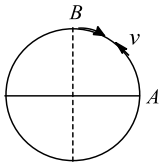
MERITSTORE

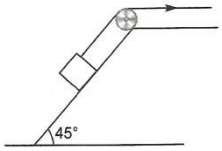
NEET FULL PORTION TEST 1

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

1. The unit of absolute permittivity is
   a) $Fm\ \ (farad - metre)$
   b) $Fm^{-1}\ (farad/metre)$
   c) $Fm^{-2}\ (farad/metre^2)$
   d) F (farad)
2. The physical quantities not having same dimensions are
   a) Speed and $(\mu_0\varepsilon_0)^{-1/2}$
   b) Torque and work
   c) Momentum and Planck's constant
   d) Stress and Young's modulus
3. From the top of a tower, a particle is thrown vertically downwards with a velocity of 10ms^{-1}. The ratio of the distances covered by it in the 3rd and 2nd seconds of its motion is (Given, $g = 10\text{ms}^{-2}$)
   a) 7:5 b) 3:4 c) 4:3 d) 6:5
4. A body of mass m is moving with a uniform speed v along a circle of radius r, what is the average acceleration in going from A to B?



   a) $2v^2/\pi r$ b) $2\sqrt{2}v^2/\pi r$ c) $v^2/\pi r$ d) None of these
5. A very broad elevator is going up vertically with a constant acceleration of 2 ms^{-2}. At the instant when its velocity is 4 ms^{-1} a ball is projected from the floor of the list with a speed of 4 ms^{-1} relative to the floor at an elevation of 30°. The time taken by the ball to return the floor is ($g = 10\ \text{ms}^{-2}$)
   a) 1/2 s b) 1/3 s
   c) 1/4 s d) 1 s
6. A block of mass 200 kg is being pulled up by men on an inclined plane at angle of 45° as shown in the figure. The coefficient of static friction is 0.5. Each man can only apply a maximum force of 500 N. Calculate the number of men required for the block to just start moving up the plane.



   a) 10 b) 15 c) 5 d) 3
7. A stationary body of mass 3 kg explodes into three equal pieces. Two of the pieces fly off in two mutually perpendicular directions, one with a velocity of $3\hat{\imath}\ ms^{-1}$ and the other with a velocity of $4\hat{\jmath}\ ms^{-1}$. If the explosion occurs in $10^{-4}\ s$, the average force acting on the third piece in newton is
   a) $(3\hat{\imath} + 4\hat{\jmath}) \times 10^{-4}$ b) $(3\hat{\imath} - 4\hat{\jmath}) \times 10^{-4}$
   c) $(3\hat{\imath} + 4\hat{\jmath}) \times 10^{4}$ d) $-(3\hat{\imath} + 4\hat{\jmath}) \times 10^{4}$
8. A spring of force constant 800 Nm^{-1} has an extension of 5 cm.The work done in extending it from 5 cm to 15 cm is
   a) 16 J b) 8 J c) 32 J d) 24 J
9. In rotational motion of a rigid body, all particles move with
   a) Same linear & angular velocity
   b) Same linear and different angular velocity
   c) With different linear velocities and same angular velocities
   d) With different linear velocities and different angular velocities
10. A spherical shell has mass M and radius R. Moment of inertia about its diameter will be
    a) $\frac{2}{5}MR^2$ b) $\frac{2}{3}MR^2$ c) $\frac{1}{2}MR^2$ d) MR^2
11. Two spheres of radius r and $2r$ are touching each other. The fore of attraction between them is proportional to
    a) r^6 b) r^4 c) r^2 d) r^{-2}
12. The area of cross section of a steel wire ($Y = 2.0 \times 10^{11}N/m^2$)is $0.1cm^2$. The force required to double its length will be
    a) $2 \times 10^{12}N$ b) $2 \times 10^{11}N$
    c) $2 \times 10^{10}N$ d) $2 \times 10^{6}N$
13. The cylindrical tube of spray pump has a cross-section of 8cm^2, one end of which has 40 fine holes each of area 10^{-8}m^2. If liquid flows inside the tube with a speed of 0.15 m min^{-1}, the speed with which the liquid is ejected through the hole is

a) 50 ms^{-1} b) 5 ms^{-1}
c) 0.05 ms^{-1} d) 0.5 ms^{-1}

14. The working of an atomizer depends upon
a) Bernoulli's theorem
b) Boyle's law
c) Archimedes principle
d) Newton's law of motion

15. If the initial temperatures of metallic sphere and disc, of the same mass, radius and nature are equal, then the ratio of their rate of cooling in same environment will be
a) 1 : 4 b) 4 : 1 c) 1 : 2 d) 2 : 1

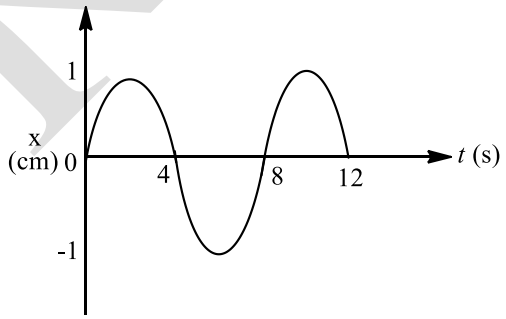
16. A gaseous mixture contains equal number of hydrogen and nitrogen molecules. Specific heat measurements on this mixture at temperature below 150 K would indicate the value of $\gamma = C_p/C_v$ for the mixture as
a) 3/2 b) 4/3 c) 5/3 d) 7/5

17. We consider a thermodynamic system. If ΔU represents the increase in its internal energy and W the work done by the system, which of the following statements is true?
a) $\Delta U = -W$ in an adiabatic process
b) $\Delta U = W$ in an isothermal process
c) $\Delta U = -W$ in an isothermal process
d) $\Delta U = W$ in an adiabatic process

18. If the degree of freedom of a gas are f, then the ratio of two specific heats C_P/C_V is given by
a) $\frac{2}{f}+1$ b) $1-\frac{2}{f}$ c) $1+\frac{1}{f}$ d) $1-\frac{1}{f}$

19. The acceleration of a particle in S.H.M. is
a) Always zero
b) Always constant
c) Maximum at the extreme position
d) Maximum at the equilibrium position

20. The x-t graph of a particle undergoing simple harmonic motion is shown below. The acceleration of the particle at $t = \frac{4}{3}$ s is



a) $\frac{\sqrt{3}}{32}\pi^2 cms^{-2}$ b) $-\frac{\pi^2}{32} cms^{-2}$
c) $\frac{\pi^2}{32} cms^{-2}$ d) $-\frac{\sqrt{3}}{32}\pi^2 cms^{-1}$

21. A sound absorber the sound level by 20 dB. The intensity decreases by a factor of
a) 1000 b) 10000 c) 10 d) 100

22. Identify the WRONG statement
a) The electrical potential energy of a system of two protons shall increase if the separation between the two is decreased
b) The electrical potential energy of a proton electron system will increase if the separation between the two is decreased
c) The electrical potential energy of a proton electron system will increase if the separation between the two is increased
d) The electrical potential energy of a system of two electrons shall increase if the separation between the two is decreased

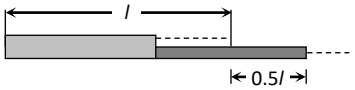
23. A capacitor is charged by using a battery which is then disconnected. A dielectric slab is then slipped between the plates, which results in
a) Reduction of charge on the plates and increase of potential difference across the plates
b) Increase in the potential difference across the plate, reduction in stored energy, but no change in the charge on the plates
c) Decrease in the potential difference across the plates, reduction in the stored energy, but no change in the charge on the plates
d) None of the above

24. A metal foil of negligible thickness is introduced between two plates of a capacitor at the centre. The capacitance of capacitor will be
a) Same b) Double c) Half d) K times

25. A current of 0.01mA passes through the potentiometer wire of a resistivity of $10^9\Omega$-cm and area of cross-section $10^{-2}cm^2$. The potential gradient is
a) $10^9 Vm^{-1}$ b) $10^{11} Vm^{-1}$
c) $10^{10} Vm^{-1}$ d) $10^8 Vm^{-1}$

26. In a meter bridge experiment, null point is obtained at 20cm from one end of the wire when resistance X is balanced against another resistance Y. If X<Y, then where will be the new position of the null point from the same end, if one decides to, balance a resistance of $4X$ against Y?
a) 50 cm b) 80 cm c) 40 cm d) 70 cm

27. In order to quadruple the resistance of a uniform wire, a part of its length was uniformly stretched till the final length of the entire wire was 1.5 times the original length, the part of the wire was fraction equal to



a) 1/8 b) 1/6 c) 1/10 d) 1/4

28. A current of 1 $ampere$ is passed through a straight wire of length 2.0 $metres$. The magnetic field at a point in air at a distance of 3 $metres$ from either end of wire and lying on the axis of wire will be

a) $\frac{\mu_0}{2\pi}$ b) $\frac{\mu_0}{4\pi}$ c) $\frac{\mu_0}{8\pi}$ d) Zero

29. Two short magnets with their axes horizontal and perpendicular to the magnetic meridian are placed with their centres 40 cm east and 50 cm west of magnetic needle. If the needle remains undeflected, the ratio of their magnetic moments $M_1 : M_2$ is

a) $4:5$ b) $16:25$ c) $64:125$ d) $2:\sqrt{5}$

30. Two identical thin bar magnets each of length l and pole strength m are placed at right angle to each other with north pole of one touching south pole of the other. Magnetic moment of the system is

a) ml b) $2ml$ c) $\sqrt{2}ml$ d) $\frac{1}{2}ml$

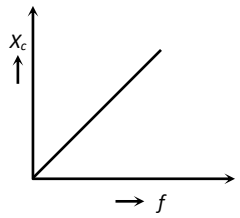
31. A uniformly wound solenoid coil of self-inductance 1.8×10^{-4}H and resistance 6Ω is broken up into two identical coils. These identical coils are then connected in parallel across a 12 V battery of negligible resistance. The time constant for the current in the circuit is

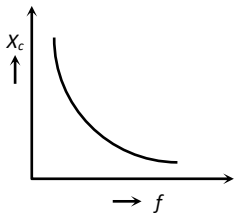
a) 0.1×10^{-4}s b) 0.2×10^{-4}s
c) 0.3×10^{-4}s d) 0.4×10^{-4}s

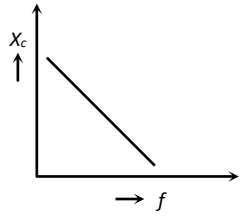
32. An alternating current of rms value 10 A is passed through a 12 Ω resistor. The maximum potential difference across the resistor is

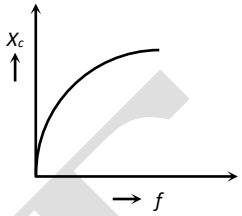
a) $20V$ b) $90V$
c) $169.68\ V$ d) None of these

33. Which of the following curves correctly represents the variation of capacitive reactance X_C with frequency f

a) 

b) 

c) 

d) 

34. The ozone layer of the atmosphere lies in the region called

a) Troposphere b) Stratosphere
c) Mesosphere d) Ionosphere

35. What will be the height of the image when an object of 2mm is placed at a distance 20 cm in front of the axis of a convex mirror of radius of curvature 40 cm?

a) 20 mm b) 10 mm c) 6 mm d) 1 mm

36. Resolving power of a microscope depends upon

a) The focal length and aperture of the eye lens
b) The focal lengths of the objective and the eye lens
c) The apertures of the objective and the eye lens
d) The wavelength of light illuminating the object

37. In Young's double-slit experiment, an interference pattern is obtained on a screen by a light of wavelength 6000 Å, coming from the coherent sources S_1 and S_2. At certain point P on the screen third dark fringe is formed. Then the path difference $S_1P - S_2P$ in microns is

a) 0.75 b) 1.5 c) 3.0 d) 4.5

38. The threshold frequency for a metallic surface corresponds to an energy of 6.2 eV and the stopping potential for a radiation incident on this surface is 5V. The incident radiation lies in

a) Ultra-violet region b) Infra-red region
c) Visible region d) X-ray region

39. Energy of a quanta of frequency $10^{15}\ Hz$ and $h = 6.6 \times 10^{-34} J\text{-}s$ will be

a) $6.6 \times 10^{-19} J$ b) $6.6 \times 10^{-12} J$
c) $6.6 \times 10^{-49} J$ d) $6.6 \times 10^{-41} J$

40. The wavelength of the first spectral line in the Balmer series of hydrogen atom is 6561 Å. The wavelength of the second spectral line in the Balmer series of singly ionized helium atom is

a) 1215 Å b) 1640 Å c) 2430 Å d) 4687 Å

41. In the Bohr's hydrogen atom model, the radius of the stationary orbit is directly proportional to (n = principle quantum number)
a) n^{-1} b) n c) n^{-2} d) n^2

42. The fraction of the initial number of radioactive nuclei which remain undecayed after half of a half-life of the radioactive sample is
a) $\frac{1}{\sqrt{2}}$ b) $\frac{1}{2}$ c) $\frac{1}{2\sqrt{2}}$ d) $\frac{1}{4}$

43. A crystal has bcc structure and its lattice constant is 3.6 Å. What is the atomic radius?
a) 3.6 Å b) 1.8 Å c) 1.27 Å d) 1.567 Å

44. An optical fibre communication system works on a wavelength of 1.3 μm. The number of subscribers it can feed if a channel requires 20 kHz are
a) 2.3×10^{10} b) 1.15×10^{10}
c) 1×10^{5} d) None of these

45. Sinusoidal carrier voltage of frequency 1.5 MHz and amplitude 50 V is amplitude modulated by sinusoidal voltage of frequency 10 kHz producing 50% modulation. The lower and upper side-band frequencies in kHz are
a) 1490, 1510 b) 1510, 1490
c) $\frac{1}{1490}, \frac{1}{1510}$ d) $\frac{1}{1510}, \frac{1}{1490}$

46. The equivalent mass of chlorine is 35.5 and the atomic mass of copper is 63.5. the equivalent mass of copper chloride is 99.0. hence, formula of copper chloride is
a) CuCl b) Cu_2Cl
c) $CuCl_2$ d) None of these

47. One gram mole of a gas at NTP occupies 22.4 L. This fact was derived from
a) Law of gaseous volumes
b) Avogadro's hypothesis
c) Berzelius hypothesis
d) Dalton's atomic theory

48. Rutherford scattering formula fails for very small scattering angles because
a) The kinetic energy of α- particles is larger
b) The gold foil is very thin
c) The full nuclear charge of the target atom is partially screened by its electron
d) All of the above

49. According to Bohr's model of hydrogen atom
a) Total energy of the electron is quantized
b) Angular momentum of electron is quantised
c) Both (a) and (b)
d) None of the above

50. The bond length of LiF will be
a) Equal to that of KF
b) More than that of KF
c) Equal to that of NaF
d) Less than that of NaF

51. Number of lone pair (s) in $XeOF_4$ is/are
a) 0 b) 1 c) 2 d) 3

52. Which one is polar molecule among the following?
a) CH_4
b) CCl_4
c) CO_2
d) H_2O

53. At constant volume, for a fixed number of mole of a gas, the pressure of the gas increases with rise of temperature due to
a) Increase in average molecular speed
b) Increase in number of mole
c) Increase in molecular attraction
d) Decrease in mean free path

54. What will be the temperature at which $\Delta G = -5.2$ kJ mol^{-1}, $\Delta H = 145.6$ kJ mol^{-1} and $\Delta S = 216$ JK^{-1}mol^{-1}for a chemical reaction?
a) 650 K b) 425°C c) 525 K d) 625°C

55. Consider the following reactions at 1100°C
(I) $2C + O_2 \rightarrow 2CO$, $\Delta G° = -460$ kJ mol^{-1}
(II) $2Zn + O_2 \rightarrow 2ZnO$, $\Delta G° = -360$ kJ mol^{-1}
Based on these, select correct alternate.
a) Zinc can be oxidised by CO
b) Zinc oxide can be reduced by carbon
c) Both are correct
d) None of the above is correct

56. What is the best description of the change that occurs when $Na_2O(s)$ is dissolved in water?
a) Oxidation number of sodium decreases
b) Oxide ion accepts sharing in a pair of electrons
c) Oxide ion donates a pair of electrons
d) Oxidation number of oxygen increases

57. Which one of the following reaction is possible at anode?
a) $F_2 + 2e^- \longrightarrow 2F^-$
b) $2H^+ + \frac{1}{2}O_2 + 2e^- \longrightarrow H_2O$

c) $2Cr^{3+} + 7H_2O \longrightarrow Cr_2O_7^{2-} + 14H^+ + 6e^-$
d) $Fe^{2+} \longrightarrow Fe^{3+} + e^-$

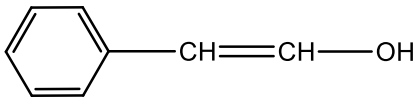
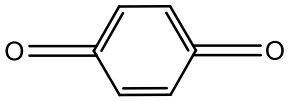
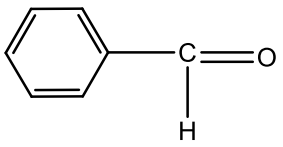
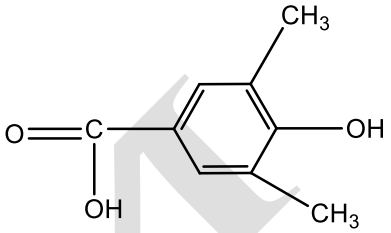
58. The oxidation number of oxygen in KO_3, Na_2O_2 is
a) 3,2 b) 1,0
c) 0,1 d) $-0.33, -1$

59. When zeolite which is hydrated sodium aluminium silicate is treated with hard water, the sodium ions are exchanged with
a) H^+ ions b) Mg^{2+} ion c) Ca^{2+} ion d) both Ca^{2-}

60. $CaC_2 + N_2 \rightarrow A$, product A is
a) $CaCN_2$ b) $CaCN_2$ and C
c) $CaCN_2 + N_2$ d) None of these

61. The colour of blue glass is due to the presence of oxide of
a) Cr b) Co c) Au d) Ag

62. Which of the following does not exist in free form?
a) BF_3 b) BH_3 c) BCl_3 d) BBr_3

63. Tautomerism is exhibited by
a) 
b) 
c) 
d) 

64. Identify Z in the following series?
$CH_2 = CH_2 \xrightarrow{HBr} X \xrightarrow{\text{Hydrolysis}} Y \xrightarrow[I_2 \text{ excess}]{Na_2CO_3} Z$
a) C_2H_5I b) CHI_3
c) CH_3CHO d) C_2H_5OH

65. Ozonolysis of an organic compounds gives formaldehyde as one of the products. This confirms the presence of
a) Two ethylenic double bonds
b) A vinyl group
c) An *iso*-propyl group
d) An acetylenic triple bond

66. Which of the following types of pollution is caused by invisible pollutants?
a) Thermal pollution b) Noise pollution
c) Radioactive pollution d) All of these

67. What is the structure of NaCl?
a) BCC b) FCC
c) Interpenetrating fcc d) None of these

68. The limiting radius ratio for tetrahedral shape is
a) 0 to 0.155 b) 0.255 to 0.414
c) 0.155 to 0.225 d) 0.414 to 0.732

69. In a solution of 7.8 g benzene (C_6H_6) and 46.0 g toluene ($C_6H_5CH_3$), the mole-fraction of benzene is
a) $\frac{1}{2}$ b) $\frac{1}{3}$ c) $\frac{1}{5}$ d) $\frac{1}{6}$

70. Which of the following can be measured by the Ostwald-Walker dynamic method?
a) Relative lowering of vapour pressure
b) Lowering of vapour pressure
c) Vapour pressure of the solvent
d) All of the above

71. On passing 0.1 F of electricity through aluminium metal deposited at cathode is (Al = 27)
a) 0.3 g b) 0.6 g c) 0.9 g d) 1.2 g

72. A reaction has a rate constant of $0.5\ mol^{-1}dm^3\ min^{-1}$. If initial concentration of the reactant is $0.2\ mol\ dm^{-3}$, half-life of the reaction
a) 1.4 min b) 10 min c) 15 min d) 20 min

73. At 373 K, a gaseous reaction $A \rightarrow 2B + C$ is found to be of first order. Starting with pure A, the total pressure at the end of 10 min was 176 mm and after a long time when A was completely dissociated, it was 270 mm. The pressure of A at the end of 10 min was
a) 94 mm b) 47 mm c) 43 mm d) 90 mm

74. Which will not form colloidal solution?
(Where DP = Dispersion phase and DM = Dispersion medium)
a) DP-gas, DM-liq. b) DP-liquid DM-solid
c) DP-gas, DM-gas d) DP-solid, DM-solid

75. The slag obtained during the extraction of copper from copper pyrites is composed of
a) Cu_2S b) SiO_2 c) $CuSiO_3$ d) $FeSiO_3$

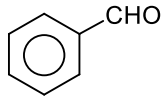
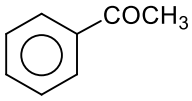
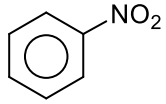
76. The method of concentrating the ore which makes use of the difference in density between ore and impurities is called

a) Leaching b) Liquation
c) Levigation d) Magnetic separation

77. Which of the following is not a peroxy acid?
a) Perphosphoric acid b) Pernitric acid
c) Perdisulphuric acid d) Perchloric acid

78. Number of electrons in $3d$-orbital of V^{2+}, Cr^{2+}, Mn^{2+}, and Fe^{2+} are 3, 4, 5 and 6 respectively. Which of the following ions will have largest value of magnetic moment (μ)?
a) V^{2+} b) Cr^{2+} c) Mn^{2+} d) Fe^{2+}

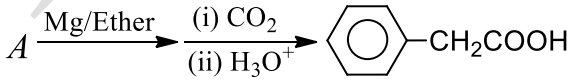
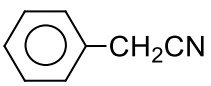
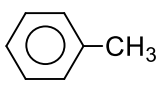
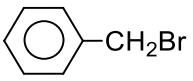
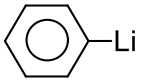
79. One of the following metals is obtained by leaching its ore with dilute cyanide solution. Identify it.
a) Titanium b) Vanadium
c) Silver d) Zinc

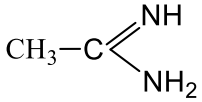
80. Which of the following compounds can exhibit tautomerism?
a) 
b) 
c) 
d) $CH_3 - CH - CH_3$ with NH_2

81. In the preparation of chlorobenzene from aniline, the most suitable reagent is
a) Chlorine in the presence of ultraviolet light
b) Chlorine in the presence of $AlCl_3$
c) Nitrous acid followed by heating with Cu_2Cl_2
d) HCl and Cu_2Cl_2

82. Phenol $\xrightarrow{NaNO_2/H_2SO_4} B \xrightarrow{H_2O} C \xrightarrow{NaOH} D$
Name of the above reaction is
a) Liebermann's reaction
b) Phthalein fusion test
c) Reimer-Tiemann reaction
d) Schotten-Baumann reaction

83. Phenol is heated with phthalic anhydride in presence of concH_2SO_4. The product gives pink colour with alkali. The product is
a) Phenolphthalein b) Bakelite
c) Salicylic acid d) Fluorescein

84. Identify the starting material of the following reaction

a) 
b) 
c) 
d) 

85. The correct order of basicities of the following compound is

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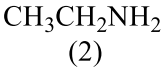
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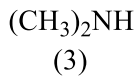
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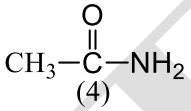
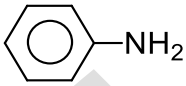
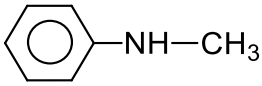
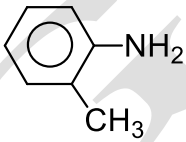
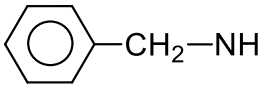
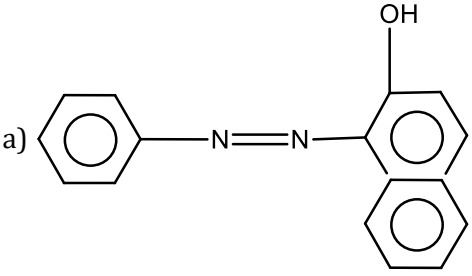
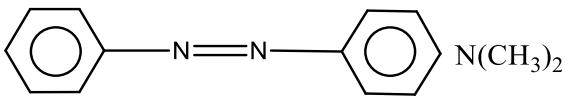

(4)
a) 2>1>3>4 b) 1>3>2>4
c) 3>1>2>4 d) 1>2>3>4

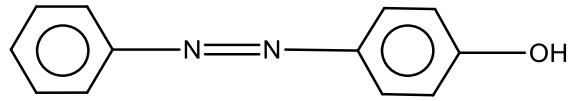
86. Which of the following is the strongest base?
a) 
b) 
c) 
d) 

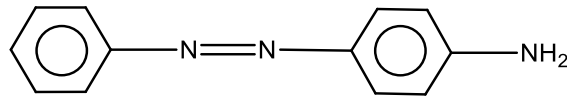
87. Which of the following test is not used for testing of proteins?
a) Millon's test b) Molish's test
c) Biuret test d) Ninhydrin test

88. Which of the following types of bonds are present in nylon-6, 6?
a) Covalent bond b) Double bond
c) Hydrogen bond d) All of these

89. In case of condensation of polymers?
a) High molecular weight polymers are formed all at once.
b) Lower molecular weight polymers are formed all at once.
c) Molecular weight of polymers rises throughout the reaction.
d) Have no specific relation to their molecular weight.

90. Which of the following is red dye?
a) 
b) 

c) 

d) 

91. Phenetic classification of organism is based on
    a) Observable characteristics of existing organisms
    b) The ancestral lineage of existing organism
    c) Dendrogram based on DNA characteristics
    d) Sexual characteristics
92. Which of the following is correctly sequenced?
    a) Phylum, class, order, family
    b) Phylum, order, class, genus
    c) Phylum, class, family, order
    d) Phylum, order, family, class
93. Biodiversity can be best defined as
    a) Occurrence of number and type of organisms
    b) Species and ecosystem of a region
    c) Variety of life in an ecosystem
    d) Totality of genes, species and ecosystem of a given region
94. Slipper animalcule is
    a) *Paramecium*
    b) *Trypanosoma*
    c) *Entamoeba*
    d) Protozoa
95. Choose the correct sequence of stages of growth curve for bacteria
    a) Lag, log, stationary, decline phase
    b) Lag, log, stationary phase
    c) Stationary, lag, log, decline phase
    d) Decline, lag, log phase
96. Ectophloicsiphonostele is found in
    a) *Adiantum* and *Cucurbitaceae*
    b) *Osmunda* and *Equisetum*
    c) *Marsilea* and *Botrychium*
    d) *Dicksonia* and maiden hair fern
97. Two very distinst generations are found in the life cycle of
    a) Bacteria
    b) *Spirogyra*
    c) *Volvox*
    d) Ferns
98. Which one of the following animals possesses high regeneration capacity?
    a) *Planaria*
    b) *Taenia*
    c) *Salpa*
    d) *Periplaneta*
99. If *Hydra* is cut transversely in three equal parts, then
    a) All three parts will die
    b) Regeneration will occur in all the three parts
    c) Regeneration will occur only in anterior part
    d) Regeneration occur only in middle part
100. Pouched mammals are
    a) Prototherians
    b) Metatherians
    c) Eutherians
    d) Therians
101. $\underline{G}_{\infty}$ stands for
    a) Gynoecium, polycarpellary, apocarpous, inferior
    b) Gynoecium, polycarpellary, syncarpous, superior
    c) Gynoecium, polycarpellary, apocarpous, superior
    d) Gynoecium, polycarpellary, inferior, apocarpous inferior
102. How many types of inflorescence are present in angiosperm depending on whether the apex gets converted into a flower or continuous to grow?
    a) Three type
    b) Four type
    c) Five type
    d) Two type
103. In which plant, the fruit is a drupe, seed coat is thin, embryo is inconspicuous and endosperm is edible?
    a) Groundnut
    b) Wheat
    c) Apple
    d) Coconut
104. The scutellum observed in a grain of wheat or maize is comparable to which part of the seed in other monocotyledons?
    a) Cotyledon
    b) Endosperm
    c) Aleurone layer
    d) Plumule
105. Meristamatic tissue helps in the
    a) Absorption of water
    b) Growth of plant
    c) Absorption of minerals
    d) Transpiration
106. Dendrochronology is
    a) Secondary growth
    b) Apical growth
    c) Seasonal variation
    d) Determination of age of tree
107. Cockroaches are placed in the phylum-Arthropooda because
    a) Chewing mouth parts
    b) Presence of wings

c) Chitinous exoskeleton
d) Joined appendages

108. Which of the following are the examples of saccular glands?
a) Oil and milk glands of humans
b) Sweat gland in mammals
c) Brunner's gland in humans
d) None of the above

109. Cytoskeleton is made up of
a) Calcium carbonate granules
b) Callose deposits
c) Cellulosic microfibrils
d) Proteinaceous filaments

110. Meselson and Stahl experiment on semi-conservative replication demonstrates
a) 60% radioactive, 50% non-radioactive
b) 50% non-radioactive
c) 50% radioactive
d) None of the above

111. The inhibitor which inhibits the enzyme activity by binding to the active site of the enzyme, due to the close resemblance to the substrate in its molecular structure is called
a) Non-competitive inhibitor
b) Competitive inhibitor
c) Allosteric modulator
d) Feedback inhibitor

112. Which of the following polysaccharide is present as a store house of energy in plant tissues?
a) Glycogen
b) Cellulose
c) Insulin
d) Starch

113. What is not seen during mitosis in somatic cells?
a) Spindle fibre
b) Chromosomes movement
c) Disappearance of nucleolus
d) Synapsis

114. Choose the correct statements regarding cell cycle
I. Interphase is called the resting phase
II. Interphase is the time during which the cell is preparing for division
III. The interphase is divided into phases, *i.e.*, G_1, S and G_2-phase
IV. Interphase represents the phase between the two successive M-phases
The option with correct statements is
a) I and IV
b) II and III
c) I and III
d) I, II, III and IV

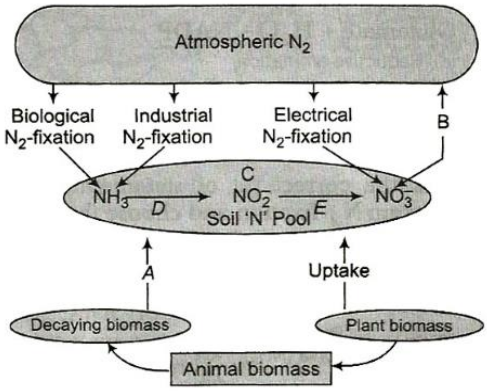
115. Root hair absorb water from the soil on account of
a) Turgor pressure
b) Osmotic pressure
c) Suction pressure
d) Root pressure

116. Cell A has $\Psi_w - 3$ bars and cell B has $\Psi_w - 8$ bars. The movement of water will be from
a) Cell A to cell B
b) Cell B to cell A
c) Data insufficient
d) Water can not move in negative value of ΨW

117. Which of the following is used as an antitranspirant?
a) Cobalt chloride
b) Naphthol acetic acid
c) Calcium carbonate
d) Phenyl mercuric acetate

118. Potassium is required by which of the following regions of plants
I. Meristematic tissues
II. Buds
III. Leaves
IV. Root tips
a) Only I
b) I and IV
c) II and IV
d) All of these

119. Identify the labels in the given flow diagram which links the major nitrogen pools
Choose the correct combination from the options given below



a) A-Nitrification, B-Ammonification, C-*Nitrobacter*, D-*Nitrosomonas*
b) A-Ammonification, B-Denitrification, C-Nitrification, D-*Nitrosomonas*, E-*Nitrobacter*
c) A-Denitrification, B-*Nitrobacter*, C-Nitrification, D-*Nitrosomonas*, E-
d) A-*Nitrobacter*, B-Denitrification, C-*Nitrosomonas*, D-Ammonification

Ammonification

120. 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

121. Substance which is essential for the respiration as well as photosynthesis is
a) Cytochrome b) RuBisCo
c) Plastocyanin d) Ubiguinine

122. Which of the following substrate can enter into the respiration?
a) Glucose b) Amino acid
c) Fatty acid d) All of these

123. Apparatus to measure rate of respiration and respiratory quotient is
a) Auxanometer b) Potometer
c) Respirometer d) Manometer

124. The chemical nature of gibberellins is
a) Acidic b) Alkaline
c) Proteinaceous d) Amines

125. Short day plant is
a) *Xanthium* b) *Pisum*
c) *Cucumis* d) *Avena*

126. Closure of lid of picher, in pitcher plant, is
a) Tropic movement
b) Paratonic movement
c) Turgor movement
d) Autonomous movement

127. What is cholecystokinin?
a) Enzyme
b) Bile-pigment
c) Gastro- intestinal hormone
d) Lipid

128. Among mammals, a significant role in the digestion of milk is played by
a) Rennin b) Invertase
c) Amylase d) Intestinal bacteria

129. One of the major cause of emphysema is
a) Pollution b) Smog
c) Cigarette smoking d) Sanitary condition

130. Which is called Hamburger shift?
a) Hydrogen shift b) Bicarbonate shift
c) Chloride shift d) Sodium shift

131. To which of the following, bundle of His passes stimulus of contraction?
a) AV-node b) SA-node
c) Purkinje fibre d) Atrium

132. The systemic circulation provides nutrients, ...A... and other essential substances to the ...B... and takes ...C... and other harmful substances away for elimination
Choose the correct option for A, B, C and D
a) A-CO_2, B-tissue, C-O_2
b) A-O_2, B-tissue, C-CO_2
c) A-O_2, B-tissue, C-NO_2
d) A-NO_2, B-tissue, C-CO_2

133. Mammals excrete
a) Urea b) Uric acid
c) Ammonia d) All of these

134. Reabsorption of the filtrate in the renal tubules takes place by
a) Active means b) Passively means
c) Either (a) or (b) d) Osmosis means

135. Podocytes are present on the
a) Endothelial cells of the glomerulus
b) Endothelial cells of the Bowman's capsule
c) Epithelium cells of the Bowman's capsule
d) Epithelium cells of the glomerulus

136. Human skull is
a) Monocondylic b) Dicondylic
c) Procoelous d) Heterocoelous

137. Actin binding sites are located on
a) Troponin b) Tropomyosin
c) Meromyosin d) Both (b) and (c)

138. Ciliary movement occurs in most of our internal tubular organs which are lined by ...A epithelium. The coordinated movement of cilia in the ...B... help us in removing dust particles. Passage of ova through female reproductive tract is facilitated by the ...C... movement
Identify A, B and C to complete the given NCERT statement
a) A-squamous, B-trachea, C-ciliary
b) A-cuboidal, B-trachea, C-ciliary
c) A-ciliated B-trachea, C-amoeboid
d) A-stratified, B-trachea, C-amoeboid

139. The function of Na^+ and K^+ pump is to move
a) Na^+ in and K^+ out b) Na^+ out and K^+ in
c) Na^+ out and Cl^- in d) Cl^- out and Na^+ in

140. In humans, tympanic membrane is composed of connective tissues which is covered with
a) Skin outside and with mucus membrane inside
b) Mucus membrane only
c) Mucus membrane outside and with skin inside
d) Skin only

141. Which of the following is correct
a) Leukaemia - Skin cancer

b) Diabetes - Sugar free
c) Rheumatic fever - Defective pacemaker
d) Heart attack - Radiation therapy

142. Pituitary gland is divided into
a) Adenohypophysis and neurohypophysis
b) Adenohypophysis and pars distalis
c) Adenohypophysis and pars intermedia
d) Adenohypophysis and anterior pituitary

143. Which one is female gametophyte?
a) Embryo b) Embryo sac
c) Endosperm d) Synergid

144. What is common between vegetative reproduction and apomixis?
a) Both occur round the year
b) Both produce progeny identical to the parent
c) Both are applicable to only dicot plants
d) Both bypass the flowering plant

145. Study the following pairs.

I. Modified aerial stem	- Unisexual flowers Develop Acropetally	- Chalazal entry of pollen tube
II. Flowers achlamydeous	- Pedicels of all the flowers are of same Length	- Presence of false whorl
III. Cohesion of Bracts forming a cup	- Centrifugal opening of flowers	- Male flowers many
IV. flower Formation on One side in a Spiral manner	- Presence of rachilla	- terminal part of the peduncle is flowerless

Select the correct pair of answers in which the former represents the set of characters present in *poinsettia* and the latter in the pair represents the set of characters present in *casuarina.*
a) II and III b) I and II
c) IV and III d) III and I

146. Identify the correct statement.
a) Because of marked climatic variations, plants growing near the sea shore do not produce annual rings
b) The age of the plant can be determined by its height
c) Healing of damaged tissue is because of the activity of sclerenchyma cells
d) Grafting is difficult in monocot plants as they have scattered vascular bundles

147. Development of an embryo without fertilization Is called as
a) Apomixis b) Polyembryony
c) Parthenocarpy d) Parthenogenesis

148. Saheli is a
a) Oral contraceptive for females
b) Surgical sterilization method for females
c) Diaphragm for females
d) Surgical method of sterilization in males

149. Correct statement with reference to a test tube bay is
a) The fertilized egg is placed in the womb of the mother where the gastrula period is completed
b) Unfertilized egg is placed in the womb and allowed to grow parthenogenetically
c) A prematurely born baby is reared in an incubator
d) Fertilized egg is taken out and grown in a large test tube

150. During embryonic development, endoskeleton and muscle develop from which germinal layer?
a) Ectoderm b) Endoderm
c) Mesoderm d) Blastopore

151. Function of bulbourethral gland is to
a) Lubricate the penis
b) Increase the motility of sperm
c) Enhance the sperm count
d) All of the above

152. 'Hum Do Hamare Do' slogan for encourages
a) Family planning
b) Immunisation
c) Electric growth
d) Patriotism

153. Choose the correct causes for the population growth
I. Decline in death rate
II. Rapid increase in MMR and IMR
III. Rapid decline in MMR and IMR
IV. Increase in the number of people, in the reproductive age group
V. Rapid increase in the death rate
a) I, II, III, IV and V
b) I, II and IV
c) I, III and IV
d) III, IV and V

154. Colourblindness is caused due to
a) Recessive female chromosome
b) Dominant female chromosome

c) Dominant male chromosome
d) linkage

155. Sexual reproducation leads to
a) Genetic recombination
b) Polyploidy
c) Aneuploidy
d) Euploidy

156. Mendel was successful in discovering the principles of inheritance as
a) He took pea plants for his experiments
b) He did not encounter linkage between the genes for the characters he considered
c) He had an in-depth knowledge on hybridization
d) He was a famous mathematician

157. UGA, UAG and UAA are called termination codons because
a) They terminate anticodon
b) They are present at the beginning of *m*RNA
c) They do not specify any amino acid
d) They indicate initiation of polypeptide chain

158. Starting codon is prokaryotes codes for
a) Methyle methionine b) Ethyle methionine
c) Propyle methionine d) Formyle methionine

159. Ancestor of man, who first stood erect, was
a) *Australopithecus* b) Cromagnon
c) Java –ape man d) Peking man

160. The first enzyme on the primitive earth was/were
a) Proteins b) DNA
c) RNA d) Amino acids

161. The major phagocytic cells are
a) Antibody b) Antigen
c) Lymphocytes d) Macrophages

162. Flemming, Chain and Florey were awarded the Nobel Prize in 1945 for the discovery of
a) HIV b) CT scan
c) Penicillin d) *Staphylococcus*

163. Sickle cell anaemia has not been eliminated from the African population because
a) It is controlled by recessive genes
b) It is not a fatal disease
c) It provides immunity against malaria
d) It is controlled by dominant genes

164. Pearl producing Indian species is:
a) *Pinctada indica*
b) *Ostrea indica*
c) *Pinctada vulgaris*
d) *Ostrea vulgaris*

165. Part of the plant, which is cultured to obtain virus free clones is
a) Leaf b) Root tip
c) Short tip d) Embryo

166. Genetic diversity in agricultural crops is threatened by
a) Introduction of high yielding varieties
b) Intensive use of fertilizers
c) Extensive intercropping
d) Intensive use of biopesticides

167. Which of the following plant yields oil and fibre both?
a) *Cocos nucifera*
b) *Eucaiyptus*
c) *Brassica compestris*
d) *Euphorbia hirta*

168. The tumour inducing capacity of *Agrobacterium tumefaciens* is located in large extrachromosomal plasmids called
a) Ri-plasmid b) Lambda phage
c) pBR322 d) Ti-plasmid

169. Producing a 'giant mouse' in the laboratory was possible through:
a) Gene mutation b) Gene duplication
c) Gene synthesis d) Gene manipulation

170. Molecular scissors are
a) Restriction endonucleases
b) DNA polymerase
c) DNA ligase
d) RNA polymerase

171. The green revolution succeeded in increasing the yield of crops mainly due to the use of
I. improved varieties of the crops
II. agro-chemicals
III. better management practices
Choose the correct option
a) I and II b) I and III
c) II and III d) I, II and III

172. In which of the following method, a probe is allowed to hybridise to its complementary DNA in the clone of cells?
a) Gene therapy
b) Recombinant DNA technology
c) Polymerase chain reaction
d) Enzyme Linked Immuno-Sorbent Assay (ELISA)

173. Choose the wrong statement
a) Natality and immigration increases the population density
b) Mortality and emigration decreases the population density
c) Adverse condition does not effect the population density

d) Food availability and predation pressure affect population density

174. Humus is formed by
a) Partial degradation of organic matter
b) Complete degradation of organic matter
c) Complete degradation of inorganic matter
d) Partial degradation of organic matter

175. Primary productivity is
I. is 10% less than secondary productivity
II. is the rate of formation of new organic matter by consumers
III. is expressed in terms of weight or energy
IV. is the amount of biomass or organic matter produced per unit area over a time period in plants during photosynthesis
Which of the statements given above are correct?
a) I, II and III b) I and II
c) III and IV d) II and IV

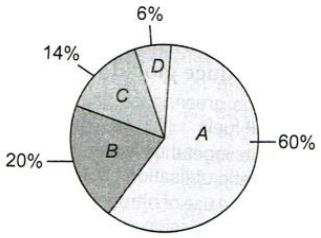
176. Gross primary productivity is utilised by ...A... in ...B...
Choose the correct option for A and B
a) A-plants; B-photosynthesis
b) A-plants; B-respiration
c) A-animal; B-respiration
d) A-animal; B-digestion

177. Manas sanctuary is located at
a) Rajastha b) Asom c) Bihar d) Gujarat

n

178. Which of the following is the correct estimation about the numbers of national parks, biosphere and the wildlife sanctuaries of India
a) 158,62,10 b) 58,412,10
c) 96,412,10 d) 90,14,448

179. Study carefully the following pie diagram representing the relative contribution of various greenhouse gases to total global warming. Identify the gases A, B, C and D



a) A-N_2O, B − CO_2, C − CH_4, D − CFCs
b) A-CO_2, B − CH_4, C − CFCs, D − N_2O
c) A-CH_4, , B − CFCs, C − N_2O, D − CO_2
d) A-CFCs, , B − N_2O, C − CO_2, D − CH_4

180. Identify the correctly matched pair.
a) Montreal protocol - Global warming
b) Kyoto protocol - Climate change
c) Ramsar convention - Ground water pollution
d) Basal convention - Biodiversity conservation

MERITSTORE

Date: **NEET FULL PORTION** **TEST ID: 31**

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

: ANSWER KEY :

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

: HINTS AND SOLUTIONS :

2 **(c)**

Momentum $[MLT^{-1}]$, Plank's constant $[ML^2T^{-1}]$

3 **(a)**

$S_{3rd} = 10 + \frac{10}{2}(2 \times 3 - 1) = 35$

$S_{2nd} = 10 + \frac{10}{2}(2 \times 2 - 1) = 25$

$\therefore \frac{S_{3rd}}{S_{2nd}} = \frac{35}{25}\ ie = \frac{7}{5}$

4 **(b)**

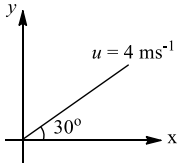
Here, $T = \frac{2\pi r}{4v} = \frac{\pi r}{2v}$

Change in velocity is going from A to $B = v\sqrt{2}$

Average acceleration $= \frac{v\sqrt{2}}{\pi r/2v} = \frac{2\sqrt{2}v^2}{\pi r}$

5 **(b)**

Components of velocity of ball relative to lift are



$u_x = 4\cos 30° = 2\sqrt{3}\text{ms}^{-1}$

and $u_y = 4\sin 30° = 2\text{ms}^{-1}$

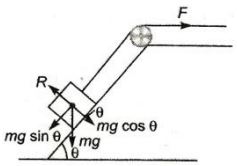
and acceleration of ball relative to lift is 12 ms^{-2} in negative y-direction or vertically downwards.

Hence, time of flight

$$T = \frac{2u_y}{12} = \frac{u_y}{6} = \frac{2}{6} = \frac{1}{3}\text{s}$$

6 **(c)**

Total force required



$$F = mg\sin\theta + f$$
$$= mg\sin\theta + \mu_s R$$
$$= mg\sin\theta + \mu_s mg\cos\theta$$
$$= mg(\sin\theta + \mu_s\cos\theta)$$
$$= 200 \times 10(\sin 45° + 0.5\cos 45°)$$
$$F = \frac{200 \times 10 \times 3}{2\sqrt{2}} = 5$$

The number of men required will be

$$\frac{200 \times 10 \times 3}{500 \times 2\sqrt{2}} = 5$$

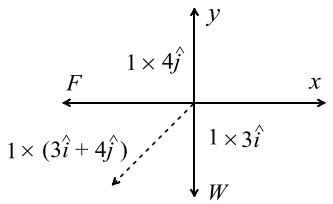
7 **(d)**

According to law of conservation of momentum the third piece has momentum

$$= 1 \times -(3i + 4\hat{j})kg\ ms^{-1}$$

Impulse = Average force × time

$$\Rightarrow \text{Average force} = \frac{\text{Impulse}}{\text{time}}$$



$$= \frac{\text{Change in momentum}}{\text{time}}$$
$$= \frac{-(3\hat{\imath} + 4\hat{j})kg\ ms^{-1}}{10^{-4}s} = -(3\hat{\imath} + 4\hat{j}) \times 10^4\ N$$

8 **(b)**

The work is stored as the PE of the body and is given by,

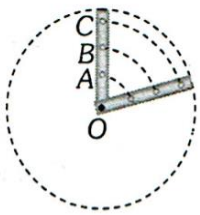
$$U = \int_{x_1}^{x_2} F_{\text{external}}\,dx$$

Or $U = \int_{x_1}^{x_2} kx\,dx$

$$= \frac{1}{2}k(x_2^2 - x_1^2)$$
$$= \frac{800}{2}[(0.15)^2 - (0.05)^2][K = 800\ \text{(given)}]$$
$$= 400[0.2 \times 0.1]$$
$$= 8\ \text{J}$$

9 **(c)**

As the body is rigid therefore angular velocity of all particles will be same $i.e.\ \omega =$ constant



From $v = r\omega, v \propto r$ (if $\omega =$ constant)

It means linear velocity of that particle will be more, whose distance from the centre is more, $i.e.\ v_A < v_B < v_C$ but $\omega_A = \omega_B = \omega_C$

11 **(d)**

$$F = \frac{Gm_1m_2}{(r+2r)^2} = \frac{Gm_1m_2}{9r^2}, ie, F \propto r^{-2}$$

Note that $F \propto r^4$ by taking $m = \frac{4}{3}\pi r^4\rho$ and then

$$F \propto \frac{r^3r^3}{r^2}, ie, F \propto r^4$$

is not correct because the gravitational law obeys inverse square law and is not related with densities

12 **(d)**

When the length of wire is doubled then $l = L$ and strain $= 1 \therefore Y =$ strain $= \frac{F}{A}$

$$\therefore \text{Force} = Y \times A = 2 \times 10^{11} \times 0.1 \times 10^{-4}$$
$$= 2 \times 10^6 N$$

13 **(b)**

According to equation of continuity,

$av =$ constant

$$\therefore \quad \text{For tube, } (8 \times 10^{-4}) \times \left(\frac{0.15}{60}\right) = a_1v_1$$

For holes $(40 \times 10^{-8}) \times \text{v} = a_2v_2$

$$\therefore\ a_1v_2 = a_2v_1$$
$$\therefore\ 40 \times 10^{-8} \times v = \frac{8 \times 10^{-4} \times 0.15}{60}$$
$$\Rightarrow\ v = \frac{8 \times 10^{-4} \times 0.15}{40 \times 10^{-8} \times 60} = 5\text{ms}^{-1}$$

15 **(d)**

$$E \propto AT^4 \Rightarrow \frac{E_{\text{sphere}}}{E_{\text{Disc}}} = \frac{4\pi r^2}{2\pi r^2} \times \left(\frac{T}{T}\right)^4 = \frac{2}{1}$$

16 **(a)**

Below 150 K, hydrogen behaves as monoatomic gas

$\therefore$ For the mixture, $\gamma = \frac{1}{2}[\gamma_{\text{mono}} + \gamma_{\text{di}}] =$

$$\frac{1}{2}\left(\frac{5}{3} + \frac{7}{5}\right) = \frac{3}{2}$$

17 **(a)**

An isothermal process is a constant temperature process. In this process, $T =$ constant or $\Delta T = 0$.

$$\therefore \qquad \Delta U = nC_V\,\Delta T = 0$$

An adiabatic process is defined as one with no

heat transfer into or out of a system. Therefore, $\Delta Q = 0$. From the first law of thermodynamics.

$$W = -\Delta U$$

or $$\Delta U = -W$$

18 **(a)**

$\frac{C_P}{C_V} = \gamma = 1 + \frac{2}{f}$

19 **(c)**

Acceleration $= \omega^2 a$ at extreme position is maximum

20 **(d)**

$T = 8\text{s}, \omega = \frac{2\pi}{T} = \left(\frac{\pi}{4}\right) \text{rads}^{-1}$

$x = A \sin \omega\, t$

$\therefore \quad a = -\omega^2 x = -\left(\frac{\pi^2}{16}\right) \sin\left(\frac{\pi}{4} t\right)$

Substituting $t = \frac{4}{3}$ s, we get

$a = -\left(\frac{\sqrt{3}}{32}\pi^2\right) \text{cms}^{-2}$

21 **(d)**

Let intensity of sound be I and I'.

Loudness of sound initially

$\beta_1 = 10 \log\left(\frac{I}{I_0}\right)$

Later,

$\beta_2 = 10 \log\left(\frac{I'}{I_0}\right)$

Given, $\beta_2 - \beta_1 = 20$

$\therefore 20 = \log\left(\frac{I'}{I}\right)$

$I' = 100I$

22 **(c)**

Potential energy as well as force are positive if there is repulsion between the particles and negative if there is attraction.

We take of only the magnitude of values when discussing decrease or increase of energy.

As P. E. $= \frac{Q_1 Q_2}{4\pi\varepsilon_0 r}$,

Plus or minus, i.e., whether both are of the same sign or different, if r decreases, the value increase, Therefore (c) is wrong

23 **(c)**

Battery in disconnected so Q will be constant as $C \propto K$. So with introduction of dielectric slab capacitance will increase using $Q = CV, V$ will decrease and using $U = \frac{Q^2}{2C}$, energy will decrease

24 **(a)**

The system will be equivalent to series combination of two capacitors of half thickness *ie*.,each of capacity 2 C

$\therefore \quad \frac{1}{C_s} = \frac{1}{2c} + \frac{1}{2c} = \frac{1}{c} or\ C_s = c$

∴capacity remains the same

25 **(d)**

Potential gradient is given by

$k = \frac{V}{l} = \frac{IR}{l} (\because V = I\,R)$

$= \frac{I \times \rho l/A}{l} \left(\because R = \frac{\rho l}{A}\right)$

$= \frac{I\rho}{A}$

$\therefore \quad k = \frac{0.01 \times 10^{-3} \times 10^9 \times 10^{-2}}{10^{-2} \times 10^{-4}} = 10^8 \text{Vm}^{-1}$

26 **(a)**

Meter bridge is an arrangement which works on Wheatstone's principle, so the balancing condition is

$\frac{R}{S} = \frac{l_1}{l_2}$

Where $l_2 = 100 - l_1$

Ist case $R = X, S = Y, l_1 = 20$ cm, $l_2 = 100 - 20 =$ 80cm

$\therefore \quad \frac{X}{Y} = \frac{20}{80}$ ... (i)

IInd Case Let the position null point is obtained at a distance l from same end.

$\therefore R = 4X, S = Y, l_1 = l, l_2 = 100 - l$

So, from Eq. (i)

$\frac{4X}{Y} = \frac{l}{100 - l}$

$\Rightarrow \frac{X}{Y} = \frac{l}{4(100 - l)}$ ... (ii)

Therefore, form Eqs. (i) and (ii)

$\frac{l}{4(100 - l)} = \frac{20}{80}$

$\Rightarrow \frac{l}{4(100 - l)} = \frac{1}{4}$

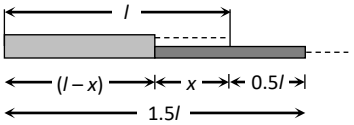
$\Rightarrow \quad l = 100 - l$

$\Rightarrow \quad 2l = 100$

Hence, l=50cm

27 **(a)**

Let l be the original length of wire and x be its length stretched uniformly such that final length is 1.5 l



Then $4R = \rho\frac{(l-x)}{A} + \rho\frac{(0.5l+x)}{A'}$ where $A' = \frac{x}{(0.5l+x)}A$

$\therefore 4\rho\frac{l}{A} = \rho\frac{l-x}{A} + \rho\frac{(0.5l+x)^2}{xA}$

or $4l = l - x + \frac{1}{4}\frac{l^2}{x} + \frac{x^2}{x} + \frac{lx}{x}$ or $\frac{x}{l} = \frac{1}{8}$

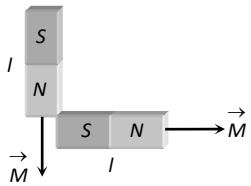
28 **(d)**

The magnetic field at any point on the axis of wire be zero

29 **(c)**

For null deflection $\frac{M_1}{M_2} = \left(\frac{d_1}{d_2}\right)^3 = \left(\frac{40}{50}\right)^3 = \frac{64}{125}$

30 **(c)**



$M_{net} = \sqrt{2}M = \sqrt{2}ml$

31 **(c)**

Given, self inductance, $L = 1.8 \times 10^{-4}$H

Resistance, $R = 6\Omega$

When self inductance and resistance is broken up into identical coils.

Then, self inductance of each oil

$$= \frac{1.8 \times 10^{-4}}{2}\text{H}$$

Resistance of each oil

$$= \frac{6\Omega}{2} = 3\Omega$$

Coil are then connected in parallel

$$\therefore \quad L' = \frac{\frac{1.8}{2} \times 10^{-4} \times \frac{1.8}{2} \times 10^{-4}}{\frac{1.8}{2} \times 10^{-4} + \frac{1.8}{2} \times 10^{-4}}$$

$$= 0.45 \times 10^{-4}\text{H}$$

and $R' = \frac{3\times3}{3+3} = 1.5\Omega$

Time constant $= \frac{L'}{R'}$

$$= \frac{0.45 \times 10^{-4}}{1.5} = 0.3 \times 10^{-4}\text{s}$$

32 **(c)**

Here $I_{rms} = 10\ A, R = 12\Omega$

The maximum current is

$I_m = \sqrt{2}I_{rms} = \sqrt{2}(10) = 10\sqrt{2}\ A$

Maximum potential difference is $V_m = I_m R$

$= 10\sqrt{2} \times 12 = 169.68\ V$

33 **(b)**

$X_C = \frac{1}{\omega C} = \frac{1}{2\pi f C}$

$i.e., X_C \propto \frac{1}{f}$

35 **(d)**

$O = 2$ mm, $u = -20$ cm

$f = \frac{R}{2} = \frac{40}{2} = 20$ cm

From mirror formula,

$\frac{1}{f} = \frac{1}{v} + \frac{1}{u}$

$\frac{1}{20} = \frac{1}{v} + \frac{1}{-20}$

$\frac{1}{v} = \frac{1}{20} + \frac{1}{20}$

$\Rightarrow v = 10$ cm

$\therefore \frac{I}{O} = \frac{v}{u}$

$\frac{I}{2} = \frac{10}{20}$

$\Rightarrow I = 1$ mm

Height of image = 1 mm

36 **(d)**

R.P. of microscope $= \frac{2\mu\sin\theta}{\lambda}$

37 **(b)**

For dark fringe at P

$S_1P - S_2P = \Delta = (2n-1)\lambda/2$

Here $n = 3$ and $\lambda = 6000$Å

So, $\Delta = \frac{5\lambda}{2} = 5 \times \frac{6000\text{Å}}{2} = 15000\text{Å} = 1.5\ micron$

38 **(a)**

$hv_0 = 6.2\ eV, \qquad eV_0 = 5\ eV$

from Einstein's photoelectric equation

$$hv = hv_0 + eV_0 = 6.2 + 5$$

$$= 11.2\ eV$$

$$\Rightarrow \quad \frac{hc}{\lambda} = 11.2$$

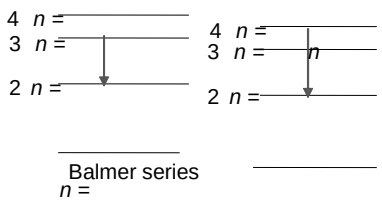
$$\therefore \quad \lambda = \frac{hc}{11.2} = 1108.9\text{Å}$$

Which belongs to ultra-violet region.

39 **(a)**

$E = hv = 6.6 \times 10^{-34} \times 10^{15} = 6.6 \times 10^{-19}J$

40 **(a)**



For hydrogen or hydrogen type atoms

$\frac{1}{\lambda} = RZ^2\left(\frac{1}{n_f^2} - \frac{1}{n_i^2}\right)$

In the transition from $ni \rightarrow nf$

$$\therefore \quad \lambda \propto \frac{1}{Z^2\left(\frac{1}{n_f^2}-\frac{1}{n_i^2}\right)}$$

$$\therefore \quad \frac{\lambda_2}{\lambda_1}=\frac{Z_1^2\left(\frac{1}{n_f^2}-\frac{1}{n_i^2}\right)_1}{Z_2^2\left(\frac{1}{n_f^2}-\frac{1}{n_i^2}\right)_2}$$

$$\lambda_2=\frac{\lambda_1 Z_1^2\left(\frac{1}{n_f^2}-\frac{1}{n_i^2}\right)_1}{Z_2^2\left(\frac{1}{n_f^2}-\frac{1}{n_i^2}\right)_2}$$

Substituting the values, we have

$$=\frac{(6561)(1)^2\left(\frac{1}{2^2}-\frac{1}{3^2}\right)}{(2)^2\left(\frac{1}{2^2}-\frac{1}{4^2}\right)}=1215\ \text{Å}$$

41 **(d)**

Bohr radius $r=\frac{\varepsilon_0 n^2h^2}{\pi Zme^2}; \therefore r\propto n^2$

42 **(a)**

$$N=\frac{N_0}{2^n}=\frac{N_0}{2^{1/2}}=\frac{N_0}{\sqrt{2}}$$

43 **(d)**

Atomic radius for bcc structure,

$$r=\frac{a\sqrt{3}}{4}=\frac{3.6\sqrt{3}}{4}=1.56\ \text{Å}$$

44 **(b)**

Optical source frequency

$$f=\frac{c}{\lambda}=\frac{3\times10^8}{1.3\times10^{-6}}=2.3\times10^{14}Hz$$

$\therefore$ Number of channels or subscribers $=\frac{2.3\times10^{14}}{20\times10^3}$

$=1.15\times10^{10}$

45 **(a)**

Here, $f_c=1.5\ MHz=1500\ kHz, f_m=10\ kHz$

$\therefore$ Low side band frequency

$=f_c-f_m=1500\ kHz-10\ kHz=1490\ kHz$

Upper side band frequency

$=f_c+f_m=1500\ kHz+10\ kHz=1510\ kHz$

46 **(a)**

Eq. mass of copper chloride = 99

Eq. mass of chlorine = 35.5

$\therefore$ Eq. mass of copper = 99 −35.5 = 63.5

$\therefore$ Valency of copper $=\frac{\text{at mass of copper}}{\text{eq.mass of copper}}=1$

$\therefore$ Formula of copper chloride is CuCl.

47 **(b)**

According to Avogadro's hypothesis one gram mole of a gas at NTP occupies 22.4 L.

48 **(c)**

According to Rutherford

Scattering angle $\propto \frac{1}{\sin^4(\theta/2)}$

It fails for very small scattering angles because the full nuclear charge of the target atom is partially screened by its electron

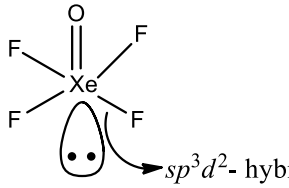
50 **(d)**

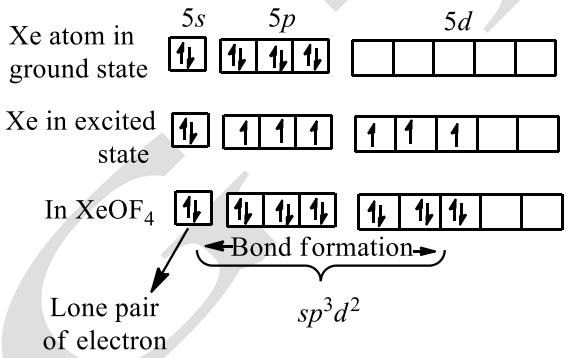
Down the group, size of atom increases.

Therefore, bond length of LiF is less than that of NaF

51 **(b)**

Number of lone pair in $XeOF_4$ is one (1). The structure of $XeOF_4$ is given as follows :





One π-bond so remaining six electron pairs form an octahedron with one position occupied by a lone pair.

53 **(a)**

As constant volume, pressure of the gases increases on increasing temperature due to increase in average molecular speed

54 **(b)**

$\because \ \Delta G=\Delta H-T\Delta S$

$-5.2=145.6-T(216/1000)$

or $\quad T=698\ \text{K}=425°\text{C}$

55 **(b)**

$ZnO+C\rightarrow Zn+CO; \quad \Delta G°=-\text{ve}.$

Hence, this is spontaneous.

56 **(c)**

$Na_2O+H_2O\rightarrow 2NaOH$

↑ ↑

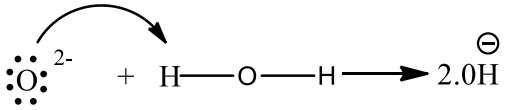
Oxidation number of Na +1 +1

Oxygen -2 -2

-2

No change in oxidation number, so (a) and (d) are not true.

(b) is also not true.



Oxide ion donates a pair of electrons, thus changes to OH^-

57 **(d)**

Oxidation takes place at anode (c) is not feasible, $i.e.$, $Cr^{3+}$is not oxidised to $Cr_2O_7^{2-}$ under given conditions. Hence, option (d) is correct.

58 **(d)**

$KO_3Na_2O_2$

Suppose O.N. of $O = x$ suppose O.N. of $O = x$

$+1 + 3x = 02 \times 1 + 2x = 0$

$3x = -12 + 2x = 0$

$x = -\frac{1}{3}2x = -2$

$x = -0.33x = -\frac{2}{2}$

$x = -1$

60 **(b)**

When calcium carbide reacts with nitrogen at 1000°C, calcium cyanamide and carbon is formed.

$CaC_2 + N_2 \xrightarrow{1000°C} CaCN_2 + C$

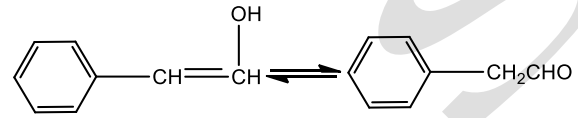
calcium cyanamide

62 **(b)**

Boron from different hydride of general formulaB_nH_{n+4} and B_nH_{n+6} but BH_3 is unknown

63 **(a)**

Tautomerism it is functional isomerism in which the isomers are readily interchangeable and maintain a dynamic equilibrium with each other.



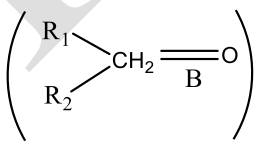
enol form keto form

65 **(b)**

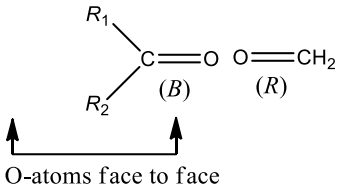
Alkenes give carbonyl compounds on ozonolysis

Alkene $\xrightarrow{O_3/Zn/H_2O}$ HCHO + other carbonyl compound

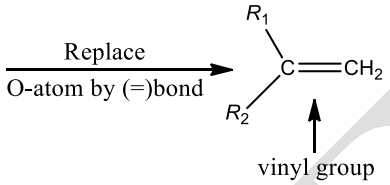
(A)



To determine alkene, place carbonyl compounds with their O-atom face to face. Replace O-atom by a double bond



O-atoms face to face



67 **(b)**

NaClhas fcc arrangement of ions. The coordination number of Cl^- as well as Na^+ ion is six. Therefore, it is termed 6 : 6 coordination crystal.

68 **(b)**

For tetrahedral shape, limiting radius ratio is $0.225 - 0.414$.

69 **(d)**

Mole fraction of $C_6H_6 = \frac{\frac{7.8}{78}}{\frac{7.8}{78}+\frac{46}{92}} = \frac{1}{6}$

70 **(d)**

By Ostwald-walker dynamic method, the relative lowering of vapour pressure, lowering of vapour pressure and vapour pressure of the solvent, all can be measured.

In this method, the apparatus used, contains two bulbs: bulb A contains solution and bulb B contains solvent. The loss of weight in bulb B gives the lowering vapour pressure and total loss of weight in both the tubes gives the vapour pressure of the solvent and

Relative lowering of vapour pressure

$$= \frac{\text{lowering of vapour pressure}}{\text{vapour pressure of solvent}}$$

71 **(c)**

At cathode,

$Al^{3+} + 3e^- \rightarrow Al$

$E_{Al} = \frac{27}{3} = 9$

$w_{Al} = E_{Al} \times$ no.of faradays

$= 9 \times 0.1 = 0.9$ g

72 **(b)**

For nth order reaction :

$$t_{1/2} \propto \frac{1}{a^{n-1}}$$

For second order reaction

$$t_{1/2} = \frac{1}{ka} = \frac{1}{0.5 \times 0.2} = \frac{100}{10} = 10 \text{ min}$$

73 **(b)**

For the reaction : $A \rightarrow 2B + C$

p_1 0 0

After 10 min $p_1 - p$ $2p$ p

After long time 0 $2p_1 p_1$

Total pressure $= (p_1 - p + 2p + p) = 176$ mm

Total pressure after long time

$= 2p_1 + p_1 = 270$ mm

Calculate the value of p from above two equation and then the difference of p_1 and p will be the pressure of A

74 **(c)**

A colloidal solution cannot form when dispersion medium as well as dispersion medium both are gas

75 **(d)**

The slag obtained during the extraction of copper from copper pyrites is of$FeSiO_3$. It is carried out in smelting.

$FeO + SiO_2 \rightarrow FeSiO_3$

(slag)

76 **(c)**

Levigation (gravity separation) in based on the difference in the specific gravities of the gangue particles and the ore particles.

77 **(d)**

Perchloric acid is not a peroxy acid while perphosphoric acid, pernitric acid and perdisulphuric acid are the example of peroxy acid.

78 **(c)**

Magnetic moment $(\mu) = \sqrt{n(n+2)}$BMwhere,'n' is the number of unpaired electrons.

$_{23}V^{2+} = [Ar]3d^3$ $(n=3)$

$_{24}Cr^{2+} = [Ar]3d^4$ $(n=4)$

$_{25}Mn^{2+} = [Ar]3d^5$ $(n=5)$

$_{26}Fe^{2+} = [Ar]3d^6$ $(n=4)$

Hence magnetic moment will be maximum for Mn^{2+}(equal to 5.92 BM).

79 **(c)**

Silver metal is obtained by Mac-Arthur Forrest process which is called cyanide process. The concentrated ore of argentite is treated with dilute NaCN solution and a current of O_2 is continuously passed. Silver sulphide goes into solution in the form of soluble complex sodium argentocyanide.

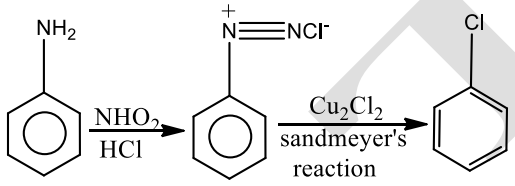
$2Ag_2S + 8NaCN + O_2 + 2H_2O \longrightarrow$

$4Na[Ag(CN)_2] + 4NaOH + 2S$

The soluble complex is treated with zinc dust, when silver gets precipitated.

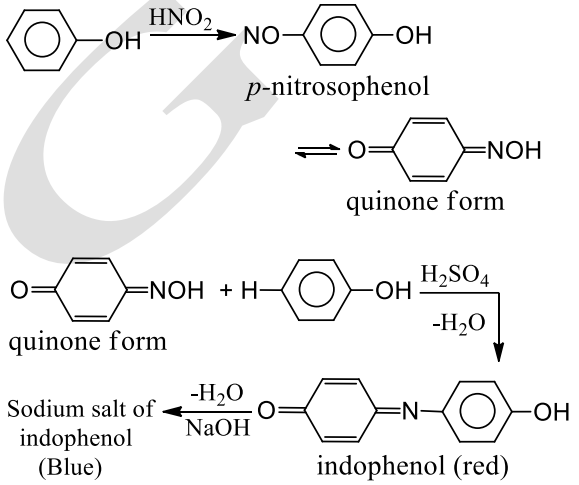
$2Na[Ag(CN)_2] + Zn \longrightarrow Na_2[Zn(CN)_4 + 2Ag \downarrow$

81 **(c)**



(Diazotization)

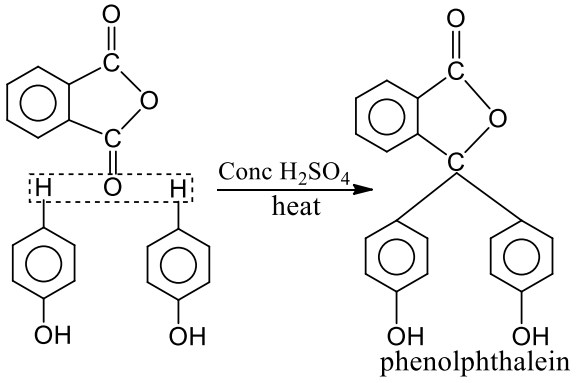
82 **(a)**



This reaction is an example of coupling reaction

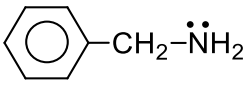
83 **(a)**

Phenol is heated with phthalic anhydride in presence of conc H_2SO_4 to given phenolphthalein which gives pink colour with alkali



86 **(d)**

Benzyl amine is the strongest base among the given compounds because lone of N̈ are not taking part in conjugation whereas in other compounds lone pairs are taking part in conjugation



87 **(b)**
Molisch's test is used in testing of carbohydrate and is not used in testing of protein.

89 **(c)**
The process of condensation polymerization takes place in the following manner.

$$A + B \xrightarrow{\text{Condense}} A - B$$

Monomers dimer

$$A - B + A \xrightarrow{\text{Condense}} A\text{—}B\text{—}A$$

$$A\text{—}B\text{—}A + B \longrightarrow A\text{—}B\text{—}A\text{—}B$$

In this process no initiator is required and it is also called step growth polymerization.

91 **(a)**
Phenetics (Gr. *Phainein*= to appear; the term phenotypes is derived from this same root) dedicates taxonomic affinities entirely on the basis of measurable similarities and differences.

92 **(a)**
The system by which various taxonomic categories are arranged in a proper descending order is called taxonomic or systematic hierarchy. The correct sequence of categories in systematic hierarchy is-

Kingdom, sub-kingdom, division or phylum, class, sub-class, series, order, family, genus, species.

93 **(a)**
Number and type of organisms it includes

94 **(a)**
Due to resemblance with slipper of shoe, the *Paramecium* (a protozoan) is known as slipper animalcule.

95 **(a)**
When microbes are grown in a closed system or batch culture, the resulting growth curve has usually four phases : lag phase, exponential (log phase), stationary phase and death phase.

96 **(b)**
In the ectophloicsiphonostele, the xylem surrounds pith and this xylem is surrounded by phloem, pericycle and endoderm respectively, *e. g.*, *Osmunda* and *Equisetum*.

97 **(d)**
Ferns exhibit alternation of dominant sporophyte generation with an inconpicuous gametophyte generation (heteromorphic)

98 **(a)**
Planaria(*Dugesia*) has remarkable power of regeneration. If an individual is cut transversely into two parts, the anterior fragment will regenerate a new tail and a posterior piece will develop a new head.

99 **(b)**
If a living *Hydra* is cut into two, three or more very small pieces, every piece develops into a new individual.

100 **(b)**
Pouched mammals have abdominal pouch or marsupium in which young ones live for some times, *e.g.,***Metatherians**, like kangaroo.

101 **(c)**
G $\underline{\infty}$ Represents gynoecium, polycarpellary, apocarpous and superior
Polycarpellary condition is found in the *Ranunculus*

102 **(d)**
Inflorescence.
Depending on whether the apex gets converted into flower or continues to grow

Racemose	Cymose
Main axis continues to grow flower grow laterally, *e. g.*, radish, mustard	The main axis terminates in flower hence limited growth, *e. g.*, jasmine, *Calotropis*

103 **(d)**
The fruit of coconut is an indehiscent drupe with a single seed. The single seed remains enclosed by stony endocarp and posses thin seed coat, brown testa, small inconspicuous embryo and white oily edible endosperm.

104 **(a)**
In wheat or maize (family-Poaceae), the Scutellum is through to be a modified cotyledon or seed leaf.

105 **(a)**
Both primary and secondary meristems contributes to the growth of plants. Shoot apical meristem and root apical meristem helps the plant to grow in length while the lateral meristem helps the plant to grow in width

106 **(d)**
Dendrochronology is the branch of Botany that deals with the determination of age of a tree by counting and analyzing the annual growth rings of the tree.

107 **(d)**
The cockroaches are placed in Phylum-Arthropoda because they have joined appendages and haemocoel

108 **(a)**
Saccular glands have wide, spherical, secretory part called acinus. They may be simple or compound. The simple saccular glands may be branched or unbranched. A compound saccular gland consists of several lobules, each having many acini.
The acini of a lobule opens by short ductules into a common duct that discharge into the main duct of the glands. The oil glands in the human skin are simple, branched and saccular whereas, milk glands of humans are compound and saccular

109 **(d)**
The cytoplasm of all eukaryotic cells is criss-crossed by a network of protein fibres that support the shape of the cell and anchor organelles to fixed locations. It is a dynamic system with three types of fibres – actin filaments, microtubule and intermediate filament.

110 **(a)**
Mathew Meselson and **Franklin Stahl** (1957) proved that DNA replication is semi-conservative. They obtained DNA strands, which were 50% radioactive and 50 non-radioactive.

111 **(b)**
When the inhibitor closely resembles the substrate in its molecular structure and inhibits the activity of the enzyme, it is known as competitive inhibitor

112 **(d)**
Starch is present as a store house of energy in plant tissues

113 **(d)**
Synapsis is the pairing of homologous chromosomes during zygotene stage of prophase-I of meiotic division-I. These homologous chromosomes come from mother and father.

114 **(d)**
The interphase, as called the resting phase, is the time during which the cell is preparing for division by undergoing both cell growth and DNA replication.
It is the phase between two successive M-phases
The interphase is divided into three further classes
G_1-phase (Gap 1), S-phase (synthesis) and G_2-phase (Gap 2)

115 **(c)**
The net force with which water is drawn into cell or root hair is equal to difference of OP and TP and known as **diffusion pressure deficit** or **suction pressure**, i.e.,
SP or DPD=OP-TP.

116 **(a)**
The movement of H_2O occurs from high value of Ψ_w to low value of Ψ_w,*i.e.,* from less negative value to more negative value of Ψ_w

117 **(d)**
Phenyl mercuric acetate is used as an antitranspirant.

118 **(d)**
Potassium is absorbed as K^+ ions. In plants, this is required in more abundant quantities in the meristematic tissues, buds, leaves and root lips

120 **(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.

121 **(a)**
Cytochromes are iron containing pigments. These acts as electron transporter or electron acceptor in respiration and photosynthesis

122 **(d)**
Respiratory pathway involved in both anabolism and catabolism, hence it is regarded as amphibolic pathway. In respiratory pathway not only the glucose but also amino acid and fatty acid can be used as intermediatory substances

123 **(c)**
Respiration and respiratory quotient is measured by respirometer

124 **(a)**
Gibberellins (Tabuta; 1935) are weakly **acidic** plant growth hormones.

125 **(a)**
*Xanthium*is a short day plant.

126 **(b)**
Paratonic movements are produced in response to some external stimulus. These are said to be positive if directed towards the stimulus and

negative if away from the stimulus. In pitcher plant, stimulus is provided by the insect.

127 **(c)**
Cholecystokinin (a hormone) is secreted by duodenum in response to presence of food. It stimulates flow of pancreatic enzymes and contraction of gall bladder.

128 **(a)**
The enzyme rennin coagulates casein, the soluble protein of the milk, into insoluble calcium salt of casein, which is then digested by the pepsin

129 **(c)**
Cigarette smoking

130 **(c)**
Chloride shift occurs in response, to HCO_3^-. To maintain electrostatic neutrality of plasma many chloride ions diffuse from plasma into RBCs and bicarbonate ions pass out. The chloride content of RBCs increases when oxygenated blood become deoxygenated. This is called chloride shift or Hamburger shift.

131 **(c)**
The waves of contraction originating from SA-node, when reaches the AV-node (pace-setter), the latter is simulated and excitatory impulses are rapidly transmitted from it to all parts of the ventricle *via* bundle of His and Purkinje fibres.

132 **(b)**
A-O_2, B-tissues, C-CO_2

133 **(a)**
In mammals, main excretory product is urea (20-30 gm).

134 **(c)**
The tubular epithelial cells in different segments of the nephrons perform reabsorption either by active or passive mechanisms. For example, substances like glucose, amino acids, Na^+ etc, in the filtrate reabsorbed actively whereas the nitrogenous wastes are absorbed by passive transport. Reabsorption of the water also occurs passively in the initial segments of the nephron

135 **(c)**
Epithelium cells of the Bowman's capsule. Glomerular capillary blood pressure causes the filtration of the blood through three layers, *i.e.,*
(i) The endothelium of the glomerular blood vessels
(ii) Epithelium of Bowman's capsule
(iii) Basement membrane between these two layers
The epithelium of the Bowman's capsule called podocytes are arranged in an intricate manner so as to leave some minute spaces called podocytes

136 **(b)**
The human skull articulates with the superior region of the vertebral column with the help of two occipital condyles, that's why human skull is called dicondylic skull

137 **(b)**
Each actin filament is made of two 'F' (filamentous) actins helically wound to each other. Each 'F' actin is a polymer of monomeric 'G' (Globular) actins. Two filaments of other proteins, tropomyosin also run close to the 'F' actins throughout its length. A complex protein troponin is distributed at regular intervals on the tropomyosin. In the resting state a subunit of troponin marks the active binding sites for myosin on the actin filaments.

138 **(c)**
A-Ciliated B-Trachea, C-Amoeboid

139 **(b)**
The process of expelling out sodium ions and drawing in potassium ions against concentration and electrochemical gradients is termed as sodium potassium pump. It occurs normally to maintain the normal difference in the ionic concentrations and electric potential between the outside and inside of the plasma membrane, *i.e.,* the steady state of a resting nerve fibre

140 **(a)**
Skin outside and with mucus membrane inside. The pinna collects the vibrations in the air, which produce sound. The external auditory meatus leads inwards and extends upto the tympanic membrane (the ear drum). There are very fine hairs and wax secreting sebaceous glands in the skin of pinna and meatus. The tympanic membrane is composed of connective tissues covered with skin outside and with mucus membrane inside

141 **(b)**
Diabetes is a sugar disease so, advised to patient of diabetes to eat sugar free food. Blood cancer is known as leukaemia.

145 **(d)**
In *Poinsettia and Euphorbia*, inflorescence is cyathium, in which involucre fuse to form a cup surrounding a large achlamydous, pedicellate, tricarpellary, syncarpous female flower.

Numerous centrifugally arranged male flowers surround the female flower.numerous centrifugally arranged male flowers surround the female flower.

In *Casuarina*,cylindrical phylloclades are found which are modified aerial stems. Flowers are unisexual which develop acropetally and pollen tube enters the ovule through chalazal tissues, *i. e*., chalazogamy.

146 **(d)**

Grafting is difficult in monocot plants as they have scattered vascular bundles. Vascular bundles with cambium is necessary for grafting while in monocot, no such cambium is present in vascular bundles.

147 **(d)**

Parthenogenesis is development of an embryo from an unfertilized egg or if a spermatozoan does penetrate the egg, there is no union of male and female pronuclei. It is found in many plants (dandelions and hawk weeds) and animals (aphids and honey bees).

148 **(a)**

Saheli is a new oral contraceptive for the females. It contains a non-steroidal preparation. It is once a weeks' pill with very low side effects and high contraceptive value.

149 **(a)**

To produce test tube baby, the egg fertilized outside the human body, is placed in the womb of the mother, where the gastrula period is completed.

150 **(c)**

All systems (except nervous system, gills and lungs), muscles, bone, heart, blood, kidney, reproductive system, coelom, lymph node, spleen, eustachian tube, adrenal cortex develop from mesoderm.

151 **(a)**

Bulbourethral gland secretes mucus, which lubricate penis during intercourse. This reduces the friction during the process. Bulbourethral gland is also called Cowper's gland

152 **(a)**

'Hum do Humare Do' slogan encourages family planning.

With 1.7% of the growth rate. India's population could double in 33 years. Such an alarming growth rate could lead to an absolute scarcity of even the basic requirement. Therefore, the government was forced to take up serious measures to check the population growth.

The most important step to overcome this problem is to motivate smaller families by using various contraceptive methods. You might have seen advertisements in the media as well as posters/bills, etc., showing a happy couple with two children with a slogan *Hum Do Humare Do* (we two, our two).

Many couples, mostly the young, urban, working ones have even adopted 'one child norm'. Statutory raising of marriageable age of the female to 18 years and that of males to 21 years and incentives given to couples with small families are two of the other measures taken to tackle this problem

153 **(c)**

Main causes for the population growth are

(i) Decline in death rate

(ii) Rapid decline in Mother Mortality Rate (MMR)

(iii) Increase in the number of people in the reproductive age group

(iv) Better medical facilities

154 **(a)**

Colour blindness and haemophilia are diseases caused by X-linked recessive genes. Colour blindness involving faulty perception of red and green light and follows an X-linked pattern of inheritance.

155 **(a)**

Meiosis is an important stage in sexual reproduction. During meiosis, genetic recombination occurs as a result of crossing over.

156 **(b)**

Mendel was successful in discovering the principles of inheritance as he did not encounter linkage between genes for the characters he considered. One of his principles-independent assortment is applicable only if the genes are located on different non-homologous chromosome pairs.

157 **(c)**

UAA (ochre), UAG (amber) and UGA (opal) are called termination codons because they do not specify any amino acid. Whenever termination codon present in *m*RNA, they would bring about termination of polypeptide chain, which would

then be released from the ribosome. Previously, UAA, UAG and UGA were called nonsense codons because they did not code for any of the 20 essential amino acids.

158 **(d)**
AUG (starting codon) codes for formyl methionine for prokaryotes

159 **(a)**
*Australopithecus*are considered as connecting link between ape and man. They were the ancestors of man, who first stood erect. Their cranial capacity was 300-500 cc.

160 **(c)**
RNAs most probably could have catalyzed the formation of lipid like molecules that could have in turn formed plasma membrane and proteins. The proteins might have taken over most enzymatic heredity molecule then, DNA evolved from RNA template. Once cells were evolved, DNA probably replaced RNA in most organisms

161 **(d)**
The major phagocytic cells are macrophages. Phagocytosis is the process of engulfing a solid particle by a phagocyte

162 **(c)**
Alexander Fleming discovered the first antibiotic, penicillin while working, on *Staphylococcus* bacteria. However its full potential as in effective antibiotic was established much later by Ernst Chain and Howard florey. They were awarded the Nobel Prize in 1945 for this discovery.

163 **(c)**
Sickle cell anemia (in which RBCs become sickle-shaped and stiff) is a genetic disorder that is autosomal and linked to a recessive allele. It has not been eliminated from the African population because it provides immunity against malaria. People who are heterozygous for sickle cell allele are much less susceptible for *falciparum* malaria, which is one of main cause of illness and death in them. Thus, the sickle cell allele is maintained at high levels in populations where *falciparum* malaria is common.

165 **(c)**
Seeds from virus infected plants generally do contain the virus. Therefore, sexual progeny are usually virus free, except for new-infections. But this belief is not entirely correct. In case of sexually reproducing crop virus infections spread rapidly.
This is because of vegetative propagules from virus infected plants contain virus particle, hence in vegetatively propagated plants the virus gets transmitted through propagule (rhizome/bulb/tuber/root). But the growing bud is not infected (*i.e.,* shoot tips are virus free)

166 **(a)**
Genetic diversity in agricultural crops is threatened by introduction of high yielding varieties.

167 **(a)**
Coconut (*Cocos nucifera*) is the plant which yields both oil as well as fibres (coir).

168 **(d)**
Ti-plasmid is found in *Agrobacterium tumefaciens,* which produces crown gall (tomour) in a large number of dicot species. *A. tumefaciens*is a Gram negative soil bacterium that infects a wide range of plants and causes crown galls

170 **(a)**
Restriction endonuclease is the enzyme which recognizes a specific DNA base sequence and cleavages both the strands of a DNA at a particular site called restriction site having palindromic sequence. So, restriction endonuclease are also called molecular scissors.

171 **(d)**
The green revolution succeeded in increasing food supply because of
(i) Use of improved crop varieties
(ii) Use of agrochemicals (fertilisers and pesticides)
(iii) Use of better management practices

172 **(b)**
In recombinant DNA technology, a probe is allowed to hybridise to its complementary DNA in the clone of cells. The cells are then detected by autoradiography. The cells with mutated genes will not be observed on the photographic film because the probe was not complementary to the mutated genes

173 **(c)**
Adverse condition affect the population by influencing on natality and mortality of the population. It also effects the immigration and emigration

174 **(a)**
Humus it is a dark brown amorphous gummy

substances formed by partial decomposition of plant and animal matter that constitute organic component of soil

175 **(c)**
The amount of biomass or organic matter produced per unit area over a time period in plants during photosynthesis is called primary production. It is expressed in the terms of weight (g^{-2}) or energy (kcal m^{-2})

176 **(b)**
Gross primary productivity is utilised by plants in respiration

177 **(b)**
Manas Wildlife Sanctuary is situated at Kamrup (Asom). It covers 80 sq km area. It's key vertebrate species are tiger, wild boar, sambhar, golden langoor, one-horned rhino, swamp deer, wild dog and wild buffalo.

178 **(d)**
India now, has 14 biosphere reserves, 90 national parks and 448 wildlife sanctuaries

179 **(b)**
$A-CO_2(60\%), B-CH_4(20\%), C-$ $CFCs(14\%), D-N_2O(6\%)$

180 **(b)**
Kyoto protocol deals with climate changes while Montreal Protocol deals with ozone depletion.