mesophyll cells of all plants

122. Alternate name of TCA cycle is

a) Kreb's cycle b) Grab's cycle
c) Mayerhoff cycle d) Embden cycle

123. Calculation of ATP gain for every glucose is made on certain assumptions. Choose the correct option in accordance with the statement given above

a) The pathway functioning is sequential and orderly
b) One substrate forms the reactant for the others
c) TCA cycle and ETS pathway follow one after another
d) All of the above

124. Stimulus of vernalisation is perceived by

a) Shoot tips b) Mature tissues
c) Embryo tips d) Both (a) and (c)

125. Photoperiod was first observed in

a) Potato b) Maryland mammoth
c) Four O'clock d) Evening primrose

126. The pigment involved in photomorphogenetic movement is

a) Cytochrome b) Phytochrome
c) Chromatin d) vernalin

127. The process of resynthesis of food materials from simpler food molecules is called

a) Biosynthesis b) Catabolism
c) Absorption d) Assimilation

128. Process of absorption of nutrients is carried out by

a) Passive transport b) Facilitated transport
c) Active transport d) All of the above

129. Haemoglobin is having maximum affinity with

a) Carbon dioxide b) Carbon monoxide
c) Oxygen d) Ammonia

130. Exchange of gases in lungs occurs through

a) Simple diffusion b) Active transport
c) Osmosis d) Plasmolysis

131. Impulse of heart beat originates from

a) SA-node b) AV-node
c) Vagus nerve d) Cardiac nerve

132. Extrinsic factors (blood clotting) are the factors triggered by release of

a) Thromboplastin b) Heparin
c) Histamin d) Fibrinogen

133. Kidney stones are produced due to deposition of uric acid and

a) Silicates b) Minerals

c) Calcium carbonate d) Calcium oxalate

134. When does glomerular filtration occurs in Bowman's capsule?
a) When hydrostatic pressure of blood in the glomerulus is 70 mm Hg and net filtrate pressure is -25 mm Hg
b) When hydrostatic pressure of blood in the glomerulus is 70 mm Hg and net filtrate pressure is -35 mm Hg
c) When hydrostatic pressure of blood in the glomerulus is 70 mm Hg and net filtrate pressure is 10 mm Hg
d) When hydrostatic pressure of blood in the glomerulus is 70 mm Hg and net filtrate pressure is -70 mm Hg

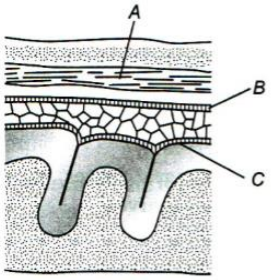
135. Glomerulus is formed by
a) Branch from renal vein
b) Uriniferous tubule
c) Branch from renal artery
d) Coiling of proximal part of uriniferous tubule

136. How many ear ossicles you have?
a) 3 b) 4 c) 5 d) 6

137. Identify the correct statements
I. Acetylcholine is released when the neural signal reaches to the motor end plate
II. Muscle contraction is initiated by signals sent by CNS *via* a sensory neuron
III. During muscle contraction, isotropic bands get elongated
IV. Repeated activation of the muscles can lead to lactic acid accumulation in them
The option with correct choices is
a) I and III b) I and IV c) II and III d) I and II

138. Where the troponin is found during muscle contraction?
a) Myosin filament b) Meromyosin
c) Tropomyosin d) T-tubule

139. Given is the diagram of human brain showing meninges. Identify *A* and *C*



a) A-Piamater, B-Arachnoid membrane, C-Duramater
b) A-Duramater, B-Arachnoid membrane, C-Piamater
c) A-Arachnoid membrane, B-Piamater, C-Duramater
d) A-Arachnoid membrane, B-Duramater, C-Piamater

140. Sense of smell is perceived by
a) Pituitary b) Hypothalamus
c) Olfactory lobe d) Cerebrum

141. Secretion of PTH is regulated by the circulating levels of …… in blood
a) Na^+ b) I^- c) Ca^{2+} d) Fe^{2+}

142. Hypothalamus releases two types of hormones mainly
a) Stimulating hormones; Releasing hormones
b) Stimulating hormones; Inhibiting hormones
c) Exocrine hormones; Inhibiting hormones
d) Exocrine hormones; Stimulating hormones

143. In grafting scion forms:
a) Shoot system b) Root system
c) New plant d) Hybrid plant

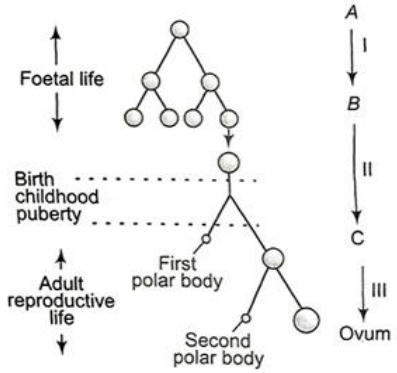
144. Micropropagation is a technique:
a) For production of true to type plants
b) For production of haploid plant
c) For production of somatic hybrids
d) For production of somaclonal plants

145. Which of the following statements about sporopollenin is false?
a) Exine is made up of sporopollenin
b) Sporopollenin is one of the resistant organic materials
c) Exine has apertures called germ pores where sporopollenin is present
d) Sporopollenin can withstand high temperatures and strong acids

146. In wind pollination the pollens are feathery, whether it is
a) True b) False
c) Sometimes (a) and sometimes (b) d) Neither (a) nor (b)

147. The process of transfer of pollen grains from anther to stigmatic surface with the help of water is called
a) Anemophily b) Zoophily
c) Hydrophily d) Ornithophily

148. Identify of *A*, *B* and *C* in the figure given below

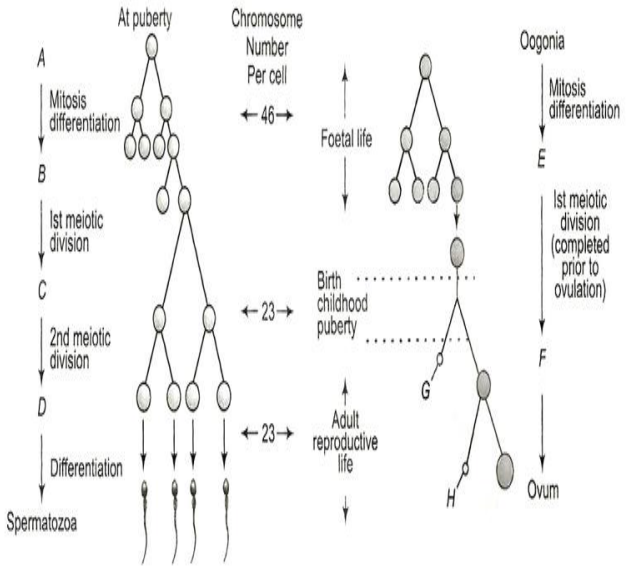


a) A-Secondary oocyte, B-Oogonia, C-Primary oocyte
b) A-Oogonia, B-Primary oocyte, C-Secondary oocyte
c) A-Secondary oocyte, B-Primary oocyte, C-Oogonia
d) A-Oogonia, B-Secondary oocyte, C-Primary oocyte

149. Which of the following is viviparous?
a) Running birds
b) Whales
c) Bats
d) Both (b) and (c)

150. Which one of the following statements with regard to embryonic development in humans is correct?
a) Cleavage divisions bring about considerable increase in the mass of protoplasm
b) In the second cleavage division, one of the two blastomeres usually divides a little sooner than the second
c) With more cleavage divisions, the resultant blastomeres become larger and larger
d) Cleavage division results in a hollow ball of cells called morula

151. Given diagram refers to spermatogenesis and oogenesis in humans. Identify *A* to *H* correctly.



a) A-Spermatogonia, B-Secondary spermatocytes, C-Primary spermatocytes, D-Spermatids, E-Primary oocyte, F-Secondary oocyte, G-First polar body, H-Second polar body
b) A-Spermatogonia, B- Primary spermatocytes, C- Secondary spermatocytes, D-Spermatids, E- Secondary oocyte, F-Secondary oocyte, G-First polar body, H-Second polar body
c) A-Spermatogonia, B-Primary spermatocytes, C-Secondary spermatocytes, D-Spermatids, E-Primary oocyte, F-Secondary oocyte, G-First polar body, H-Second polar body
d) A-Spermatogonia, B-Primary spermatocytes, C-Secondary spermatocytes, D-Spermatids, E-Primary oocyte, F-Secondary oocyte, G-Second polar body, H-First polar body

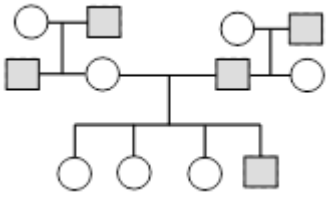
152. Which oral contraceptive is developed by CDRI?
a) Saheli
b) Mala-D
c) Both (a) and (b)
d) None of these

153. Detection technique for AIDS is
a) PCR
b) ELISA
c) Both (b) and (c)
d) Clinical culture

154. When a segment of a chromosome breaks and later rejoins after 180°rotation,it is known as
a) Deletion
b) Duplication
c) Inversion
d) Interstitial translocation

155. Mendel cross tall and dwarf plant. In F_2-generation the observed ratio was 3:1 (tall: short). From this result, he deduced
I. law of dominance
II. law of independent assortment
III. law of segregation
IV. incomplete dominance
Choose the correct option
a) I, II, III and IV
b) I and III
c) II, III and IV
d) I, II and III

156. Given pedigree chart indicates



a) Autosomal recessive trait
b) Y-linkage trait
c) Autosomal dominant trait
d) Sex linkage recessive trait

157. In *E. coli*, hydrolysis of disaccharide, lactose into galactose and glucose is performed by
a) Permease b) Catalase
c) β-galactosides d) Transacylase

158. Promoter and terminator flanks the
a) House keeping gene b) Structural gene
c) Recon d) Transcription unit

159. Which of the following natural process is likely to fasten organic evolution?
a) Favourable environment b) Overproduction
c) Abundant genotypic variations d) Reproductive isolation

160. True statements regarding the genetic drift are
I. It mostly occurs in smaller population
II. Certain alleles can be lost forever because of genetic drift
III. Founder effects and bottle neck effects are caused by genetic drift
IV. Mutations are primarly responsible for genetic drift
The correct combination showing true statement is
a) Only I b) III and IV c) II and IV d) All except IV

161. Osteomalacia is a deficiency disease of
a) Infants due to protein energy malnutrition
b) adults due to protein energy malnutrition
c) Adults due to vitamin-D deficiency
d) Infants due to vitamin-K deficiency

162. Morphine is
a) A very effective sedative and pain-killer b) Very useful in patients who have undergone surgery
c) both (a) and (b) d) Stimulant

163. What is true about T-lymphocytes is mammals?
a) They scavenge damaged cells and cellular debris
b) These are produced in thyroid
c) There are three main types-cyctotoxic T-cells, helper T-cells and suppressor T-cells
d) These originate in lymphoid tissues

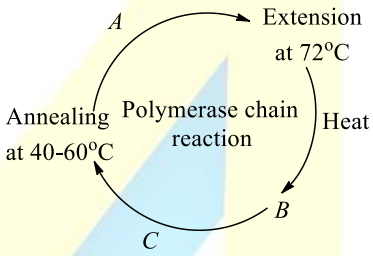
164. Mutation breeding is carried out by
I. inducing mutations in plants by various means
II. screening the plant for resistance
III. selecting the desirable plant for multiplication and breeding
Choose the correct option
a) I and II b) I and III
c) II and III d) I, II and III

165. Most common honey bee species in India
a) *Apis indica*
b) *Apis florea*
c) *Apis mellifera*
d) *Apis dorsata*

166. Which one of the following is being utilized as a source of biodiesel in the Indian countryside?
a) Euphorbia b) Beetroot
c) Sugarcane d) Pongamia

167. A collection of plants and seeds having diverse alleles of all the genes of a crop is called
a) Germplasm b) Gene library
c) Genome d) Herbarium

168. Study the following diagram and identify *A*, *B* and *C*



a) A-*Taq* polymerase, B-Denaturation at 94°C, C-Primer
b) A-Denaturation at 94°C, B-*Taq* polymerase, C-Primer
c) A-Primer, B-Denaturation at 94°C, C-*Taq* polymerase
d) A-*Taq* polymerase, B-Extension, C-Transformation

169. pBR322 was the first artificial cloning vector developed in ...A... by ...B... and ...C... from *E. coli* plasmid. Here A, B and C can be
a) A-1976, B-Boliver, C-Rodriquez
b) A-1975, B-Tiselius, C-Rodriquez
c) A-1977, B-Boliver, C-Rodriquez
d) A-1978, B-HO Smith, C-KW Wileox

170. The SCID patient has a defective gene for the enzyme Adenosine Deaminase (ADA). He/She lacks functional ..... and therefore, fails to fight the infecting pathogens
a) B-lymphocytes b) Phagocytes
c) T-lymphocytes d) Both (a) and (b)

171. ..... is a collection of methods that allows correction of gene defects diagnosed in a child

or embryo
a) Genetic therapy
b) Gene therapy
c) Molecular diagnosis
d) ELISA

172. Adenosine Deaminase (ADA) deficiency can be cured by ...A... and ...B... but it is not fully curative. Here A and B can be
a) A-gene therapy, B-radiation therapy
b) A-bone marrow transplantation, B-enzyme replacement therapy
c) A-organ transplantation, B-hormone replacement therapy
d) A-radiation therapy, B-enzyme replacement therapy

173. Bell-shaped age pyramid indicates that
a) Number of pre-reproductive and reproductive individual is almost equal
b) Post-reproductive individuals are comparatively fewer
c) The population size remains stable
d) All of the above

174. Parasite lives on the other parasite called
a) Fittest parasite b) Parasite on parasite
c) Hyperparasite d) Hypoparasite

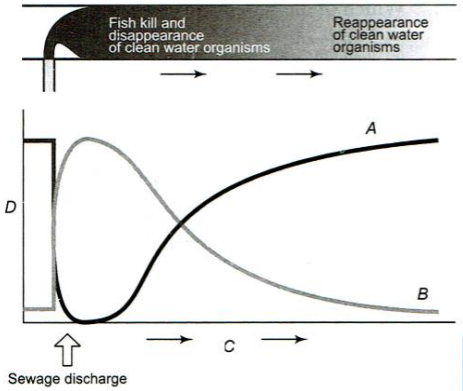
175. Pyramid that is never inverted
a) Energy b) Mass c) Number d) Size

176. Community is a group of independent and interacting population of
a) Different species
b) Same species
c) Same species in a specific area
d) Different species in a specific area

177. The species diversity of animals on earth is
a) 70% b) 8.1% c) 22% d) 55%

178. Identify the correct matched pair.
a) Gir forest – Rhino
b) Kaziranga – Elephant
c) Corbett park – Aves
d) Rann of Kutch- Wild ass

179. Given below is a flow chart showing the effect of sewage discharge on some important characteristics of a river. Read carefully and identify A, B, C and D



a) A-BOD, B-Dissolved oxygen, C-Concentration, D-Direction of flow
b) A-Dissolved oxygen, B-BOD, C-Direction of flow, D-Concentration
c) A-Dissolved oxygen, B-BOD, C-Concentration, D-Direction of flow
d) A-BOD, B-Dissolved oxygen, C-Direction of flow, D-Concentration

180. In the town of Arcata situated on northern coast of ...A... , an integrated waste water treatment process was developed with the help of biologists from ...B... . Here A and B refers to
a) A-Florida; B-Barry University
b) A-California; B-Humboldt State University
c) A-Florida; B-Abilence Christian University
d) A-California; B-Becker University

Mukesh Sir's Group Tuitions

Date : **NEET FULL PORTION** **TEST ID: 39**

Time: 03 hrs **PCB** **Marks : 720**

: ANSWER KEY :

1)	c	2)	c	3)	a	4)	a	5)	b	6)	c	7)	b
8)	a	9)	b	10)	b	11)	b	12)	a	13)	c	14)	d
15)	d	16)	d	17)	c	18)	c	19)	b	20)	b	21)	a
22)	b	23)	d	24)	c	25)	b	26)	c	27)	c	28)	b
29)	d	30)	d	31)	a	32)	b	33)	a	34)	b	35)	a
36)	b	37)	d	38)	d	39)	b	40)	b	41)	b	42)	c
43)	d	44)	a	45)	d	46)	b	47)	c	48)	c	49)	c
50)	a	51)	a	52)	d	53)	d	54)	a	55)	c	56)	c
57)	d	58)	c	59)	a	60)	b	61)	a	62)	d	63)	c
64)	a	65)	c	66)	b	67)	b	68)	c	69)	a	70)	c
71)	a	72)	a	73)	d	74)	c	75)	c	76)	b	77)	b
78)	c	79)	c	80)	c	81)	a	82)	a	83)	b	84)	a
85)	a	86)	d	87)	b	88)	c	89)	c	90)	b	91)	b
92)	c	93)	a	94)	c	95)	a	96)	d	97)	a	98)	c
99)	a	100)	c	101)	a	102)	a	103)	b	104)	c	105)	c
106)	d	107)	a	108)	c	109)	d	110)	b	111)	b	112)	d
113)	d	114)	b	115)	a	116)	d	117)	b	118)	d	119)	c
120)	b	121)	c	122)	a	123)	d	124)	d	125)	b	126)	b
127)	a	128)	d	129)	b	130)	a	131)	a	132)	a	133)	d
134)	c	135)	b	136)	d	137)	b	138)	c	139)	b	140)	c
141)	c	142)	c	143)	a	144)	c	145)	c	146)	a	147)	c
148)	b	149)	d	150)	b	151)	c	152)	a	153)	c	154)	c
155)	b	156)	b	157)	c	158)	b	159)	a	160)	d	161)	c
162)	c	163)	c	164)	d	165)	a	166)	a	167)	a	168)	a
169)	c	170)	c	171)	b	172)	b	173)	d	174)	c	175)	a
176)	d	177)	a	178)	d	179)	b	180)	b				

: HINTS AND SOLUTIONS :

Single Correct Answer Type

1 **(c)**

Linear momentum $= [MLT^{-1}]$

Angular momentum $= [ML^2T^{-1}]$

2 **(c)**

The magnitude of induced emf is

$|\varepsilon| = L\frac{dI}{dt}$ or $L = \frac{|\varepsilon|dt}{dI}$

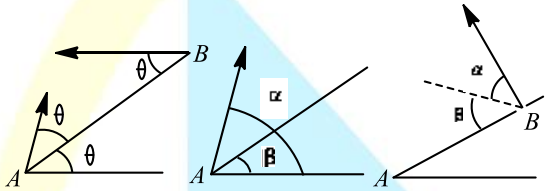
$L = \frac{\text{volt} \times \text{second}}{\text{ampere}} = ohm\text{second}$

3 **(a)**

$S \propto u^2 \ \therefore \frac{S_1}{S_2} = \left(\frac{u_1}{u_2}\right)^2 \Rightarrow \frac{2}{S_2} = \frac{1}{4} \Rightarrow S_2 = 8\ m$

4 **(a)**

Here, $\alpha = 2\theta, \beta = \theta$



Time of flight of $A$is,

$T_1 = \frac{2u\sin(\alpha - \beta)}{g\cos\beta}$

$= \frac{2u\sin(2\theta - \theta)}{g\cos\theta}$

$= \frac{2u}{g}\tan\theta$

Time of flight of $B$is, $T_2 = \frac{2u\sin\theta}{g\cos\theta}$

$= \frac{2u}{g}\tan\theta$

So, $T_1 = T_2$. The acceleration of both the particles is g downwards. Therefore, relative acceleration between the two I zero or relative motion between the two is uniform. The relative velocity of A w.r.t. B is towardsAB, therefore collision will take place between the two in mid air.

5 **(b)**

$v = \sqrt{3gr}$ and $a = \frac{v^2}{r} = \frac{3gr}{r} = 3g$

6 **(c)**

Acceleration $a = \frac{1}{m}\left(\frac{-dm}{dt}\right)v_r = \frac{1}{1}\left(\frac{1}{60}\right) \times 2400 = 40\ ms^{-2}$

7 **(b)**

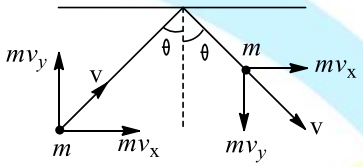
Horizontal velocity of apple will ren ain same but due to retardation of train, velocity of train and hence velocity of boy $w.r.t.$ ground decreases, so apple falls away from the hand of boy in the direction of motion of the train

8 **(a)**

In head on elastic collision velocity get interchanged (if masses of particle are equal) $i.e.$ the last ball will move with the velocity of first ball $i.e.\ 0.4\ m/s$

9 **(b)**

From adjoining figure the component of momentum along x-axis (parallel to the wall of container) remains unchanged even after the collision.



$\therefore$ Impulse $=$ change in momentum of gas molecule along y-axis, ie, in a direction normal to the wall $= 2mv, = 2mv\cos\theta$

10 **(b)**

Kinetic energy will not be conserved because friction force is acting at the point of contact with the plane. But torque of this force about point of contact will be zero. So angular momentum of the sphere about point of contact will be conserved

$\vec{\tau} = \frac{d\vec{L}}{dt}$, if $\vec{\tau} = 0$ then $\vec{L} =$ constant

11 **(b)**

Time period is independent of mass. Therefore their periods of revolution will be same.

12 **(a)**

$F = YA\frac{\Delta L}{L} = 2 \times 10^{11} \times (10^{-4}) \times 0.1$

$= 2 \times 10^6$ N

13 **(c)**

The angle θ, which the tangent to the liquid surface at the point of contact makes with the solid surface inside the liquid, is called the angle of contact or the capillary angle. The angle of contact is acute (less than 90°) in the case of liquids which wet the walls of the container, then liquid rises in the capillary and angle of contact is obtuse (greater than 90°) for the liquid which do not wet the walls of the container, ie, they fall in capillary tube.

14 **(d)**

Pressure at depth $h = p_a + \rho gh$

where p_a is atmospheric pressure

$= 1.01 \times 10^5 \text{Nm}^2$

$\therefore p_{\text{total}} = 1.01 \times 10^5 + 10^3 \times 10 \times 20$

$= 3.01 \times 10^5 \text{Pa} = 3$ atm

15 **(d)**

$\frac{X-LFP}{UFP-LFP}$ = constant

Where X = Any given temperature on that scale

L. F. P. = Lower fixed point (Freezing point)

U. F. P. = Upper fixed point (Boiling point)

$\frac{W-39}{239-39}=\frac{39-0}{100-0}$

$\Rightarrow \frac{W-39}{200}=\frac{39}{100}\Rightarrow W=78+39\Rightarrow W=117^oW$

16 **(d)**

$W = 2.3026\, nRT \log_{10}\left(\frac{V_2}{V_1}\right)$

$= 2.3026\times 10\times 9.3\times 600\log_{10}\left(\frac{10}{100}\right)$

$= -11.4\times 10^4 \text{J}$

17 **(c)**

As we know that slope of isothermal and adiabatic curves are always negative and slope of adiabatic curve is always greater than that of isothermal curve

Hence in the given graph curve A and B represents adiabatic and isothermal changes respectively

18 **(c)**

Boyle's and Charle's law follow kinetic theory of gases

19 **(b)**

Amplitude of damped oscillator

$A = A_0e^{-\lambda t}; \lambda$ = constant, t = time

For $t = 1$ min. $\frac{A_0}{2} = A_0e^{-\lambda t}\Rightarrow e^{\lambda}=2$

For $t = 3$ min. $A = A_0e^{-\lambda\times 3}=\frac{A_0}{(e^{\lambda})^3}=\frac{A_0}{2^3}\Rightarrow X = 2^3$

20 **(b)**

$T = 2\pi\sqrt{\frac{m}{k}}, T' = 2\pi\sqrt{\frac{m}{4k}}=\frac{T}{2}=\frac{5}{2}\text{s} = 2.5\text{ s}$

21 **(a)**

$n' = \frac{v}{v-v_s\cos 60^\circ}n$

Here,

v=340, $v_s = 20$m/s, n=660Hz

$n' = \frac{340}{340-20\times\frac{1}{2}}\times 660$

$= \frac{340}{330}\times 660 = 680\ Hz$

22 **(b)**

Nuclear force binds the protons and neutrons in the nucleus of an atom

23 **(d)**

$C_{medium} = KC_{air}\Rightarrow K=\frac{C_{medium}}{C_{air}}=\frac{110}{50}=2.20$

24 **(c)**

$\phi_E=\frac{\sum q}{\varepsilon_0}=\frac{(+5-5)\times 10^{-6}}{\varepsilon_0}=$ zero

25 **(b)**

$R\propto\frac{l}{r^2}\Rightarrow\frac{R_2}{R_1}=\frac{l_2}{l_1}\times\frac{r_1^2}{r_2^2}=\left(\frac{2}{1}\right)\times\left(\frac{1}{2}\right)^2=\frac{1}{2}$

$\Rightarrow R_2=\frac{R_1}{2}$, specific resistance doesn't depend upon length, and radius

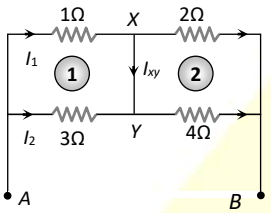
26 **(c)**

$R=\frac{\rho(L)}{A}=\frac{\rho L}{tL}=\frac{\rho}{t}$

ie, R is independent of L.

Hence the correct option is (c).

27 **(c)**



$-i_1+0\times i_{xy}+3i_2=0\ i.e.\ i_1=3i_2$ ...(i)

Also $-2(i_1-i_{xy})+4(i_2+i_{xy})=0$

$i.e.\ 2i_1-4i_2=6i_{xy}$ ...(ii)

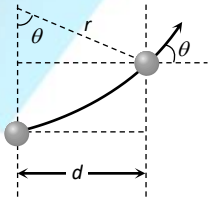
Also $V_{AB}-1\times i_1-2(i_1-i_{xy})=0\Rightarrow 50=i_1+2(i_1-i_{xy})$

$=3i_1-2i_{xy}$ ...(iii)

Solving (i), (ii) and (iii), $i_{xy}=2A$

28 **(b)**

According to the following figure, $\sin\theta=\frac{d}{r}$



Also $r=\frac{\sqrt{2mk}}{qB}=\frac{1}{B}\sqrt{\frac{2mV}{q}}$

$\therefore \sin\theta = Bd\sqrt{\frac{q}{2mV}}$

$=0.51\times 0.1\sqrt{\frac{1.6\times 10^{-19}}{2\times 1.67\times 10^{-27}\times 500\times 10^3}}$

$=\frac{1}{2}\Rightarrow\theta=30$

29 **(d)**

$W = mB\cos\theta$

$= mB\cos 60^\circ$

$= mB \times \frac{1}{2}$

$\tau = mB \sin\theta$

$= mB \sin 60°$

$= \sqrt{3}\,W [\because mB = 2W]$

30 **(d)**

We have, $B = \mu_0 H + \mu_0 I$

or $I = \frac{B - \mu_0 H}{\mu_0}$ or $I = \frac{\mu H - \mu_0 H}{\mu_0} = \left[\frac{\mu}{\mu_0} - 1\right] H$

$I = (\mu_r - 1)H$

For a solenoid of n-turns per unit length and current $iH = ni$

$\therefore I = (\mu_r - 1)ni = (1000 - 1) \times 500 \times 0.5$

$I = 2.5 \times 10^5 Am^{-1}$

$\therefore$ Magnetic moment $M = IV$

$M = 2.5 \times 10^5 \times 10^{-4} = 25\ Am^2$

31 **(a)**

$\frac{V_s}{V_p} = \frac{N_s}{N_p} \Rightarrow \frac{V_s}{20} = \frac{5000}{500} \Rightarrow V_s = 200\ V$

Frequency remains unchanged

32 **(b)**

Motional emf across PQ

$V = Blv = 4(1)(2) = 8$ volt

This is the potential to which the capacitor is charged.

As $q = CV$

$\therefore\ q = (10 \times 10^{-6})8 = 10^{-5} C = 80\mu C$

As magnetic force on electron in the conducting rod PQ is towards Q, therefore, A is positively charged and B is negatively charged

$ie,\ q_A = +80\mu C \text{and} q_B = -80\ \mu C$

33 **(a)**

Natural frequency is nothing but resonant frequency.

In this case $X_L = X_C$

$\Rightarrow \quad \omega_0 L = \frac{1}{\omega_0 C}$

$\Rightarrow \quad \omega_0^2 = \frac{1}{LC}$

$\Rightarrow \quad \omega_0 = \frac{1}{\sqrt{LC}}$

$\Rightarrow \quad 2\pi f = \frac{1}{\sqrt{LC}}$

$\Rightarrow \quad f = \frac{1}{2\pi\sqrt{LC}}$

35 **(a)**

$\mu = 1.5$

$\delta_m = A$

We know that

$\mu = \frac{\sin\left(\frac{A + \delta_m}{2}\right)}{\sin\frac{A}{2}}$

$1.5 = \frac{\sin\left(\frac{A + A}{2}\right)}{\sin\frac{A}{2}} = \frac{\sin A}{\sin\frac{A}{2}}$

$1.5 = \frac{2\sin\frac{A}{2}.\cos\frac{A}{2}}{\sin\frac{A}{2}}$

$1.5 = 2\cos\frac{A}{2}$

$\cos\frac{A}{2} = \frac{1.5}{2} = 0.75$

$cos41.4 = 0.75$

$\frac{A}{2} = 41.4$

$A = 82.8$

36 **(b)**

In microscope final image formed is enlarged which in turn increases the visual angle

37 **(d)**

Ultrasonic waves are longitudinal waves

38 **(d)**

$QE = mg \Rightarrow mg = \frac{QV}{d}$

39 **(b)**

When the oil drop is falling freely under the effect of gravity is a viscous medium with terminal speed v, then

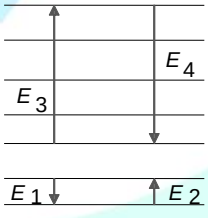
$mg = 6\pi\,\eta r v$ ...(i)

To move the oil drop upward with terminal velocity v if E is the electric field intensity applied, the

$Eq = mg + 6\pi\eta r v = mg + mg = 2mg$

So $E = 2\ mg/q$

40 **(b)**



$E_1 = -13.6 - (-3.4) = -10.2$ eV

$E_2 = -3.4 - (-13.6) = +10.2$ eV

$E_3 = -0.136 - (-1.51) = -1.374$ eV

$E_4 = -1.51 - (-0.136) = -1.374$ eV

When an electron makes transition from higher energy level having energy $E_2(n_2)$ to lower energy level having energy$E_1(n_1)$, then a photon of frequency v is emitted.

Here, for emission line E_1 is maximum hence, it

will have the highest frequency emission line.

41 **(b)**

Activity, $A = \frac{-N}{dt} = \lambda N$

As the number of nuclei (N) per mole are equal for both the substances, irrespective of their molecular mass, therefore, $A \propto \lambda$

$$\frac{A_1}{A_2} = \frac{\lambda_1}{\lambda_2} = \frac{4}{3}$$

42 **(c)**

From Rutherford-Soddy's law

$$N = N_0\left(\frac{1}{2}\right)^n$$

Given, $N = 1 - \frac{3}{4} = \frac{1}{4}N_0$, $n = \frac{t}{T} = \frac{t}{4}$

$$\therefore \quad \frac{1}{4} = \left(\frac{1}{2}\right)^{t/4}$$

$$\Rightarrow \quad \left(\frac{1}{2}\right)^2 = \left(\frac{1}{2}\right)^{t/4}$$

$$\Rightarrow \quad 2 = \frac{t}{4}$$

$$\Rightarrow \quad t = 8 \text{ months}$$

46 **(b)**

Weight of empirical formula CH_2=14

Mass of 1 mole=molecular weight=56

$$n = \frac{\text{molecular weight}}{\text{empirical formula weight}} = \frac{56}{14} = 4$$

Molecular formula=$(CH_2)_4$

$= C_4H_8$

47 **(c)**

As ratio of masses of nitrogen per gram of hydrogen in hydrazine and NH_3

$= 1\frac{1}{2} : 1$

$= \frac{3}{2} : 1$ or $3 : 2$

ie, the law of multiple proportions.

48 **(c)**

$$\Delta x . \Delta v \geq \frac{h}{4\pi m}$$

$$\Delta x = \frac{6.63 \times 10^{-34}}{4 \times 3.14 \times 9.1 \times 10^{-31} \times 300 \times 0.001 \times 10^{-2}}$$

$$= 0.01933$$

$$= 1.93 \times 10^{-2}$$

49 **(c)**

$_{29}Cu = 1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 4s^1, 3d^{10}$

$Cu^+ = 1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 3d^{10}, 4s^0$

Total number of shells occupied = 3

Number of sub-shell occupied = 6

Number of orbitals filled = 14

Number of unpaired electrons = 0

50 **(a)**

In a given group, atomic size increase due to addition of extra shell which outweighs the effect of increased nuclear charge. Number of shells increases with addition of extra electrons. Hence, increase in atomic size down the group is due to increase in number of electrons.

51 **(a)**

$O_2^- = 8 + 8 + 1$

$= \sigma 1s^2, \quad {}^*\sigma 1s^2, \sigma 2s^2, \quad {}^*\sigma 2s^2, \sigma 2p_z^2, \pi 2p_x^2$

$= \pi 2p_y^2, \quad {}^*\pi 2p_x^2 = \quad {}^*\pi 2p_y^1$

$\therefore$ Total antibonding electrons = 7

$O_2 = 8 + 8 = 16$

$= \sigma 1s^2, \quad {}^*\sigma 1s^2, \sigma 2s^2, \quad {}^*\sigma 2s^2, \sigma 2p_z^2, \pi 2p_x^2$

$= \pi 2p_y^2, \pi 2p_x^1 = \quad {}^*\pi 2p_y^1$

$\therefore$ Total antibonding electrons = 6

$O_2^{2-} = 8 + 8 + 2 = 18$

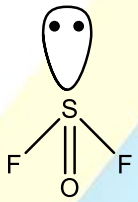
$= \sigma 1s^2, \quad {}^*\sigma 1s^2, \sigma 2s^2, \quad {}^*\sigma 2s^2, \sigma 2p_z^2, \pi 2p_x^2$

$= \pi 2p_y^2, \quad {}^*\pi 2p_x^2 = \quad {}^*\pi 2p_y^2$

$\therefore$ Total antibonding electrons = 8

52 **(d)**

OSF_2 has pyramidal shape



53 **(d)**

On the basis of kinetic theory of gases

$$pV = \frac{1}{2}N_A m\bar{v}^2$$

And $\frac{1}{2}m\bar{v}^2 = \frac{3}{2}KT$

$$p = \frac{1}{3}\left(\frac{N}{V}\right)m\bar{v}^2$$

or $p = \frac{2}{3}\left(\frac{N}{V}\right)\frac{1}{2}m\bar{v}^2$

$$= \frac{2}{3}\left(\frac{N}{V}\right)\left(\frac{3}{2}\right)KT$$

or $pV = nKT$

54 **(a)**

For 1 mole of liquid $C_p \approx C_V$.

55 **(c)**

Macroscopic properties which determine the state of a system are referred as state functions. The change in the state properties depends only upon the initial and final state of the system. All thermodynamic functions are state functions except work and heat.

56 **(c)**

NH_4Cl being a strong electrolyte, dissociates as

$NH_4Cl \rightarrow NH_4^+ + Cl^-$

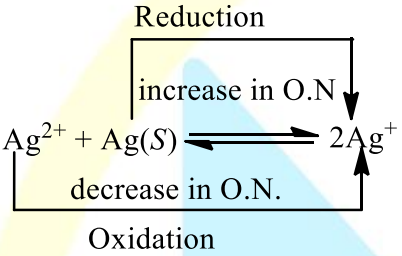
and NH_4OH as,

$NH_4OH \rightleftharpoons NH_4^+ + OH^-$

weak electrolyte common ion

Due to the presence of common ion, the degree of dissociation of NH_4OH decreases. Thus, less OH^- ions are produced which are sufficient only for the precipitation of hydroxides if III group radicals and not of higher group radicals.

57 **(d)**



Hence, those reactions in which two or more species undergo oxidation as well as reduction are called comproportionation.

58 **(c)**

The oxidation state of iodine inHIO_4 is + 7 as

$1 + x + 4(-2) = 0$

$x = +7$

The oxidation state of iodine in H_3IO_5 is +7 as

$3+x + 5(-2) = 0$

$x = +7$

The oxidation state of iodine in H_5IO_6 is +7 as

$5+x + 6(-2) = 0$

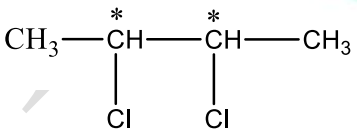
$x = +7$

61 **(a)**

As we move down the group , the basic nature of the oxides of group 13 elements increases. Tl_2O in aqueous solution gives TlOH which is as strong a base as alkali metal hydroxides

$Tl_2O + H_2O \longrightarrow 2TlOH$

63 **(c)**



There are two chiral C-atoms (*)

Thus, optical isomerism is possible.

64 **(a)**

$$CH_3I + 2H \xrightarrow[\text{or } Zn-Cu/C_2H_5OH]{Zn+HCl} CH_4 + HI$$

methane

$$CH_3I + 2Na + ICH_3 \xrightarrow{\text{Dry ether}} CH_3 - CH_3 + 2NaI$$

ethane

65 **(c)**

Antiknocking compounds are the chemicals which reduce knocking for improving the quality of gasoline $e.g.$, TEL (tyetraethyl lead).

68 **(c)**

$n\lambda = 2d \sin\theta$

$1 \times 1.54 = 2d \sin 45°$

$1 \times 1.54 = 2d \times 0.850$

$$2d = \frac{1.54}{0.850} = 0.905 \text{ Å}$$

69 **(a)**

According to the Boyle-van't Hoff law, at constant temperature the osmotic pressure of a solution is directly proportional to its concentration and inversely proportional to its dilution.$\pi \propto C$ (where, C= concentration).

Hence, the osmotic pressure of a solution at a given temperature increases with concentration.

70 **(c)**

$$\text{Molarity} = \frac{10 \times \text{density} \times \text{wt.of solute}}{\text{mol.wt.of the solute}}$$

$$\text{density} = \frac{3.60 \times 98}{10 \times 29} = 1.21$$

% by weight of solute × density

71 **(a)**

In MnO_4^- the oxidation number of Mn is + 7.

$\overset{+7}{Mn} + 5e^- \longrightarrow \overset{+2}{Mn}$

In the reaction, 5 electrons are involved hence 5 Faraday will be needed for the reduction of 1 mole of MnO_4^-.

Therefore, for 0.5 mole of MnO_4^-, number of Faradays required = 2.5 F

72 **(a)**

For zero order reaction, for example,

$A \rightarrow B$

$$\frac{-d[A]}{dt} = k[A]^0$$

$$\frac{-d[A]}{dt} = k$$

73 **(d)**

Rate constant almost gets doubled by the increase of 10°C in temperature. Hence, the rate constant at 310 K will be

$= 3.2 \times 10^{-3} \times (2)^2$

(∵increase in temperature=20 K)
$= 1.28 \times 10^{-2} J^{-1}$

75 **(c)**
Corundum (Al_2O_3) is the combined state of aluminium

76 **(b)**
Gallium arsenide is purified by zone refining method

77 **(b)**
$2HClO_4 \rightarrow H_2O + Cl_2O_7$

78 **(c)**
Ni^{2+} and Cr^{2+} are coloured due to presence of unpaired electrons. But Zn^{2+} is colourless because of absence of unpaired electrons

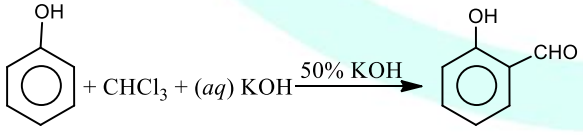
79 **(c)**
The most common oxidation state of lanthanoid is +3. Lanthanoids in +3 oxidation state usually have unpaired electrons in f-subshell and impart characteristic colour in solid as well as in solution state due to $f - f$ transition.
(Except lanthanum and lutetium)

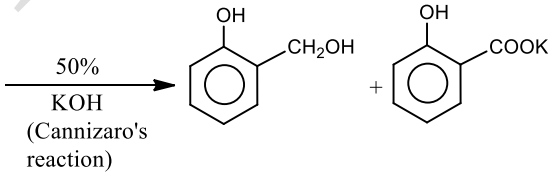
80 **(c)**
EAN=(Atomic number – O. S + 2 × C. N.)
Hence, EAN of Ni in $[Ni(CN)_4]^{2-} = (28 - 2 + 2 \times 4) = 34$

81 **(a)**
$CH_3Br + OH^- \rightarrow CH_3OH + Br^-$
This reaction proceeds by S_N2 mechanism.
Rate ∝ [substrate][nucleophile]
Rate ∝ $[CH_3Br][OH^-]$

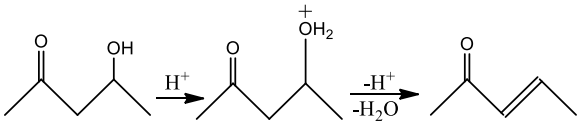
82 **(a)**
Salicylic acid +$NaHCO_3$ →effervescence of CO_2
Phenol +$NaHCO_3$ →No reaction
∴ $NaHCO_3$ is used to distinguish between phenol and salicylic acid.

83 **(b)**
Phenol on reaction with chloroform and KOH gives salicyladehyde, which with 50% KOH solution undergoes Cannizaro's reaction.

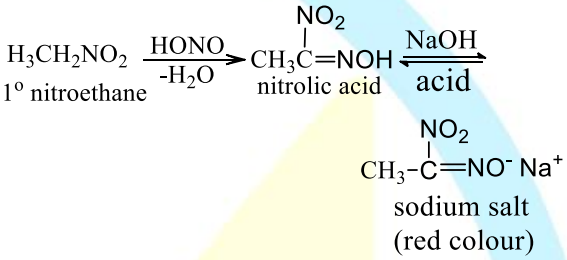




84 **(a)**
β −hydroxy aldehydes or β −hydroxy ketones (*i. e.*,aldol) readily dehydrated under acidic condition to give $\alpha - \beta$ −unsaturated aldehyde or ketone.



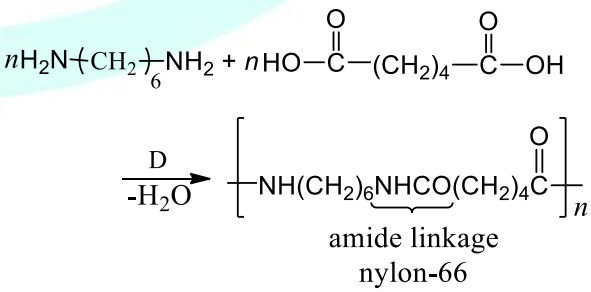
85 **(a)**
Primary nitro alkanes when treated with nitrous acid from nitrolic acid which when dissolve in alkali gives, salt of nitrolic acid which is red in colour. In excess of acid, the salt dissociated, thus colour disappears while in excess of alkali the red colour reappears



86 **(d)**
$C_6H_5SO_2Cl + RNH_2 \rightarrow RNHSO_2C_6H_5 \xrightarrow{KOH} R - NKSO_2C_6H_5$
Benzene sulphyonyl chloride — N-alkyl benzene sulphonamide — soluble in KOH

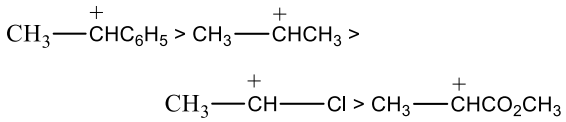
87 **(b)**
Disulphide bond may be reduced to thiol by means of reagents, *i.e.,* $NaBH_4$,which shows the presence of thiol group in disulphide bond formation.

88 **(c)**
Nulon-6, 6 is obtained by the condensation of hexamethylene diamine with adipic acid. Since, two different monomers involve in its preparation, it is a copolymer.



89 **(c)**
In cationic polymerization,carbocationsare

formed. Greater the stability of the carbocation, more reactive is the alkene. Since, the stability of the intermediate carbocation follows the order.



Therefore, reactivity decreases in the same order. Thus, styrene is most reactive.

91 **(b)**
The genus *Felis* is used to represent cats

92 **(c)**
A species is a group of organisms that interbreed freely in their natural setting and do not interbreed with other population. In simple words, members of one species are reproductively isolated from members of other species. Species is the real basic unit for understanding taxonomy as well as evolution.

93 **(a)**
The ascending hierarchy in similar characteristic is Class < Family < Genus < Species, *i.e.*, specificity is increasing

94 **(c)**
Plant like nutrition is found in *Euglena*.

95 **(a)**
Dikaryophase of fungus occurs in Ascomycetes and Basidiomycetes

96 **(d)**
Bryophytes are also known as amphibians of plant kingdom. They have various features, which enabled them to live on both land and on water habitats

97 **(a)**
In pteridophytes, gametophytes (prothallus) require cool, damp and shady places to grow

98 **(c)**
Animals which excrete ammonia as a waste product are called ammonotelic animals and this phenomenon is called ammonotelism, *e.g.,* frog's tadpole, *Ascaris*, leech, etc.

99 **(a)**
In *Hydra*, reproduction occurs in favourable conditions by **budding**.

100 **(c)**
Water vascular system is characteristic of phylum-Echinodermata. Tracheal system, gills, book gills and book lungs are all organs of respiration in animals belonging to phylum-Arthropoda

101 **(a)**
In pseudocarpic fruits (false fruits), the edible part is formed from ovary along with outside part of the ovary (*i.e.*, other floral parts like bracts, perianth, thalamus, etc), *e.g.*, in apple and pear thalamus forms major part in fruit formation.

102 **(a)**
Thorns are deep-seated outgrowths present as modified stem structures, possessing vascular cylinder surrounded by dark. In *Duranta* and *Bougainvillea*, thorns are the modification of axillary buds.

103 **(b)**
In insectivorous plant Nepenthes, the lamina forms the pitcher, the lid represents the apex, and the petiole is tendrilar, whereas leaf base is flattened. In *Utricularia*, which is submerged floating hydrophyte, the leaves are dissected and some of the leaf segments get modified into tiny bladders.

104 **(c)**
The fruit of Ananas sativus (pineapple or ananas) is sorosis (a type of multiple fruits), developing from spike, spadix or catkin. In this type, the flowers associate by their succulent petals, the axis bearing them grows and becomes fleshy or woody, thus, the whole inflorescence turns into a compact fruit.

105 **(c)**
In roots the protoxylem lies towards the periphery and metaxylem lies toward the centre. Such arrangement is called exarch

106 **(d)**
Intercalary meristematic tissues are intercalated in between the permanent tissues. They may be present either at the base of internodes (*e.g.,* grasses, wheat, etc) or at the base of leaf (*e.g.,* *Pinus*) or at the base of node (*e.g.,* mint). The activity of intercalary meristem also add to the length of plant or its organs.

107 **(a)**
Septal nephridias, present on both the sides of the intersegmental septa from the segment is 15 to the last that opens into the intestine of earthworm's excretory system

108 **(c)**
Earthworm shows adaptations mainly for burrowing and survival. It has an ability to push its way through the soft soil and to eat its way through the hard soil. Thus ensures its efficiency under both type of soil conditions

109 **(d)**
Okazaki fragments are produced during DNA synthesis.

110 **(b)**
The **microfilaments** are formed mainly of protein actin. They have a role in cell motion, intracellular movements, changes in cell shape, cleavage and muscle contraction.

111 **(b)**
System at equilibrium cannot perform work. As living organisms work continuously, they make a constant effort to prevent falling into equilibrium

112 **(d)**
When we grind a tissue, we are distrupting the cell structure
Cell membrane and other membranes are broken into pieces and form vesicles which are not water soluble. Therefore, these membrane fragments in the form of vesicles get separated along with the acid insoluble pool and hence, in the macromolecular fraction. Lipids are not strictly macromolecules

113 **(d)**
Pachytene or **thick thread** or **pachynema** substage is the longest substage of prophase-I of meiosis. It is characterised by the process of crossing over during which the non-sister chromatids twist around and exchange segments with each other by proper breakage and then fusion of broken ends.

114 **(b)**
Duration of the cell cycle, *i.e.,* period between two successive cell divisions is called generation time. It depends on the type of cell and external factors such as temperature food and oxygen supplies. Mammalian (*e. g.*,human) cell divides once in approximate every 24 hrs

115 **(a)**
Mineral ions are frequently remobilised, particularly from older, senescing parts. Older dying leaves export much of their mineral content to younger leaves. Similarly, before leaf fall in decidous plants,minerals are removed to other parts. Elements most readily mobilised are phosphorus, sulphur, nitrogen and potassium. Some elements that are structural components, like calcium are not remobilised

116 **(d)**
Hormones, amino acids and sugars are transported or translocated through phloem

117 **(b)**
Water movement between the two system takes place from the system having higher water potential or more energy to the system containing lower water potential or low energy. So, during water absorption from the soil, the water potential of the root cells is lower than that of the soil

118 **(d)**
Nitrifying bacteria (one of the chemosynthetic bacteria) oxidize ammonia to nitrates and obtain energy for the preparation of food. This oxidation occurs in two steps. In the first step, ammonia is oxidized to nitrite by nitrite bacteria (*e.g., Nitrosomonas* and *Nitrosococuus*). In the second step, nitrate is oxidised to nitrate by nitrate bacteria (*e.g., Nitrocystis* and *Nitrobacter*).

119 **(c)**
Leghaemoglobin during biological nitrogen fixation in root nodules of legumes protects the nirogenase enzyme from oxygen.

120 **(b)**
In photosynthesis, carbon dioxide is reduced and water is oxidised.

121 **(c)**
The C_4-plants have **dimorphic chloroplasts-granal** and **agranal**. Chloroplasts in mesophyll cells are granal, *i.e.,* they contain thylakoids that are stacked to form grana, as in C_3 −plants. Chloroplasts of **bundle sheath cells** are agranal, *i.e.,* grana are absent and the thylakoids are present only as stroma lamellae.

122 **(a)**
The citric acid cycle for production of energy in the cell was described by Kreb's, therefore TCA cycle is also known as Kreb's cycle

123 **(d)**
There is a sequential, orderly pathway functioning, with one substrate forming the next and with glycolysis TCA cycle and ETS pathway following one after another

124 **(d)**
Site of vernalisation The stimulus of vernalization is perceived only by the meristematic cells, *e. g.*, shoot tip, embryo tip, root apex, developing leaves, etc.

125 **(b)**

Garner and Allard (1920) firstly observed photoperiod in 'Maryland' Mammoth'. A variety of tobacco could be made to flower in summers by reducing the amount of light hour along with artificial darkening. It could be made to remain vegetative in winters by proving extra light

126 **(b)**
The photomorphogenetic movement (photoperiodism) is the effect of photoperiods or dally duration of light hours in the growth and development of plants. **Phytochrome** (amorphous, photoreceptor, chromoprotein) is involved in photoperiodism.

127 **(a)**
Processof resynthesis of food materials from simpler food molecules is called **biosynthesis**. Absorption is the process by which digested nutrients are absorbed through the wall of gut into blood, while conversion of absorbed food into active cytoplasm within the cell is called assimilation.

128 **(d)**
Absorption of differents nutrients from the food is carried out by the simple diffusion, osmosis, facilitated transport and by active transport, *i.e.,* absorption of nutrients is carried out by passive, active diffusion and facilitated transport

129 **(b)**
Haemoglobin is having 250 times more affinity for carbon monoxide as compared to oxygen, forming a cherry-red compound carboxyhaemoglobin.

130 **(a)**
Exchange of gases in lungs is called external respiration. In this gaseous exchange, oxygen passes from alveoli to pulmonary capillary blood and carbon dioxide, come to alveoli from pulmonary capillary. Exchange of gases through alveocapillary membrane is a purely physical diffusion phenomenon. No chemical reaction is involved.

131 **(a)**
SA-node (sino-atrial node) is a group of specialized cardiac muscle cells, which have the property of generating rhythmic excitatory waves. It is also called pacemaker of the heart as it generates the wave for all the chambers of heart to contact.

132 **(a)**
Extrinsic factors are triggered by thromboplastin. (Factor III), various factors are also needed which are collectively known as intrinsic system because it occurs inside blood vessel

133 **(d)**
During urine formation, salts and other wasters are dissolved in the filtrate and pass with it out of the kidney as urine. But sometimes, certain salts (such as calcium oxalate) do not dissolved and form crystals called **calcium stones**. These can partially block the flow of the urine from the kidney.

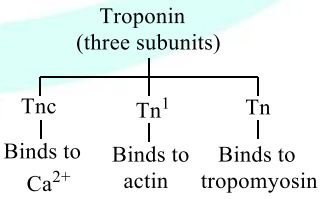
134 **(c)**
Glomerular filtration occurs in Bowman's capsule when hydrostatic pressure of blood in the glomerulus is 70 mm Hg and net filtrate pressure is 10 mm Hg.

135 **(b)**
Each nephron or uriniferous tubule contains a network of blood capillaries, the glomerulus, connected with afferent arteriole on one side and an efferent arteiole on the other side.

136 **(d)**
6 ear ossicles are present in human three in each ear.
Each middle ear contains three tiny bones (i) Malleus (ii) Incus (iii) Stapes which are collectively called ear ossicles

137 **(b)**
The junction between a motor neuron and sarcolemma of muscle is called neuromuscular junction
(i) A neural signal reaching this junction (motor end plate) release a neurotransmitter
(ii) Repeated activation of muscles can lead to the accumulation of lactic acid due to anaerobic break down of glucose in them

138 **(c)**
The proteins troponin and tropomyosin are closely associated



139 **(b)**
A – **Duramater** It is the outer meninx. It is thick, tough and lines the cranial cavity
B – **Arachnoid membrane** It is the middle meninx. It is thin but is non-vascular

C – **Piamater** It is the inner meninx. It is very thin, highly vascular and closely innervates the brain

140 **(c)**
Olfactory lobe perceives sense of smell.

141 **(c)**
The parathyroid glands secrete a peptide hormone called Parathyroid Hormone (PTH). The secretion of PTH regulated by the circulating levels of calcium ions in the blood

145 **(c)**
Exine is chiefly made up of sporopollenin. Exine is discontinous or ruptured only by nexine at some places (where sporopollenin absent), these are called pores, through which pollen tubes come out during germination on stigma.

146 **(a)**
True, because due to the presence of feathers they can cover more distance

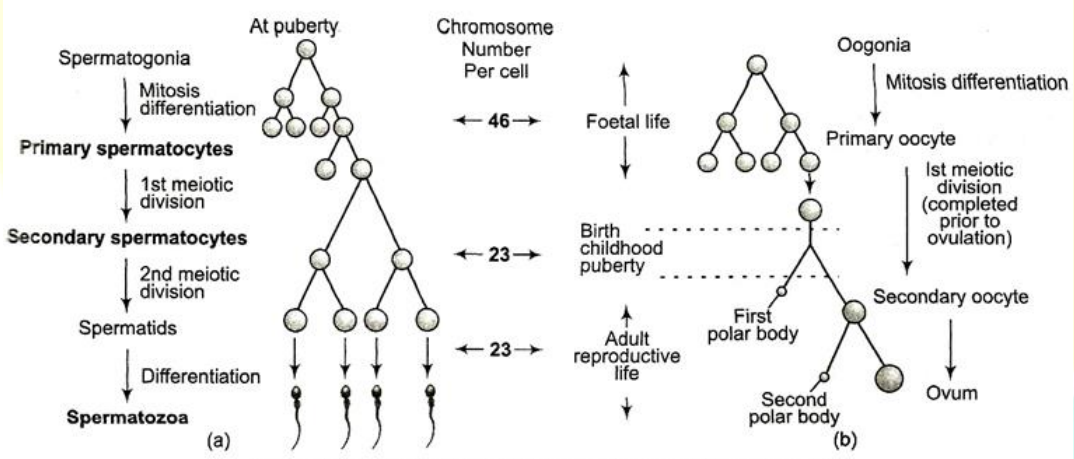
147 **(c)**
Pollination refers to the transfer of pollens to stigma. **Hydrophily** is the pollination by water. Hydrophily is commonly seen in members of Ceratophylaceae, Najadaceae, Hydrocharitaceae, etc.

148 **(b)**
A-Oogonia-46 chromosomes, B-Primary oocyte-46 chromosomes, C-Secondary oocyte-23 chromosomes

149 **(d)**
All fishes are oviparous, but whale is viviparous, *i.e.*, it gives birth to young ones and it also feeds its young ones. Among flying creatures, bat is viviparous. Whale and bat both are mammals.

150 **(b)**
During embryonic development of human, in the second cleavage division, one of the two blastomeres usually divides a little sooner then the second. Cleavage is series of mitotic cell divisions that increase the number of cells but does not change the size of the original mass.

151 **(c)**
A-Spermatogonia, B-Primary spermatocytes, C-Secondary spermatocytes, D-Spermatids, E-Primary oocyte, F-Secondary oocyte, G-First polar body, H-Second polar body



Schematic representation of (a) Spermatogenesis (b) Oogenesis

152 **(a)**
Saheli. *India*
Research in Reproductive Health It should be encouraged and supported to find out the new methods in reproduction related areas. 'Saheli' a new oral contraceptive for the females was developed by scientists in Central Drug Research Institute (CDRI) in Lucknow

153 **(c)**
Generally, AIDS detection is done by ELISA (Enzyme Linked Immuno Sorbent Assay).
But sometimes the results of this technique may prove false. So, by combining it with PCR (Polymerase Chain Reaction), the realibility of the detection of AIDS increases

154 **(c)**
Inversions occur when there are two breaks in a chromosome and the intercalary segment reunites in a reverse order by rotating at 180°.

155 **(b)**
Law of independent assortment deduced by Mendel by performing dihybrid cross (9:3:3:1). Incomplete dominance was not deduced by

Mendel

156 **(b)**

There are only very few characters, which are present on the Y-chromosome of male. Like hypertrichosis. Given pedigree analysis is the example of Y-linked inheritance because all male progeny is affected

157 **(c)**

Loctose $\xrightarrow{\beta-\text{galactosidase}}$ Galactose + glucose

158 **(b)**

Promoter is present at the 5' site of structural gene and terminator is present at the 3'-site of structural genes or we can say that promoter and terminator flaks the structural genes

159 **(a)**

As per modern synthetic theory of evolution, there are five basic factors involved in the process of organic evolution:

1.Gene mutation

2.Changes in chromosome structure and number

3.Genetic recombinations

4.Natural selection

5.Reproductive isolation

The first three factors are responsible for providing genetic variability and the last two are responsible for giving direction to the evolutionary processes.

160 **(d)**

Migration rather than mutation is primary responsible for genetic drift

161 **(c)**

Deficiency of vitamin-D causes weak bones, bone deformities, rickets in children and osteomalacia in adults. Marasmus is caused due to protein energy malnutrition.

162 **(c)**

Morphine is a very effective sedative and painkiller and is very useful in patients who have undergone surgery

163 **(c)**

The function of T-cells is to provide immunity (cellular type) and not to scavenge damaged cells and cells and cell debris. These are produced in bone marrow and mature in thymus. Hence, the only true statement is that there are three types of T-cells, i.*e.,*cytotoxic, helper and suppressor.

164 **(d)**

Mutation breeding is carried out by the following steps

Inducing mutations in plant by various means

Screening the plant for resistance

Selecting the desirable plant for multiplication and breeding

165 **(a)**

The most common species of honey bee is *Apis indica.* The exotic varieties are *Apis mellifera* (An Italian variety) and *Apis adamsoni.* At present, the Italian variety *Apis mellifera* is used in apiaries for large scale production of honey and wax

166 **(a)**

Some plants accumulate hydrocarbons in form of latex, e.g., *Euphorbia, Asclepias, capaifera.*

167 **(a)**

A germplasm is a collection of genetic resources for an organism. For plants, the germplasm may be stored as a seed collection. It includes, diverse alleles of all the genes of an organism.

168 **(a)**

A- *Taq* polymerase, B-Denaturation (air), C-Prime

169 **(c)**

pBR322 vector was the first artificial cloning vector constructed in 1977 by Boliver and Rodriquez. It is widely used in gene cloning experiments in pBR322

p – Denotes that it is plasmid

BR – stands for Boliver and Rodriquez who constructed this plasmid

322 is a number given to distinguish this plasmid from others developed in the same laboratory

170 **(c)**

The SCID patient has a defective gene for the enzyme Adenosine Deaminase (ADA). He/she lacks functional T-lymphocytes and therefore, fails to fight the infecting pathogens

171 **(b)**

Gene therapy is a collection of methods that allows the correction of gene defects diagnosed in a child or embryo. By insertion of normal gene, the defective mutant allele of the genes are replaced and non-functional gene is compensated

172 **(b)**

In some cases, adenosine deaminase deficiency can be cured by bone marrow transplantation and enzyme replacement therapy, but it is not fully curative

173 **(d)**

All of above.

A bell-shaped polygon indicates a moderate proportion of young to old. As the rate of growth becomes slow and stable, the pre-reproductively and reproductive age group become more or less equal in size and post-reproductive group remaining as the smallest. In stable population 'r' is zero. And bell-shaped curve only possible when $r = 0$ means growth of population is zero

Age pyramid Graphic representation of different age groups found in a population with pre-reproductive group at the base. Reproductive ones in the middle and post-reproductive group at the top is called age pyramid.

Age pyramid have three kinds

(i) **Triangular Age Pyramid** The number of pre-reproductive is very large. Number of reproductive individual is moderate and post-reproductive are fewer. Population size is growing

(ii) **Bell-shaped Age Pyramid** The number of prereproductive and reproductive individuals is almost equal. Post-reproductive individuals are comparatively fewer. Population size is stable

(iii) **Urn-shaped Age Pyramid** Proportion of reproductive age group is higher than the individuals in pre-reproductive age group. Number of post-reproductive individuals is also sizable. It is declining population with negative growth

174 **(c)**

Hyperparasite It is the parasite which lives on another parasite, *e*. *g*., some bacteriophage (bacterial, viruses), *Bacterium Parteurella pestis* in *Xenopsylla chaeopsis* (rat flea) which is hyperparasite on rat

175 **(a)**

Pyramid of energy is never inverted because in each ecosystem producers are green plants, which prepare their own food in the process of photosynthesis and thus, trap maximum solar energy. In herbivores, only 10% of energy of plants transfer and rest 90% is itself used by the plants and some loss as heat. Further, primary carnivores take only 10% of energy from herbivores, i.e., 1% of plants. In this way, energy percentage becomes reduced in next higher trophic levels. This 10% flow of energy from one trophic level to the next is called 10 percent law of Lindemann.

177 **(a)**

70%.

When we discuss about earth's biodiversity, more than 70% of all the species recorded are animals, while plants (including algae, fungi, bryophytes, gymnosperms and angiosperms) comprises not more than 22% of the total

178 **(d)**

Biosphere Reserve	Animal
Gir forest	Asiatic lion, panther, striped hyena
Kaziranga	Rhinoceros , wild buffalo, gaur
Corbett National Park	Elephant , tiger, panther, sloth bear, etc
Rann of Kutch	Wild ass

179 **(b)**

A-Dissolved oxygen, B-BOD, C-Direction of flow, D-Concentration

180 **(b)**

A-California; B-Humboldt State University