MERITSTORE

NEET FULL PORTION **TEST ID: Day 21 - 3**

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

1. $1\ a.m.u.$ is equivalent to
   a) $1.6 \times 10^{-27} kg$ b) $934\ MeV$
   c) $1.6 \times 10^{-24} gm$ d) All above
2. One light year is defined as the distance travelled by light in one year. The speed of light is $3 \times 10^8 \text{ms}^{-1}$. The same in metre is
   a) 3×10^{12}m b) 9.461×10^{15}m
   c) 3×10^{15}m d) None of these
3. The position of a particle moving along x-axis at certain times is given below:

$t(s)$	0	1	2	3
$x(m)$	-2	0	6	16

   Which of the following describes the motion correctly
   a) Uniform accelerated
   b) Uniform decelerated
   c) Non-uniform accelerated
   d) There is not enough data for generalization
4. If the magnitudes of scalar and vector products of two vectors and are 6 and $6\sqrt{3}$ respectively, then the angle between two vectors is
   a) 15°
   b) 30°
   c) 60°
   d) 75°
5. The kinetic energy K of a particle moving along a circle or radius R depends on the distance covered $s$as $K = as^2$. The force acting on the particle is
   a) $2\ asR$ b) $2\ as[1 + s^2/R^2]^{1/2}$
   c) $2\ as$ d) $2\ as^2/R$
6. The spring balance inside a lift suspends an object. As the lift begins to ascend, the reading indicated by the spring balance will
   a) Increase
   b) Decrease
   c) Remain unchanged
   d) Depend on the speed of ascend
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   c) Remain unchanged
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8. Two identical blocks $A$and B, each of mass 'm' resting on smooth floor are connected by a light spring of natural length L and spring constant K, with the spring at its natural length. A third identical block 'C' (mass m) moving with a speed v along the line joining A and B collides with A. The maximum compression in the spring is
   a) $v\sqrt{\frac{m}{2k}}$ b) $m\sqrt{\frac{v}{2k}}$ c) $\sqrt{\frac{mv}{k}}$ d) $\frac{mv}{2k}$
9. A ring starts to roll down the inclined plane of height h without slipping. The velocity with which it reaches the ground is
   a) $\sqrt{\frac{10gh}{7}}$ b) $\sqrt{\frac{4gh}{7}}$ c) $\sqrt{\frac{4gh}{3}}$ d) $\sqrt{gh}$
10. A solid sphere (mass $2\ M$) and a thin hollow spherical shell (mass M) both of the same size, roll down an inclined plane, then
    a) Solid sphere will reach the bottom first
    b) Hollow spherical shell will reach the bottom first
    c) Both will reach at the same time
    d) None of these
11. The effect of rotation of the earth on the value of acceleration due to gravity is
    a) g is maximum at the equator and maximum at the poles
    b) g is minimum at the equator and maximum at the poles
    c) g is maximum at the both poles
    d) g is minimum at the both poles
12. A uniform metal rod of 2 mm^2 cross-section is heated from 0^0C to 20^0C. The coefficient of the linear expansion of the rod is $12 \times 10^{-6}/°\text{C}$. Its Young's modulus of elasticity is 10^{11}Nm^{-2}. The energy stored per unit volume of the rod is
    a) 1440 Jm^{-3} b) 15750 Jm^{-3}
    c) 1500 Jm^{-3} d) 2880 Jm^{-3}
13. The terminal velocity of spherical ball of radius a falling through a viscous liquid is proportional to
    a) a b) a^2 c) a^3 d) a^{-1}
14. A hydraulic lift is designed to life cars of

maximum mass of 3000 kg. The area of cross-section of the piston carrying the load is$4.25 \times 10^{-12}\text{m}^2$. What maximum pressure the smaller piston have to bear?

a) $6.92 \times 10^{5}\text{Nm}^{-2}$ b) $7.82 \times 10^{7}\text{Nm}^{-2}$
c) $9.63 \times 10^{9}\text{Nm}^{-2}$ d) $13.76 \times 10^{11}\text{Nm}^{-2}$

15. On heating, the temperature at which water has minimum volume is

a) 0°C b) 4°C c) 4K d) 100°C

16. One mole of an ideal gas requires 207 J heat to raise the temperature by 1K, when heated at constant pressure. If the same gas is heated at constant volume to raise the temperature by the same range, the heat required will be (Take $R = 8.3\ \text{Jmol}^{-1}\text{K}^{-1}$)

a) 215.3 J b) 198.7 J
c) 207 J d) None of these

17. A gas expands with temperature according to the relation $V = kT^{2/3}$. Calculate work done when the temperature changes by 60K?

a) $10\ R$ b) $30\ R$ c) $40\ R$ d) $20\ R$

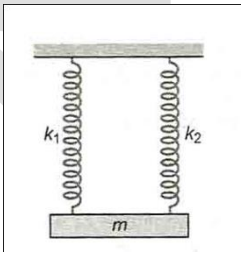
18. The specific heat of an ideal gas is

a) Proportional to T b) Proportional to T^2
c) Proportional to T^3 d) Independent of T

19. When a body of mass 1.0 kg is suspended from a certain light spring hanging vertically, its length increases by 5 cm. by suspending 2.0 kg block to the spring and if the block is pulled through 10 cm and released, the maximum velocity in it (in ms^{-1}) is (acceleration due to gravity=$10\ \text{ms}^{-2}$)

a) 0.5 b) 1 c) 2 d) 4

20. A mass m is suspended separately by two different springs in successive order then a time period is $t_1$andt_2 respectively. If m is connected by both spring as shown in figure, then time period is t_0, the correct relation is



a) $t_0^2 = t_1^2 + t_2^2$
b) $t_0^{-2} = t_1^{-2} + t_2^{-2}$
c) $t_0^{-1} = t_1^{-1} + t_2^{-1}$
d) $t_0 = t_1 + t_2$

21. A cylindrical tube open at both ends, has a fundamental frequency $f$in air. The tube is dipped vertically in water so that half of it is in water. The fundamental frequency of air column is now

a) $f/2$ b) f c) $3f/4$ d) $2f$

22. A parallel plate capacitor of a capacitance of 1 farad would have the plate area of about

a) $100\ m^2$ b) $1\ km^2$
c) $100\ km^2$ d) $1000\ km^2$

23. Two positive ions, each carrying a charge q, are separated by a distance d. If F is the force of repulsion between the ions, the number of electrons missing from each ion will be (e being the charge on an electron)

a) $\dfrac{4\pi \in_0 Fd^2}{q^2}$ b) $\dfrac{4\pi \in_0 Fd^2}{e^2}$
c) $\sqrt{\dfrac{4\pi \in_0 Fe^2}{d^2}}$ d) $\sqrt{\dfrac{4\pi \in_0 Fd^2}{e^2}}$

24. Two parallel large thin metal sheets have equal surface charge densities ($\sigma = 26.4 \times 10^{-12}\text{Cm}^{-2}$)of opposite signs. The electric field between these sheets is

a) $1.5\ \text{NC}^{-1}$ b) $1.5\times 10^{-10}\text{NC}^{-1}$
c) $3\ \text{NC}^{-1}$ d) $3 \times 10^{-10}\text{NC}^{-1}$

25. A certain piece of silver of given mass is to be made like a wire. Which of the following combinations of length (L) and the area of cross-section (A) will lead to the smallest resistance

a) L and A
b) $2L$ and $A/2$
c) $L/2$ and $2\ A$
d) Any of the above, because volume of silver remains same

26. The reading of a high resistance voltmeter when a cell is connected across it is 2.2 V. When the terminals of the cell are also connected to a resistance of 5 Ω the voltmeter reading drops to 1.8 V. Find the internal resistance of the cell

a) 1.2 Ω b) 1.3 Ω c) 1.1 Ω d) 1.4 Ω

27. A wire is stretched so as to change its diameter by 0.25%. The percentage change in resistance is

a) 4.0% b) 2.0% c) 1.0% d) 0.5%

28. An arc of a circle of radius R subtends an angle $\pi/2$ at the centre. It carries a current i. The magnetic field at the centre will be

a) $\dfrac{\mu_0 i}{2R}$ b) $\dfrac{\mu_0 i}{8R}$ c) $\dfrac{\mu_0 i}{4R}$ d) $\dfrac{2\mu_0 i}{5R}$

29. Which one of the following characteristics is not associated with a ferromagnetic material?
    a) It is strongly attracted by a magnet
    b) It tends to move from a region of strong magnetic field to a region of low magnetic field
    c) Its origin is the spin of electrons
    d) Above the Curie temperature, it exhibits paramagnetic properties
30. If the magnetic is cut into four equal parts such that their lengths and breadths are equal. Pole strength of each part is
    a) m b) $m/2$ c) $m/4$ d) $m/8$
31. Why the current does not rise immediately in a circuit containing inductance
    a) Because of induced emf
    b) Because of high voltage drop
    c) Because of low power consumption
    d) Because of Joule heating
32. In an $L-C-R$ series AC circuit, the voltage across each of the components. L, C and R is 50 V. The voltage across the $L-C$ combination will be
    a) 50 V b) $50\sqrt{2}$ V c) 100 V d) zero
33. An electric heater rated 220 V and 550 W is connected to A.C. mains. The current drawn by it is
    a) 0.8 A b) 2.5 A c) 0.4 A d) 1.25 A
34. Electric fields induced by changing magnetic fields are
    a) Conservation
    b) Non-conservation
    c) May be conservative or non-conservation depending on the conditions
    d) Nothing can be said
35. The far point of a myopia eye is at $40cm$. For removing this defect, the power of lens required will be
    a) 40 D b) -4 D c) -2.5 D d) 0.25 D
36. A concave mirror gives an image three times as large as the object placed at a distance of 20 cm from it. For the image to be real, the focal length should be
    a) 10 cm b) 15 cm c) 20 cm d) 30 cm
37. The width of a single slit if the first minimum is observed at an angle 2° with a light of wavelength 6980Å
    a) 0.2 mm
    b) 2×10^{-5}mm
    c) 2×10^{5}mm
    d) 2 mm
38. X-rays are known to be electromagnetic radiations. Therefore the X-ray photon has
    a) Electric charge
    b) Magnetic moment
    c) Both electric charge and magnetic moment
    d) Neither electric charge nor magnetic moment
39. Work function of a metal is 2.51 eV.Its threshold frequency
    a) $5.9 \times 10^{14} cycles/s$ b) $6.5 \times 10^{14} cycles/s$
    c) $9.4 \times 10^{14} cycles/s$ d) $6.08 \times 10^{14} cycles/s$
40. The ratio of the energies of the hydrogen atom in its first to second excited states is
    a) 9/4 b) 4/1 c) 8/1 d) 1/8
41. Which of the following rays are not electromagnetic waves
    a) γ-rays b) β-rays
    c) Heat rays d) X-rays
42. Hydrogen (H), deuterium (D), singly ionized helium (He^{+}) and doubly ionized lithium (Li^{++}) all have one electron around the nucleus. Consider $n = 2$ to $n = 1$ transition. The wavelengths of emitted radiations are $\lambda_1, \lambda_2, \lambda_3$ and λ_4 respectively. Then approximately
    a) $\lambda_1 = \lambda_2 = 4\lambda_3 = 9\lambda_4$
    b) $4\lambda_1 = 2\lambda_2 = 2\lambda_3 = \lambda_4$
    c) $\lambda_1 = 2\lambda_2 = 2\sqrt{2}\lambda_3 = 3\sqrt{2}\lambda_4$
    d) $\lambda_1 = \lambda_2 = 2\lambda_3 = 3\sqrt{2}\lambda_4$
43. The band gap in germanium and silicon in eV respectively is
    a) 0.7, 1.1 b) 1.1, 0.7 c) 1.1, 0 d) 0, 1.1
44. Ozone layer blocks the radiations of wavelength
    a) Less than 3×10^{-7} m
    b) Equal to 3×10^{-7} m
    c) More than 3×10^{-7} m
    d) All of these
45. In earth's atmosphere, for F_2-layer, the virtual height and critical frequency in night time are
    a) 210 km and 5 MHz b) 250 km and 6 MHz
    c) 280 km and 7 MHz d) 350 km and 6 MHz
46. The empirical formula of a compound is CH_2. One mole of this compound has a mass of 42 g. Its molecular formula is
    a) C_3H_6 b) C_3H_8 c) CH_2 d) C_2H_2
47. What is the weight of oxygen that is required for the complete combustion of 2.8 kg of ethylene?

a) 9.6 kg b) 96.0 kg c) 6.4 kg d) 2.8 kg

48. Which of the following sets of quantum number is correct for an electron in $4f$-orbital?
a) $n = 4, l = 3, m = +4, s = +1/2$
b) $n = 4, l = 4, m = -4, s = -1/2$
c) $n = 4, l = 3, m = +1, s = +1/2$
d) $n = 3, l = 2, m = -2, s = +1/2$

49. The compound in which cation is isoelectronic with anion is
a) NaCl b) CsF c) NaI d) K_2S

50. In the Periodic Table metallic character of elements shows one of the following trend
a) Decreases down the group and increases across the period
b) Increases down the group and decreases across the period
c) Increases across the period and also down the group
d) Decreases across the period and also down the group

51. N_2accept electron and convert into N_2^-, where this electron goes?
a) Antibonding π-molecular orbital b) Bonding π-molecular orbital c) σ-bonding molecular orbital d) σ-antibonding molecular orbital

52. In which of the following, the bond length between hybridised carbon atom and other carbon atom is minimum?
a) Propyne
b) Propene
c) Butane
d) Propane

53. The most probable velocity (in cm/s) of hydrogen molecule at 27°C, will be
a) 19.3×10^4 b) 17.8×10^4
c) 24.93×10^9 d) 17.8×10^8

54. The value of enthalpy change (ΔH) for the reaction $C_2H_5OH(l) + 3O_2(g) \rightarrow 2CO_2(g) + 3H_2O(l)$, at 27°C is -1366.5 kJ mol^{-1}. The value of internal energy change for the above reaction at this temperature will be
a) -1371.5 kJ b) -1369.0 kJ
c) -1364.0 kJ d) -1361.5 kJ

55. If the bond dissociation energies of XY, X_2 and Y_2 (all diatomic molecules) are in the ratio of 1: 1: 05 and ΔH for the formation of $XY$is -200 kJ mol^{-1}. The bond dissociation energy of X_2 will be
a) 100 kJ mol^{-1} b) 800 kJ mol^{-1}
c) 300 kJ mol^{-1} d) 400 kJ mol^{-1}

56. In which of the following reactions, the concentration of product is higher than the concentration of reactant at equilibrium? (K = equilibrium constant)
a) $A \rightleftharpoons B; K = 0.001$ b) $M \rightleftharpoons N; K = 10$
c) $X \rightleftharpoons Y; K = 0.005$ d) $R \rightleftharpoons P; K = 0.01$

57. The oxidation state of sulphur in sodium tetrathionate ($Na_2S_4O_6$) is
a) 2 b) 0 c) 2.5 d) 3.5

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. H_2O_2 is manufactured these days
a) By burning hydrogen in excess of oxygen
b) By the action of H_2O_2 on BaO_2
c) By the action of H_2SO_4 on Na_2O_2
d) By electrolysis of 50% H_2SO_4

60. A fire of lithium, sodium and potassium can be extinguished by
a) H_2O b) Nitrogen
c) CO_2 d) Asbestose blanket

61. $BCl_3 + H_2O \rightarrow X$, the products formed in the reaction are
a) $B_2O_3 + HOCl$ b) $H_3BO_3 + HCl$
c) $B_2H_6 + HCl$ d) No reaction

62. Which of the following is a mixed oxide?
a) Fe_2O_3 b) PbO_2 c) Pb_3O_4 d) BaO_2

63. Mesomeric effect involves delocalisation of
a) Pi-electrons b) Sigma electrons
c) Protons d) None of these

64. Which compound does not give precipitate with ammoniacal silver nitrate solution?
a) $C_2H_5 - C \equiv CH$
b) $CH_3 - C \equiv C - CH_3$
c) $CH_3 - CH(CH_3) - C \equiv CH$
d) $Ph - CH_2 - C \equiv CH$

65. In the reaction,
$C_6H_5CH_3 \xrightarrow{\text{Oxidation}} A \xrightarrow{\text{NaOH}} B \xrightarrow{\text{Soda lime}} C$
The product C is
a) C_6H_5OH b) C_6H_6
c) C_6H_5COONa d) C_6H_5ONa

66. Acid rains are produced by
a) Excess NO_2 and SO_2 from burning fossil fuels
b) Excess production of NH_3 by industry and coal gas
c) Excess release of carbon monoxide by incomplete combustion
d) Excess formation of CO_2 by combustion and animal respiration

67. The 8 : 8 type of packing is present in
a) MgF_2 b) CsCl c) KCl d) NaCl

68. KCl crystallisesin the same type of lattice as dose NaCl. Given that $r_{Na^+}/r_{Cl^-} = 0.55$ and $r_{K^+}/r_{Cl^-} = 0.74$. Calculate the ratio of the side of the unit cell for KCl to that of NaCl.
a) 1.123 b) 0.0891 c) 1.414 d) 0.414

69. What is the amount of urea dissolved per litre if its aqueous solution is isotonic with 10% cane sugar solution? (mol.wt.of urea =60)
a) 200 g/L b) 19.2 g/L
c) 17.54 g/L d) 16.7 g/L

70. Calculate the molal depression constant of a solvent which has freezing point 16.6°C and latent heat of fusion 180.75 Jg^{-1}.
a) 2.68 b) 3.86 c) 4.68 d) 2.86

71. The emf of the cell,
Ag | Ag^+ (0.1 M) || Ag^+ (1 M) | Ag at 298 K is
a) 0.0059 Vb) 0.059 V c) 5.9 V d) 0.59 V

72. For a zero order reaction, the plot of concentration of reactant vs time is (intercept refers to concentration axis)
a) Liner with positive slope and zero intercept
b) Linear with negative slope and zero intercept
c) Linear with negative slope and non-zero intercept
d) Linear with positive slope and non-zero intercept

73. Which of the following statement is in accordance with collision theory?
Rate is directly proportional to collision frequency
Rate depend upon orientation of atoms
Temperature determines the rate
a) Only III
b) Only I and II
c) Only II and III
d) All of these

74. Micelle is a term used for the aggregates formed in solution by
a) Colloidal electrolyte
b) Colloidal non-electrolyte
c) Non associated colloids
d) None of the above

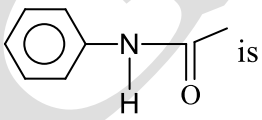
75. In electrofining of copper, some gold is deposited as
a) Cathode b) Electrode
c) Cathode mud d) Anode mud

76. Metal which can be extracted from all the three dolomite, magnesite and carnallite is
a) Na b) K c) Mg d) Ca

77. What is the product formed when phosphorus trioxide is dissolved in water?
a) HPO_3 b) H_3PO_4 c) H_3PO_3 d) HPO_2

78. The magnetic moment (in BM) of Zn^{2+}ion according to spin-only formula is
a) Zero b) 1.73 c) 2.84 d) 3.87

79. Which of the following trivalent ion has the largest atomic radii in the lanthanide series?
a) Ce b) Pm c) La d) Lu

80. The IUPAC name of compound


is
a) N-phenylaminoethanone
b) N-phenylethanamide
c) N-phenylmethanamide
d) N-phenylaminomethane

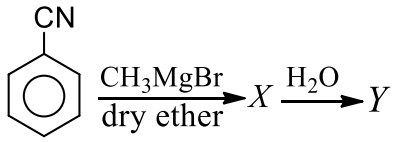
81. Methyl ketone is identified by
a) Iodoform test b) Fehling solution
c) Tollen's reagent d) Schiff's reagent

82. Reaction of tertiary butyl alcohol with hot Cu at 350°C produces
a) Butanol b) Butanal
c) 2-butene d) Methylpropene

83. An ether is more volatile than an alcohol having the same molecular formula. This is due to
a) Dipolar character of ethers
b) Alcohols having resonance structures
c) Intermolecular hydrogen bonding in ethers
d) Intermolecular hydrogen bonding in alcohols

84. The product formed in the reaction *n*-hexanamide+Br_2 + KOH, is
a) Hexanamine b) Propanamine
c) Butanamine d) pentanamine

85. In which case formation of butane nitrile is possible?
a) $C_3H_7Br + KCN$ b) $C_4H_9Br + KCN$
c) $C_3H_7OH + KCN$ d) $C_4H_9OH + KCN$

86. 

Identify *Y*
a) Benzophenone b) Acetophenone
c) Benzoic acid d) phenol

87. Main constituent of plants is
a) Cellulose b) Starch c) Fructose d) Lipids

88. From the given statements, which one is not true?
a) Teflon is a macromolecule
b) Teflon is a polymer
c) Polythene is a polymer
d) Chlorophyll is a polymer

89. When condensation product of hexamethylenediamine and adipic acid is heated to 353 K(80°C) in an atmosphere of nitrogen for about 4-5h,the product obtained is
a) Solid polymer of nylon 66
b) Liquid polymer of nylon 66
c) Gaseous polymer of nylon 66
d) Liquid polymer of nylon66

90. Which of the following is an ingrain dye?
a) Congo-red b) Aniline black
c) Alizarin d) Indigo

91. Process of metabolism leads to
a) Growth b) Development
c) Functions of living body d) All of these

92. The term 'species' was coined by
a) Aristotle b) Engler
c) John Ray d) Linnaeus

93. A place where dried, pressed and preserved plant specimens are kept
a) Herbarium b) Museum
c) Botanical garden d) Both (a) and (c)

94. The asexual spores formed by *Colletotrichumfalcatum*, *Sphaerotheca* and *Rhizopusstolonifer* are
a) Many called b) One called
c) Pyriform in shape d) Rod shaped

95. Bakanae disease is caused by
a) Fungus b) Alga
c) Bacterium d) Virus

96. Consider the following statements
I. Hydropterides are only plant among the heterosporouspteridophytes that are leptosporangiate
II. Heterosporouspteridophytes were the first land flora of earth
III. The difference in size between microspore and megaspore in *Seleginellakraussiana* is 1:200
IV. Female gametophyte of *Seleginella* mostly have single archenogium
Which of the above statement are correct?
a) I and II b) IV
c) I, II and IV d) I, II, III and IV

97. Gametophyte is dominant stage in the life cycle of
a) Bryophyta b) Pteridophyta
c) Angiosperms d) Gymnosperms

98. Which is the first class among the tetrapods to shows completely 4-chambered heart?
a) Amphibia
b) Reptilian
c) Aves
d) Mammalia

99. Which one of the following characters is not typical of the class-Mammalia?
a) Seven cervical vertebrae
b) Thecodont dentition
c) Ten pairs of cranial nerves
d) Alveolar lungs

100. Pylangium in frog is found in
a) Conus arteriosus b) Sinus venosus
c) Atrium d) Ventricle

101. A drupe develop in
a) Wheat b) Pea c) Tomato d) Mango

102. A simple one seeded fruit in which pericarp is fused with seed coat is
a) Achene b) Caryopsis
c) Cypsela d) Nut

103. The underground stem that has contractile roots, is
a) Rhizome b) Corm
c) Stem tuber d) Bulb

104. Name the condition given in statement I and II
I. When stamens attached to the petals
II. When stamens attached to perianth

I	II
a) Epiphyllous	b) Epipetalous
Epipetalous	Epiphyllous
c) Staminode	d) Epipetalous
Epiphyllous	Hypopetalous

105. The innermost layer of cortex is called
a) Epidermis
b) Casparian strips
c) Endodermis

d) Pericycle

106. Which of the following statements are not true?
I.Cork cambium is otherwise called phellogen.
II.Cork is otherwise called phellem.
III.Secondary cortex is otherwise called periderm.
IV. Cork cambium, cork and secondary cortex are collectively called phelloderm
a) III and IV
b) I and II
c) II and III
d) II and IV

107. Choose the incorrect pair from the matches given below
a) Antennae – Sensory receptors
b) Metathoracic wings - Flying
c) Malpighian tubule – Excretory role
d) Crop – Grinding food

108. In addition to the Malpighian tubules, excretion of the waste products in cockroach occurs by
a) Fat bodies b) Nephrocytes
c) Urecose glands d) All of these

109. In flagella membrane, which enzyme catalysis ATP activity?
a) Cytoplasmic dyenin b) Asconic dynein
c) Kinesis d) Myosin

110. Choose the correct statement from the codes given below
I. Separation from extracellular medium allows the cells to maintain its chemical pool, orderliness of structure and reactions in contrast to disorderly distribution and randomly interacting molecules in the extra-cellular medium
II. Cells are unable to recognise one another due to the present of specific chemicals on their surface
III. Cells of plant tissues are often connected with one another through cytoplasmic bridges called plasmodesmata
IV. Different cells of an organism communicate as well as exchange materials with one another
a) II and III b) I and II
c) I, III and IV d) I, II, III and IV

111. Given below are two statements A and B. Choose the correct answer related to the statements.
Statement A Amino acids are amphoteric in their function.
Statement B All amino acids are necessary for our body.
a) Statement A is correct but statement B is wrong
b) Both the statements A and B are correct
c) Statement A is wrong but statement B is correct
d) Both the statements A and B are wrong

112. If the total amount of adenine and thymine in a double-stranded DNA is 60%, then the amount of guanine in this DNA will be
a) 15% b) 20% c) 30% d) 40%

113. 'XX' is a phase of mitosis, in which the chromatin condenses into discrete chromosomes. During 'XX' phase, nuclear envelope breaks down and spindles forms at opposite ends of the cell
Identify 'XX'
a) Interphase b) Anaphase
c) Telophase d) Prophase

114. In which stage of the first meiotic division, two sister chromatids are formed?
a) Leptotene b) Zygotene
c) Pachytene d) Diplotene

115. A red blood cell (RBC) was kept in a certain solution for few minutes and it got burst. The said solution was
a) Isotonic
b) Concentrated sugar solution
c) Hypertonic
d) Hypotonic

116. The transport of organic and inorganic substances in plants over longer distance occurs through vascular tissue by the means of
a) Diffusion
b) Facilitated diffusion
c) Active transport
d) Mass flow

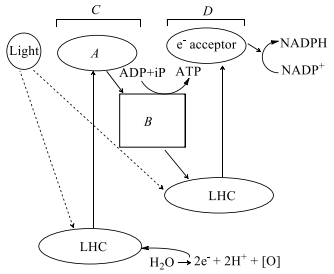
117. Read the following statement and choose the correct one from the codes given below
I. The apoplastic movement of water takes place exclusively through intercellular spaces and cell wall without crossing any membrane
II. Symplastic movement occurs from cell to cell through plasmodesmata, *i*. *e*., adjacent cells are connected through plasmodesmata
III. Permeability of a membrane depends on its

composition and chemical nature of the solute
IV. Solutes present in a cell increases the free energy of the water or water potential
a) I, II and III
b) I, II and IV
c) II and IV
d) I and IV

118. The macronutrient which is an essential component of all organic compounds, yet not obtained by plants from soil is
a) Nitrogen b) Carbon
c) Phosphorus d) Magnesium

119. Two nitrogen atoms are joined by
a) The double covalent bond b) Ionic bond
c) The triple covalent bond d) None of these

120. Identify A, B, C and D in the given diagram of z-scheme of light reaction and choose the correct option accordingly



a) A-e^- acceptor, B-ETS, C-PS-II, D-PS-I
b) A-e^- acceptor, B-ETS, C-PS-I, D-PS-II
c) A-ETS, B-e^- acceptor, C-PS-I, D-PS-II
d) A-ETS, B-e^- acceptor, C-PS-II, D-PS-I

121. Etiolation in plants is caused when they
a) Are grown in dark
b) Have mineral deficiency
c) Are grown in intense light
d) Are grown in blue light

122. During anaerobic respiration in yeast
a) H_2O and CO_2 are end-products
b) CO_2, ethanol and energy are end-products
c) CO_2, and H_2O are end-products
d) CO_2, acetic acid and energy are end-products

123. Read the following table and choose the correct pair.

1.	DCMU	Herbicide	Inhibitor of non-cyclic electron transport
2.	PMA	Fungicide	Reduce transpiration
3.	Colchicine	Alkaloid	Causes male sterility
4.	Soilrite	Sodium alginate	Encapsulation of somatic embryos

a) I, II
b) I, III
c) II, III
d) II, IV

124. Auxin was isolated by
a) Charles Darwin b) Francis Darwin
c) FW Went d) de Vries

125. Large amount of ethylene is synthesised by
a) Developing roots and fruits
b) Developing shoots and flowers
c) Senescence tissues and ripening fruits
d) Young tissue and unripened fruits

126. How does pruning help in making the hedge dense?
a) It induces the differentiation of new shoots from the rootstock
b) It frees axillary buds from apical dominance
c) The apical shoot grows faster after pruning
d) It releases wound hormones

127. Choose the most appropriate option to describe the composition of human saliva
a) Amylase, hydrolase
b) Electrolytes amylase/ptylin, lysozymes and mucous
c) Amylase/ptylin, mucous
d) Ptylin only

128. Crypts of Leiberkuhn are present in
a) Small intestine b) Liver
c) Stomach d) Colon

129. During inspiration, the diaphragm
a) Expands
b) Shows no change
c) Contracts and flattens
d) Relaxes to become dome-shaped

130. The movement of chloride ions into erythrocytes from the plasma to maintain osmotic balance during transport of gases is known as
a) Chlorination
b) Hamburger phenomenon
c) Bicarbonate shift
d) Carbon dioxide transport

131. Which of the following can be considered as the blood bank of human body?
a) Spleen b) Heart c) Liver d) Lungs

132. Chordae tendinae
a) Are present close to AV valves

b) Open semilunar valves
c) Prevent the AV valves flaps from everting
d) Are present in auricle

133. Blackening of urine, when exposed to air is a metabolic disorder in human beings. This is due to
a) Phenylalanine
b) Tyrosine
c) Valine replacing glutamine
d) Homogentisic acid

134. Large amount of water is …A... from collecting duct to produce …B… urine. This segment allows passage of small amounts of …C… into interstitium of medulla to keep up the osmolarity.
Here, A, B and C refers to
a) A-secreted, B-dilute, C-sugar
b) A-secreted, B-dilute, C-NH_3
c) A-secreted, B-dilute, C-urea
d) A-reabsorbed, B-concentrated, C-urea

135. I. Excess loss of water from body
II. Hypothalamus
III. Osmoreceptors
IV. ADH
V. Neurohypophysis
VI. Water reabsorption DCT and CT
VII. Prevention of diuresis
Arrange the given processes in correct sequence for regulation in kidney
a) I→II→III→IV→V→VI→VII
b) VII→VI→V→IV→III→II→I
c) I→III→II→V→IV→VI→VII
d) I→III→II→IV→V→VII→VI

136. Scapula is a triangular bone situated
a) Dorsal part of thorax between 2nd an 7th ribs
b) Ventral part of thorax between 2nd an 7th ribs
c) Medial part of thorax between 2nd an 7th ribs
d) None of the above

137. Axis vertebra is identified by
a) Sigmoid notch b) Deltoid ridge
c) Odontoid process d) Centrum

138. Muscular dystrophy in humans is a
a) Viral disease b) Bacterial disease
c) Genetic disease d) Fungal disease

139. The respiratory rhythm centre is present in the
a) Cerebrum
b) Cerebellum
c) Hypothalamus
d) Medulla oblongata

140. Ampulla of Lorenzini are thermoreceptors which are found in
a) Fishes b) Man
c) Reptiles d) Bats

141. Which one of the following pair correctly matches a hormone with a disease resulting from its deficiency?
a) Parathyroid hormone— Tetany
b) Insulin — Diabetes insipidus
c) Relaxin— Gigantism
d) Prolactin — Cretinism

142. A health disorder that results from the deficiency of thyroxine in adults and characterized by
I. A low metabolic rate
II. Increase in body weight
III. Tendency to retain water in tissue, is
a) Hypothyroidism b) Simple goitre
c) Myxoedema d) Cretinism

143. Female gametes are also called
a) Egg
b) Ovum
c) Both (a) and (b)
d) Antherozoid

144. Chances of survival of young ones is greater in:
a) Fishes
b) Eutherian mammals
c) Birds
d) Amphibians

145. There are 10 flowers in one individual plant of *crotalaria.* In each microsporangium of every stamen of all the flowers, there are 30 microspore mother cells. How many pollen grains are formed from that plant?
a) 4,000 b) 10,000 c) 24,000 d) 48,000

146. Filiform apparatus are
a) Special cellular thickning at antipodal cell
b) Special cellular thickning at micropylar end
c) Special cellular thickning at synergid cells
d) Special cellular thickning at nuclear end

147. The cylindrical portion below the cotyledons is …A… that terminates to …B… and tip called …C… A, B and C here refers to
a) A-radicle, B-hypocotyle, C-root cap
b) A- root cap, B- radicle, C-hypocotyle

c) A-hypocotyle, B-root cap, C-radicle
d) A-hypocotyle, B-radicle , C-root cap

148. Hormone injected by doctors to induce delivery is
a) Inhibin b) Oxytocin c) Oestrogen d) Prolactin

149. Superficial meroblastic cleavage occurs in
a) Reptiles b) Birds
c) Mammals d) Insects

150. Which of the following is not correct for gasrtulation?
a) Archenteron is formed
b) All germinal layers are formed
c) Morphogenetic movements
d) Some blastomeres and blastocoel degenerate

151. Uterine endometrium, epithelial glands and connective tissue are broken in menstrual phase. This is due to
a) Over secretion of FSH
b) Lack of oestrogen
c) Lack of progesterone
d) Over production of progesterone

152. 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

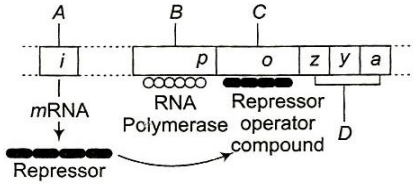
153. Reproductive health is the well-being of
a) Physical aspects b) Emotional and behavioural aspects
c) Social aspects d) All of the above

154. When both parents are of blood type AB, they can have children with
a) A, B, AB and O blood types
b) A, B, and AB blood types
c) A and B blood types
d) A, B and O blood types

155. In sex linkage, the speciality is
a) Atavism
b) Criss-cross inheritance
c) Reversion
d) Gene flow

156. Law based on fact that the characters don't show any blending and both the characters are recovered as such in F_2-generation although one character was absent in F_1-progeny, is
a) Law of purity of gametes b) Law of independent assortment
c) Law of incomplete dominance d) Law of dominance

157. Identify *A*, *B*, *C* and *D*



a) A-Regulatory gene, B-Promoter, C-Operator, D-Structural gene
b) A-Regulatory gene, B-Promoter, C-Structural gene, D-Operator
c) A-Regulatory gene, B-Structural gene, C-Promoter, D-Operator
d) A-Regulatory gene, B-Structural gene, C-Operator gene, D-Promoter gene

158. The reaction, Amino acid + ATP → Aminoacyl AMP + P − P depicts
a) Amino acid assimilation
b) Amino acid transformation
c) Amino acid activation
d) Amino acid translocation

159. The finches of Galapagos islands provide an evidence in favour of
a) Special creation
b) Evolution due to mutation
c) Retrogressive evolution
d) Biogeographical evolution

160. According to the heterotroph hypothesis, the first life on the earth was able to
a) Synthesis its food from inorganic compounds
b) Feed upon carbohydrates produced by autotrophs
c) Feed upon available nutrients in the environment
d) Carry on photosynthesis instead of respiration

161. Who among the following established the scientific basis of vaccination?
a) Edward Jenner b) George Kohler
c) Louis Pasteur d) Von Behring

162. A person has developed interferon in his body. He seems to carry an infection of
a) Typhoid b) Filariasis
c) Malaria d) Measles

163. Both sickle cell anaemia and Huntington's chorea are
a) Bacteria-related diseases
b) Congenital disorders
c) Pollutant-induced disorders
d) Virus-related diseases

164. In crop improvement programmes, virus-free clones can be obtained through
a) Grafting b) Hybridization
c) Embryo culture d) Shoot apex culture

165. Given below are a few statements regarding somatic hybridisation
I. Protoplasts of different cells of the same plant can be fused
II. Protoplasts from cells of different species can be fused
III. Treatment of cells with cellulose and pectinase is mandatory
IV. The hybrid protoplast contains characters of only one parental protoplast
Choose the correct option
a) I and II b) I and I
c) II and III d) III and IV

166. In the sewage treatment bacterial flocs are allowed to sediment in a settling-tank. This sediment is called as
a) Activated sludge b) Primary sludge
c) Anaerobic sludge d) Secondary sludge

167. Isinglass is a product obtained from air bladder of
a) Some snakes b) Some fishes
c) Some aves d) None of these

168. 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

169. What is the first step in Southern Blotting technique?
a) Isolation of DNA from a nucleated cell such as the one from the scene of crime
b) Denaturation of DNA on the gel for hybridization with specific probe
c) Production of group of genetically identical cells
d) Digestion of DNA by restriction enzyme

170. Which of the following nematode infects the roots of the tobacco plants which reduce the production of tobacco?
a) *Wuchereria* b) *Manducasexta*
c) *Meloidegyneincognit ia* d) *Enterbius*

171. White revolution is related to the increase in production
a) Egg b) Milk c) Meat d) Wool

172. Which one of the following can help in the diagnosis of a genetical disorder?
a) ELISA b) ABO blood group
c) PCR d) NMR

173. Pneumatophores have lenticels for
a) Excretion b) Gaseous exchange
c) Reproduction d) All of these

174. 5th June is celebrated as
a) Water day
b) World environment day
c) Conservation day
d) World earth day

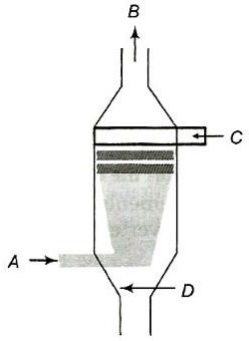
175. Building of biomass or storage of energy by green plants in a unit time and area is called
a) Productivity
b) Net primary productivity
c) Gross primary productivity
d) Primary productivity

176. Energy storage at consumer level is called
a) Gross primary productivity
b) Secondary productivity
c) Net primary productivity
d) Net productivity

177. Extinction vertex includes
a) Genetic factors b) Demographic factors
c) Both (a) and (b) d) None of these

178. The reflectivity percentage of incident light on earth is meteorologically called as
a) Tornado b) Albedo
c) Refraction d) Reradiation

179. The below diagram shows a scrubber. Identify *A*, *B*, *C* and *D*



a) A-Particulate matter, B-Clean air, C-Dirty air, D-Dust particle
b) A-Dirty air, B-Clean air, C-Water line spray,

D-Particulate matter

c) A-Clean air, B-Dirty air, C-Particulate matter, D-Water line spray

d) A-Dust particle, B-Clean air, C-Particulate matter, D-Collection plate grounded

180. UV-rays are non-ionizing type and are lethal due to inactivation of

a) Proteins b) Pigments

c) Nucleic acid d) All of these

MERITSTORE

Date : **NEET FULL PORTION** **TEST ID: 32**

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

: ANSWER KEY :

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

: HINTS AND SOLUTIONS :

2 **(b)**

One light year

$= 3 \times 10^8$ m/s year

$= \frac{3\times10^8}{s} \times 365 \times 24 \times 60 \times 60$s

$= 3 \times 10^8 \times 365 \times 24 \times 60 \times 60$m

$= 9.461 \times 10^{15}$m

3 **(c)**

Instantaeneous velocity $= v = \frac{\Delta x}{\Delta t}$

By using the data from the table

$v_1 = \frac{0-(-2)}{1} = 2m/s, \quad v_2 = \frac{6-0}{1} = 6m/s$

$v_3 = \frac{16-6}{1} = 10m/s$

So, motion is non-uniform but accelerated

4 **(c)**

$\vec{A} \cdot \vec{B} = AB\cos\theta = 6$

and $|\vec{A} \times \vec{B}| = AB\sin\theta = 6\sqrt{3}$

$\therefore \frac{AB\sin\theta}{AB\cos\theta} = \frac{6\sqrt{3}}{6} = \sqrt{3}$

or $\tan\theta = \sqrt{3}$

and $\theta = 60°$

5 **(d)**

Kinetic energy $= \frac{1}{2}mv^2 = K = as^2$

or $mv^2 = 2as^2$

Centripetal force $= \frac{mv^2}{R} = \frac{2as^2}{R}$

6 **(a)**

Let R be the reaction of base of lift and g the acceleration due to gravity, acting downwards. Their resultant provides the net acceleration to the lift. Therefore,

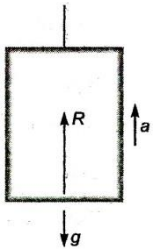
$R - mg = ma$

$\Longrightarrow R = m(g + a)$

Also, $R = mg'$

$\Longrightarrow g' = g + a$

Therefore, net acceleration increases and hence, reading indicated by spring balance will increase.

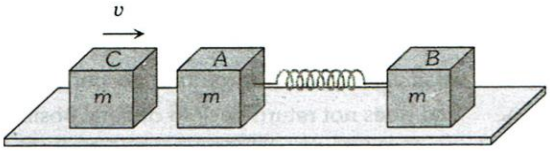


7 **(a)**

When the lift moves upwards, the apparent weight,

$= m(g + a)$. Hence reading of spring balance increases

8 **(a)**



Initial momentum of the system (block C) $= mv$

After striking with A, the block C comes to rest and now both block A and B moves with velocity V, when compression in spring is maximum

By the law of conservation of linear momentum

$$mv = (m + m)V \Rightarrow V = \frac{v}{2}$$

By the law of conservation of energy

K.E. of block C = K.E. of system + P.E. of system

$$\frac{1}{2}mv^2 = \frac{1}{2}(2m)V^2 + \frac{1}{2}kx^2$$

$$\Rightarrow \frac{1}{2}mv^2 = \frac{1}{2}(2m)\left(\frac{v}{2}\right)^2 + \frac{1}{2}kx^2 \Rightarrow kx^2 = \frac{1}{2}mv^2$$

$$\Rightarrow x = v\sqrt{\frac{m}{2k}}$$

9 **(d)**

$$v = \sqrt{\frac{2gh}{1 + \frac{k^2}{R^2}}}$$

Where k is the radius of gyration

For ring, $\frac{k^2}{R^2} = 1$

$$\therefore v = \sqrt{\frac{2gh}{1+1}} = \sqrt{gh}$$

10 **(a)**

Time of descent $t = \frac{1}{\sin\theta}\sqrt{\frac{2h}{g}\left(1 + \frac{K^2}{R^2}\right)}$

For solid sphere $\frac{K^2}{R^2} = \frac{2}{5}$

For hollow sphere $\frac{K^2}{R^2} = \frac{2}{3}$

As $\left(\frac{K^2}{R^2}\right)_{\text{Hollow}} > \left(\frac{K^2}{R^2}\right)_{\text{Solid}}$

$i.e.$ solid sphere will take less time so it will reach the bottom first

11 **(a)**

As $g' = g - \omega^2 R\cos^2\lambda$

The latitude at point on the surface of the earth is defined as the angle, which the line joining that point to the centre of earth makes with equatorial plane. It is denoted by λ. For the poles $\lambda = 90°$ and for equator $\lambda = 0°$.

(i) Substituting $\lambda = 90°$ in the above expression, we get

$g_{\text{pole}} = g - \omega^2 R\cos^2 90°$

$\therefore \quad g_{\text{pole}} = g$

ie,there is no effect of rotational motion of the earth on the value of g at the poles.

(ii) Substituting $\lambda = 0°$ in the above expression, we get

$g_{\text{equator}} = g - \omega^2 R\cos^2 0°$

$\therefore \quad g_{\text{equator}} = g - \omega^2 R$

ie, the effect of rotation of the earth on the value of g at the equator is maximum.

12 **(d)**

Energy stored per unit volume is given by

$$W = \frac{Y \times (\text{strain})^2}{2}$$

$$= \frac{10^{11}}{2} \times \left(\frac{\text{change in length}}{\text{original length}}\right)^2$$

where Y is Young's modulus

$$= \frac{10^{11}}{2}\left(\propto \frac{L\Delta\theta}{L}\right)^2$$

$$= \frac{10^{11}}{2}(12 \times 10^{-6} \times 20)^2 = 2880\ \text{Jm}^{-3}$$

13 **(b)**

If spherical body of radius a is dropped in a viscous fluid, it is first accelerated and then its acceleration becomes zero and it attains a constant velocity called terminal velocity.

Terminal velocity, $\quad v = \frac{2}{9}\frac{a^2(\rho - \sigma)g}{\eta}$

where ρ is the density of the body, σ is the density of fluid and η is coefficient of viscosity.

14 **(a)**

In hydraulic life, the pressure of smaller piston =

pressure of bigger piston $= F/A$
$= (3000 \times 9.8)/(4.25 \times 10^{-2})$
$= 6.92 \times 10^5 \text{Nm}^{-2}$

15 **(b)**
Water has maximum density at 4°C so at this temperature, it has minimum volume.

16 **(b)**
$C_v - C_p - R = 207 - 8.3 = 198.7$ J

17 **(c)**
As $V = KT^{2/3} \;\; \therefore \;\; dV = K\frac{2}{3}T^{-1/3}dT$

$\therefore \; \frac{dV}{V} = \frac{\frac{2}{3}KT^{-1/3}dT}{KT^{2/3}} = \frac{2}{3}\frac{dT}{T}$

Work done, $W = \int_{T_1}^{T_2} RT\frac{dV}{V} = \int_{T_1}^{T_2} RT\frac{2}{3}\frac{dT}{T}$

$W = \frac{2}{3}R(T_2 - T_1) = \frac{2}{3}R \times 60 = 40R$

18 **(d)**
According to the equilibrium theorem, the molar heat capacities should be independent of temperature. However, variations in C_V and C_P are observed as the temperature changes. At very high temperatures, vibrations are also important and that affects the values of C_V and C_P for diatomic and polyatomic gases. Here in this question according to given information (d) may be correct answer

19 **(b)**
$m_1 = 1$ kg, extension $l_1 = 5$ cm $= 5 \times 10^2$ m
$\therefore m_1 g = kl_1$
$k =$ force constant of the spring

$k = \frac{m_1 g}{l_1} = \frac{1 \times 10}{5 \times 10^{-2}} = 200 \text{ Nm}^{-1}$

Time period of the block of mass 2 kg.

$T = 2\pi\sqrt{\frac{m}{k}} = 2\pi\sqrt{\frac{2}{200}} = 2\pi \times \frac{1}{10} = \frac{\pi}{5}$ s

Maximum velocity $v_{\max} = A\omega$
where $A =$ Amplitude
$= 10$ cm $= 10 \times 10^{-2}$ m

$v_{\max} = A \times \frac{2\pi}{T} = 10 \times 10^{-2} \times \frac{2\pi}{\pi/5}$

$= 10^{-1} \times 2 \times 5 = 1 \text{ ms}^{-1}$

20 **(b)**

$t_1 = 2\pi\sqrt{\frac{m}{k_1}} or t_1^2 = \frac{2\pi^2 m}{k_1}$

or $k_1 = \frac{4\pi^2 m}{t_1^2}$

Similarly, $k_2 = \frac{4\pi^2 m}{t_2^2}$

And $(k_1 + k_2) = \frac{4\pi^2 m}{t_0^2}$

$\therefore \; \frac{4\pi^2 m}{t_0^2} + \frac{4\pi^2 m}{t_1^2} + \frac{4\pi^2 m}{t_2^2}$

or $\frac{1}{t_0^2} = \frac{1}{t_1^2} + \frac{1}{t_2^2}$

21 **(b)**

$f_{\text{open}} = \frac{v}{2\iota_{\text{open}}}$

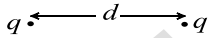
$f_{\text{closed}} = \frac{v}{4\iota_{\text{closed}}} = \frac{v}{\frac{4\iota_{\text{open}}}{2}}$

$\left(\text{As } \iota_{\text{closed}} = \frac{\iota_{\text{open}}}{2}\right)$

$= \frac{v}{2f_{\text{open}}} = f_{\text{open}}$ i. e.,

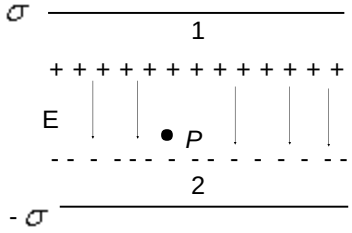
Frequency remains unchanged.

23 **(d)**



$F = \frac{(ne)^2}{4\pi \in_0 d^2} \Rightarrow n = \sqrt{\frac{4\pi \in_0 d^2}{e^2}}$

24 **(c)**
The situation is shown in the figure. Plate 1 has surface charge density σ and plate 2 has surface charge density $-\sigma$. The electric fields



at point P due to two charged plates add up, giving

$E = \frac{\sigma}{2\varepsilon_0} + \frac{\sigma}{2\varepsilon_0} = \frac{\sigma}{\varepsilon_0}$

Given, $\sigma = 26.4 \times 10^{-12} \text{Cm}^{-2}$
$\varepsilon_0 = 8.85 \times 10^{-12} \text{C}^2\text{N}^{-1}\text{m}^{-2}$

Hence, $E = \frac{26.4 \times 10^{-12}}{8.85 \times 10^{-12}} \approx 3 \text{NC}^{-1}$

Note the direction of electric field is from the positive to the negative plate.

25 **(c)**

$R = \rho\frac{l}{A}$

26 **(c)**

$E = 2.2 volt, V = 1.8\, volt, R = 5R$

$r = \left(\frac{E}{V} - 1\right)R = \left(\frac{2.2}{1.8} - 1\right) \times 5 = 1.1\Omega$

27 **(c)**
On stretching, volume (V) remains constant. So

$V = Al or l = V/A.$

Now, $R = \frac{\rho l}{A} = \frac{\rho V}{A^2} = \frac{\rho V}{\pi^2 D^4/16} = \frac{16\rho V}{\pi^2 D^4}$

Taking logarithm of both the side and differentiating it we get

$\frac{\Delta R}{R} = -4\frac{\Delta D}{D}$ or $\frac{\Delta R}{R} = -4 \times 0.25 = 1.0\%$

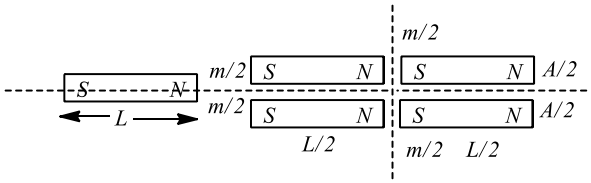
28 **(b)**

$B = \frac{\mu_0}{4\pi}\frac{\theta i}{r} = \frac{\mu_0}{4\pi} \times \frac{\pi}{2} \times \frac{i}{R} = \frac{\mu_0 i}{8R}$

29 **(b)**

Ferromagnetic material moves from a region of small magnetic field to a region of strong magnetic field.

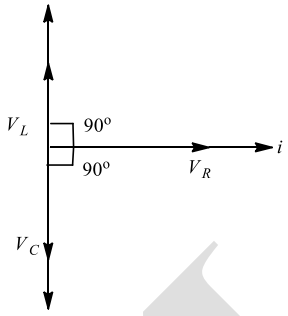
30 **(b)**



For each part $m'' = \frac{m}{2}$

32 **(d)**

In an $L-C-R$ series AC circuit, the voltage across inductor L leads the current by 90° and the voltage across capacitor C lags behind the current by 90°.



Hence, the voltage across $L-C$ combination will be zero.

33 **(b)**

$P = VI$

$I = \frac{550}{220} = 2.5\ A$

34 **(b)**

The electric field induced by changing magnetic field depends upon the rate of change of magnetic flux, hence it is non-conservative

35 **(c)**

For myopic eye $f = -$ (defected far point)

$\Rightarrow f = -40\ cm \Rightarrow P = \frac{100}{-40} = -2.5\ D$

36 **(b)**

$m = \frac{f}{f-u} \Rightarrow -3 = \frac{f}{f-(-20)} \Rightarrow f = -15\ cm$

37 **(b)**

The angular distance (θ) is given by

$\theta = \frac{\lambda}{d}$

$\theta = 2° = \frac{\pi}{180} \times 2, \lambda = 6980\ \text{Å}$

$= 6980 \times 10^{-10}\text{m}$

$\Rightarrow d = \frac{\lambda}{\theta} = \frac{6980 \times 10^{-10} \times 180}{3.14 \times 2}$

$= 1.89 \times 10^{-5}\text{mm}$

$\Rightarrow d = 2 \times 10^{-5}\text{mm}$

38 **(d)**

Because they are electromagnetic waves

39 **(d)**

$W_0 = hv_0 \Rightarrow v_0 = \frac{W_0}{h} = \frac{2.51 \times 1.6 \times 10^{-19}}{6.6 \times 10^{-34}}$

$= 6.08 \times 10^{14} Cycles/s$

40 **(a)**

1st excited state corresponds to $n = 2$

2nd excited state corresponds to $n = 3$

$\frac{E_1}{E_2} = \frac{n_3^2}{n_2^2} = \frac{3^2}{2^2} = \frac{9}{4}$

42 **(a)**

Using $\Delta E \propto Z^2$ $[\because n_1$ and n_2 are same]

$\Rightarrow \frac{hc}{\lambda} \propto Z^2 \Rightarrow \lambda Z^2 = \text{constant}$

$\Rightarrow \lambda_1 Z_1^2 = \lambda_2 Z_2^2 = \lambda_3 Z_3^2 = \lambda_4 Z_4^2$

$\Rightarrow \lambda_1 \times 1 = \lambda_2 \times 1^2 = \lambda_3 \times 2^2 = \lambda_4 \times 3^3$

$\Rightarrow \lambda_1 = \lambda_2 = 4\lambda_3 = 9\lambda_4$

44 **(a)**

Ozone layer extends from 30 km to nearly 50 km above the earth's surface in ozone sphere. This layer absorbs the major part of ultraviolet radiations coming from the sun and does not allow them to reach the earth's surface.

The range of ultraviolet radiations is 100 Å to 4000 Å. Thus, it blocks the radiations of wavelength less than 3×10^{-7}m (or 3000 Å).

45 **(d)**

Virtual height of F_2-layer is 350 km and critical frequency is 6 MHz

46 **(a)**

Weight of empirical formula

$CH_2 = 12 + (1 \times 2)$

$= 12 + 2$

$= 14$

Mass of one mole of the compound=its molecular weight

=42

$n = \frac{\text{mol. wt.}}{\text{empirical formula wt.}} = \frac{42}{14} = 3$

∴ Mol. formula=(Empirical formula× n)

$= (CH_2) \times 3 = C_3H_6$

47 **(a)**

$C_2H_4 + 3O_2 \rightarrow 2CO_2 + 2H_2O$

28 g 96 g

∵ The weight of oxygen required for complete combustion of 28 g ethylene=96 g.

∴ Weight of oxygen required for combustion of 2.8 kg ethylene

$= \frac{96 \times 2.8 \times 1000}{28 \times 1000}$kg=9.6 kg

48 **(c)**

Any sub-orbit is represented as nl such that n is the principal quantum number (in the form of values) and $l$is the azimuthal quantum number (its name).

Value of $l < n, l$: 0 1 2 3 4

$spdfg$

Value of m: $-l, \ldots \ldots \ldots .0, \ldots \ldots + l$

Value of s: $+\frac{1}{2}$or $-\frac{1}{2}$

Thus, for $4f$: $n = 4, l = 3, m =$ any value between -3 to +3.

49 **(d)**

The isoelectronic species have same number of electrons.

5. NaCl has Na^+ and Cl^- ions

Electrons in $Na^+ = 11 - 1 = 10$

Electrons in $Cl^- = 17 + 1 = 18$

∴ They are not isoelectronic.

6. CsF has Cs^+ and F^- ions

Electrons in $Cs^+ = 55 - 1 = 54$

Electrons in F^- =9+1=10

∴ They are not isoelectronic.

7. NaI has Na^+ and I^- ions

Electrons in $Na^+ = 11 - 1 = 10$

Electrons in $I^- = 53 + 1 = 54$

∴ These are not isoelectronic.

8. K_2S has K^+ and S^{2-} ions

Electrons in $K^+ = 19 - 1 = 18$

Electrons in $S^{2-} = 16 + 2 = 18$

∴ In K_2S, the ions K^+ and S^{2-} are isoelectronic.

50 **(b)**

Metallic character atomic size

$\frac{1}{\text{nuclear charge}}$ (for a period only)

Metallic character decreases across a period from left to right because atomic size decreases.

In a group from top to bottom, metallic nature increases due to increase in atomic size.

51 **(a)**

N_2molecule has 14 electrons. The molecular orbital electronic configuration of the molecule is as

$N_2: KK(\sigma 2s)^2(\ {}^*_\sigma 2s)^2(\pi 2p_x)^2$

$= (\pi 2p_y)^2(\pi 2p_z)^2$

N_2^-ion is formed when N_2 accept an electron hence it has15 electrons. The molecular orbital electronic configuration of the molecule is as

$N_2^-: KK(\sigma 2s)^2(\ {}^*_\sigma 2s)^2(\pi 2p_x)^2(\pi 2p_y)^2$

$(\sigma 2p_z)^2(\ {}^*_\pi 2p_x)^1$

Hence, this electron goes to antibonding π molecular orbital.

52 **(a)**

We know that the C − C bond length = 1.54 A, C =C bond length = 1.34 A and C ≡ C bond length = 1.20 A. Since propyne has triple bond; therefore, it has minimum bond length.

53 **(b)**

Most probable velocity $= \sqrt{\frac{8RT}{\pi M}}$

$T = (27 + 273) = 300$ K

Molecular mass of $H_2 = 2$ g mol^{-1}

Most probable velocity (H_2)

$= \sqrt{\frac{8 \times 8.314 \times 10^7 \times 300}{3.14 \times 2}}$

$= 17.8 \times 10^4$cm/s

54 **(c)**

Relation between ΔH (enthalpy change) and ΔE (internal energy change) is

$\Delta H = \Delta E + \Delta_{n_g} RT$

where Δ_{n_g}=moles of gaseous products-moles of gaseous reactants

$=2=-1$

$\Rightarrow -1366.5 = \Delta E - 1 \times 8.314 \times 10^{-3} \times 300$

$\Delta E = -1364.0 \text{ kJ mol}^{-1}$

55 **(b)**

$XY \rightarrow X(\text{g}) + Y(\text{g});\ \Delta H = +a\text{kJ/mol}$ ...(i)

$X_2 \rightarrow 2X;\ \Delta H = +a\text{kJ/mol}$ ...(ii)

$Y_2 \rightarrow 2Y;\ \Delta H = +0.5a \text{ kJ/mol}$ ...(iii)

$\frac{1}{2} \times$ (ii) $+ \frac{1}{2} \times$ (iii) $-$ (i) gives

$\frac{1}{2}X_2 + \frac{1}{2}Y_2 \rightarrow XY$

$\Delta H = \left(+\frac{a}{2} + \frac{0.5}{2}a - a\right) \text{kJ/mol}$

$\therefore\ -200 = +\frac{a}{2} + \frac{0.5a}{2} - a$

or $a = 800$

56 **(b)**

For a reaction, $K_c = \frac{[\text{product}]}{[\text{reactant}]}$

Hence,

if $K_c > 1$, then [Product]>[Reactant]

57 **(c)**

Let the oxidation state of sulphur in $Na_2S_4O_6$ is x.

$Na_2S_4O_6$

$1\times 2 + 4 \times x + (-2) \times 6 = 0$

$2 + 4x - 12 = 0$

$4x - 10 = 0$

$4x = 10$

$x = \frac{10}{4} = 2.5$

58 **(d)**

$KO_3Na_2O_2$

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

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

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

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

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

$x = -1$

59 **(d)**

Electrolysis of 50% sulphuric acid gives per disulphuric acid ($H_2S_2O_8$) which on distillation yields 30% solution of hydrogen peroxide

60 **(c)**

$\because$ Carbon dioxide does not help in burning and it reacts with alkali metals to form carbonates.

$\therefore$ $CO_2$is used to extinguish fire of lithium, sodium and potassium.

61 **(b)**

$BCl_3 + 3H_2O \rightarrow B(OH)_3 + 3HCl$

Thus, the products are $B(OH)_3$ or $H_3BO_3$and HCl.

62 **(c)**

$Pb_3O_4$is a mixed oxide. It can be represented as $2PbO.PbO_2$.

63 **(a)**

Mesomeric effect involves complete transfer of π or lone pair of electrons to the adjacent atom or covalent bond. Hence, it involves delocalisation of pi (π) electrons.

64 **(b)**

Only terminal alkynes give precipitate with ammoniacal silver nitrate solution.

Among the given, $CH_3 - C \equiv CH - CH_3$ is not a terminal alkyne. Thus, it does not give precipitate with ammoniacal $AgNO_3$.

65 **(b)**

$C_6H_5CH_3 \xrightarrow{\text{Oxidation}} C_6H_5.COOH \xrightarrow{\text{NaOH}}$

(A)

$C_6H_5COONa \xrightarrow[(NaOH+CaO)]{\text{Soda lime}} C_6H_6 + CO_2 \uparrow$

(B)

67 **(b)**

The 8:8 type of packing is present in caesium chloride (CsCl). In this structure each Cs^+ ion is surrounded by 8 Cl^- ions and each Cl^- ion is also surrounded by 8 Cs^+ ions.

68 **(a)**

Given, $r_{Na^+}/r_{Cl^-} = 0.55$

$r_{K^+}/r_{Cl^-} = 0.74$

$\frac{r_{KCl}}{r_{NaCl}} = ?$

$\frac{r_{Na^+}}{r_{Cl^-}} = 0.55$

$\frac{r_{Na^+}}{r_{Cl^-}} + 1 = 0.55 + 1$

$\frac{r_{Na^+} + r_{Cl^-}}{r_{Cl^-}} = 1.55$ ... (i)

$\frac{r_{K^+}}{r_{Cl^-}} = 0.74$

$\frac{r_{K^+}}{r_{Cl^-}} + 1 = 0.74 + 1$

$$\frac{r_{K^+} + r_{Cl^-}}{r_{Cl^-}} = 1.74 \quad \text{... (ii)}$$

Eq (ii) devide by Eq (i)

$$\frac{r_{K^+} + r_{Cl^-}}{r_{Na^+} + r_{Cl^-}} = \frac{1.74}{1.55} = 1.1226$$

69 **(c)**

$$\pi V = \frac{W}{m} RT$$

for isotonic solutions, osmotic pressure (π) is same

$$\frac{W_1}{m_1 V_1} = \frac{W_2}{m_2 V_2}$$

$$V_1 = 1L, V_2 = 100\ mL = 0.1L$$

$$\frac{W_1}{60 \times 1} = \frac{10}{342 \times 0.1}$$

$$W_1 = 17.54 \frac{g}{L}$$

70 **(b)**

Given,

R=8.314 $JK^{-1}mol^{-1}$

$T_f = 273 + 16.6 = 289.6\ K$

$L_f = 180.75\ Jg^{-1}$

k_f =?

$$k_f = \frac{R.T_f^2}{1000 \times L_f}$$

$$= \frac{8.314 \times (289.6)^2}{1000 \times 180.75}$$

$$k_f = 3.86$$

71 **(b)**

$\underset{\text{anode}}{Ag} / Ag^+ (0.1\ M) \,||\, Ag^+ (1\ M) / \underset{\text{cathode}}{Ag}$

$$E_{cell} = \frac{2.303RT}{nF} \log \frac{C_1}{C_2}$$

Here, n = number of electrons in cell reaction = 1

C_1 = concentration of cathodic electrolyte = 1 M

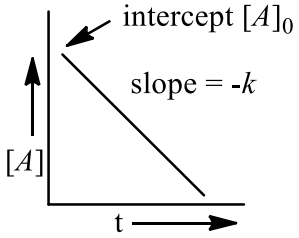
C_2 = concentration of anodic electrolyte = 0.1 M

$$\therefore \quad E_{cell} = \frac{0.059}{1} \log \frac{1}{0.1}$$

$E_{cell} = 0.059$ V

72 **(c)**

For a zero order reaction, the plot of concentration of reactant vs time is astraight line (linear) with a negative slope and non-zero intercept.



73 **(d)**

According to collision theory,

1. The reaction rate depends on collision frequency and effective collisions. For a molecule to have effective collision it should fulfill two conditions; proper orientation and sufficient energy.

2. The collision rate *i.e.*, the number of collisions taking place in unit volume is also termed as collision frequency (Z) and is given by

$$z = \frac{\pi n^2 \sigma^2 u_{av}}{\sqrt{2}}$$

3. Greater the temperature, greater will be the collision rate.

75 **(d)**

In electroefining of copper, some gold is deposited as anode mud

76 **(c)**

Dolomite $MgCO_3.CaCO_3$

Magnesite $MgCO_3$

Carnallite$KCl.MgCl_2.6H_2O$

77 **(c)**

When phosphorus trioxide is dissolved in water phosphorous acid (H_3PO_3)is formed

$P_4O_6 + 6H_2O \longrightarrow 4H_3PO_3$

78 **(a)**

Zn^{2+} (Z=30):[Ar]$3d^{10}4s^0$; zero unpaired electron.

Hence, its magnetic moment is zero.

$\mu = \sqrt{n(n+2)} = \sqrt{0(0+2)}$

$\mu = 0$

81 **(a)**

9. Iodoform test is done to detect presence of CH_3CO group in organic compounds.

10. Fehling solution identifies aldehydes.

11. Tollen's reagent identifies aldehydes.

12. Schiff's reagent identifies aldehydes.

O

‖

Methyl ketone is $CH_3 - C - R$.

O

‖

∵ It has $CH_3 - C$ group. It is tested by using iodoform test.

The compound having CH_3CO group give yellow ppt. on reaction with I_2 and aqueous alkali.

83 **(d)**
Alcohol has polar H which makes intermolecular H-bonding possible. Ether is non-polar hence no H-bonding. Lack of H-bonding in ether makes it more volatile than alcohol.

84 **(d)**
When amide is heated with a mixture of Br_2 in the presence of NaOH or KOH amine is formed which has one carbon atom less than original amide. This is called Hofmann's degradation reaction.
$Hexanamide + Br_2 + 4KOH \rightarrow Pentanamine + K_2CO_3 + 2KBr + 2H_2O$

85 **(a)**
When propyl bromide is reacted with KCN, butanenitrile is formed.
$CH_3CH_2CH_2Br + KCN \rightarrow CH_3CH_2CH_2C \equiv N + KBr$
propyl bromide butane nitrile

88 **(d)**
Chlorophyll is metallic complex of porphyrin ring with magnesium atom.

89 **(d)**
The condensation polymerization of hexanethylenediamine and adipic acid is done in solution form by interface technique. In this liquid nylon polymer is obtained.

90 **(b)**
(i) Congo red is direct dye.
(ii) Alizarin is anthraquinone dye.
(iii) Aniline black is an ingrain dye. The last process of dyeing is done on fabric for such dyes.

91 **(d)**
When synthetic process or constructive process called anabolism exceeds destructive process of the body *i.e.*, catabolism, growth will takes place, which in turn proceeds development and body will function well

92 **(c)**
A species is a group of organisms, which are closely related and sharing a common gene pool. **John Ray** (1627-1705) introduced the term 'species' for any shole kind of living thing.

93 **(a)**
Herbarium/Herbaria (Plu) are place/collection of dried pressed and preserved (FAA solution) specimen of plants

94 **(b)**
Asexual spores formed by *Colletotrichumfalcatum* (fungi imperfacti), *Sphaerotheca* (Ascomycetes) and *Rhizopusstolonifer*(Zygomycetes), all are unicellular, uninucleate, rounded to oval structures.

95 **(a)**
Bakanae disease or foolish seedling disease is caused by the fungus *Gibberellafujikuroi* (*Fusariummoniliforme*)

96 **(c)**
Hydropterids are only plant among the heterosporous. Pteridophytes that are leptosporangiate. Leptosporangiate in which the sporangium origin from epidermal cell Heterosporouspteridophytes were the first land flora of earth. The difference in size between microspore and megaspore is 1:2000 female gametophyte of *Selaginella* mostly have single archegonium

97 **(a)**
Gametophyte and sporophytic phases are present in life cycle of bryophytes and both phases are morphologically distinct. The gametophytic phase is more conspicuous independent and dominant while sporophyte depends on gametophyte.

98 **(c)**
Aves is the first class to show completely four-chambered heart

99 **(c)**
Mammals have 12 pairs of cranial nerves.

100 **(a)**
Conus arteriosus is a muscular and contractile structure, present in right auricle of frog which consists of **pylangium** (bulbus arteriosus) and **synangium**(ventral aorta).

101 **(d)**
In mango, coconut, plum, etc., the fruit is known as drupe (stony fruit). They develop from

monocarpellary, superior ovaries and are one seeded. In mango, the pericarp is well differentiated into an outer thin Epicarp, a middle fleshy edible mesocarp and an inner stony hard endocarp.

102 **(b)**
Caryopsis fruits develop from unilocular, single-ovuled, superior ovary of Multicarpellary gynoecium. They are small and single-seeded. Their pericarp is completely fused with the seed-coat or testa.

103 **(b)**
Corm is a modification of stem because it bears node and internodes as stem bears. From the base of corm, arises the adventitious roots, some of which are contractile and pull new corm, down into the soil.

104 **(b)**
Stamens of flower may be united with other members such as petals or among themselves. When stamens are attached to the petals, they are **epipetalous** as in brinjal or **epiphyllous** when attached to the perianth as in the flowers of lily

105 **(c)**
The innermost layer of cortex is called endodermis. It comprises a single layer of barrel-shaped cells without any intercellular spaces. The tangential as well as radial walls of the endodermal cells have a deposition of water impermeable, waxy material called suberin in the form of casparian strips

106 **(a)**
Cork cambium is also called **phellogen**. Cork is also called **phellem**. Secondary cortex is also called **phelloderm**.
Cork cambium, cork and secondary cortex are collectively called **periderm** or secondary ground tissue.

107 **(d)**
Crop is a sac-like structure in the digestive system of cockroach and used for storing the food and not for grinding the food

108 **(d)**
In addition to the Malpighian tubules, excretion of the waste product in cockroach also occurs by fat bodies. Nephrocyts and urecose glands

109 **(b)**
Motality of eukaryotic flagella is dependent upon ATPase activity. Enzyme **asconic dynein**catalyses ATP activity.

110 **(c)**
The ability to distinguish different neighbouring cells is important for organism's function
Glycolipids are lipids with attached carbohydrate, which acts as recognition sites during cell-cell interaction, as well as sites of attachment in a tissue
Glycoproteins are often integral membrane proteins and are also important for cell recognition

111 **(d)**
In the solid state, an amino acid ordinarily exist as Zwitter ion, which is formed by the transfer of protons from $\alpha -$ COOH group to $- NH_2$ group. Essential amino acids are those, which our body can not manufacture of its own that's why these are required in diet, while non-essential amino acids required in diet, while non-essential amino acids are those, which are not required in our diet essentially.

112 **(b)**
Purine and pyrimidine nitrogenous base are found in DNA. Among purines, adenine pairs only with the pyrimidine thymine. Similarly, guanine pairs with the cytosine. The fact that total amount of purine will be equal to total amount of pyrimidine was first enunciated by Chargaff in 1950. From this law,
Adenine=Thymine=60/2=30%
Guanine=Cytosine=40/2=20%

113 **(d)**
Prophase is generally identified by the initiation of condensation of chromosomal material. The chromosomal material condenses to form chromosomes. The nuclear envelope breaks down and spindles start to assemble at opposite ends of the cell

114 **(c)**
In **pachytene**substage of meiosis-I, the paired homologous chromosomes divide into sister chromatids. Thus, each bivalent is composed of four chromatids and known as tetrad.

115 **(d)**
When an RBC is kept in hypotonic solution then, water enters the RBC by the process of osmosis (endosmosis). The RBC will increase in size and ultimately burst. Osmosis is the movement of solvent particles from

hypotonic to hypertonic medium through semi-permeable membrane.

116 **(d)**

Transport of organic and inorganic substances in plants over longer distance proceeds through the vascular tissue system, *i.e.*, xylem and phloem and it is called translocation. It occurs through mass flow

117 **(a)**

Addition of solutes in a system or cell decreases the energy of water. Pure water has the maximum diffusion pressure. Water potential or chemical potential of pure water is the difference in the free energy per unit molal volume of water in a system in reference to pure water at normal temperature and pressure

118 **(b)**

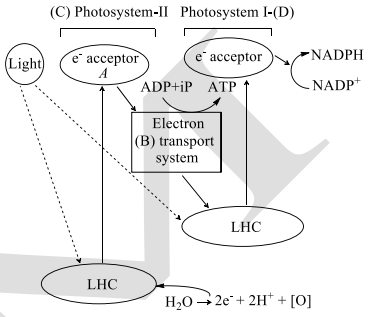
Carbon is a macronutrient, which is an essential component of all organic compounds. Plants obtain carbon in the form of carbon dioxide from atmosphere, not from the soil.

119 **(c)**

Two nitrogen atoms are joined by the triple covalent bond

120 **(a)**

Transport of electrons in photosynthesis takes place from the PS-II to PS-I through electrons transport system. In the electron transport system, there are various cytochrome, which carries electrons to the down hill potential of redox scale



121 **(a)**

Etiolation involves the destruction of chloroplasts and, hence all the chlorophyll when the plants are grown in dark.

122 **(b)**

When oxygen is not available, yeast or some other microbes respire anaerobically. In case of anaerobic respiration, the value of respiratory quotient is not utilized, eg,

$$C_6H_{12}O_6 \xrightarrow{\text{Zymase}} 3C_2H_5OH + 2CO_2 + \text{Energy}$$

Glucose Ethyl alcohol

123 **(a)**

DCMU is a herbicide which acts as an inhibitor of non-cyclic electron transport; PMA is fungicide which reduces transpiration; colchicines is an antimicrobial drug, it causes prevention of mitotic spindle formation thus blocking the mitosis.

124 **(c)**

Auxin was isolated by FW Went from the tips of coleoptiles of oat seedlings in 1928

125 **(c)**

Large amount of ethylene is synthesised by senescence tissue and ripening fruit

126 **(b)**

Pruninghelp in making the hedge dense as it frees the axillary buds from apical dominance. In fact, the apices of the plant axis (*e.g.,* shoot apex) has the highest concentration of auxin, which suppresses the axillary buds, while promotes the growth of apical bud. When the shoot apex is cut down through prunning, the axillary buds and the hedge becomes dense.

127 **(b)**

The secretion of salivary glands is called saliva. Medium of saliva is slightly acidic. The quantity of saliva in an adult is 1000-1500mL/day. Chemically, saliva is a mixture of water and electrolytes ($Na^+, K^+ Cl^-, HCO_3$). Some enzymes, salivary amylase and lysozyme, (an anti-bacterial agent) are also found in saliva

128 **(a)**

Crypts of Leiberkuhn or intestinal glands are present in the duodenum and ileum (parts of small intestine) only. These are formed by the folding of lamina propria and secrete succusentericus, *i. e*., intestinal juice.

129 **(c)**

Periodically, filling the lung with atmospheric air and then emptying, is called breathing or ventilation of lungs. Breathing in is called inspiration or inhalation and breathing out is called expiration or exhalation. During inhalation or inspiration, the diaphragm contracts putting backwards by partial flattening and increase the thoracic cavity lengthwise.

130 **(b)**

The movement of chloride ions into erythrocytes from the plasma to maintain osmotic balance during transport of gases is known as **Hamburger phenomenon**.

131 **(a)**
In the case of emergency like accidents, traumatic condition, the spleen can act as erythropoietic organ. That's why, it is called the blood bank

132 **(c)**
Both (bicuspid and tricuspid) valves are connected below to the walls of ventricles by chordae tendinae. They prevent the valves from turning inside out or from being forced upward during the contraction of ventricles

133 **(d)**
Alkaptonuria is a genetic disease. It is a metabolic disorder, in which patient excrete large amount of **homogentisic acid** in urine. Such urine turns black, when exposed to air.

134 **(d)**
A – reabsorbed, B – Concentrated, C – Urea

135 **(c)**
Osmoreceptors in the body are activated by changes in the blood volume, body fluid volume and ionic concentration. An excessive loss of fluid from the body can activate these receptors, which stimulate the hypothalamus to release ADH (Antidiuretic Hormone) or vasopressin from neurohypophysis (posterior lobe of pituitary). ADH facilitate the water reabsorption from latter parts of the tubule there by preventing decreases or water loss

136 **(a)**
Scapula is a large triangular flat bone situated in the dorsal part of the thorax between the second and the seventh ribs. The dorsal, flat, triangular body of the scapula has a slightly elevated ridge called the spine which projects as a flat, expanded process called the acromion
The clavicle articulates with this. Below the acromion depression called the glenoid cavity, which articualates with the head of the humerus to form the shoulder joint. Each clavicle is a long slender bone with two curvatures. This bone is commonly called the collar bone

137 **(c)**
Axis is the second cervical vertebra, which is identified by a prominent odontoid process. The odontoid process of axis vertebra fits in the odontoid fossa of first cervical vertebera (*i. e*., atlas) forming the actual pivot joint at which the skull rotates around together with the atlas.

138 **(c)**
Muscular dystrophy Progressive degradation of skeletal muscle mostly due to genetic disorder

139 **(d)**
Medulla oblongata is the centre for heart beats, respiration, blood pressure, etc.

140 **(a)**
Ampullae of Lorenzini, situated in the snout of shark, are thermoreceptors responding to changes in temperature.

141 **(a)**
Hyposecretion of parathormone from parathyroid gland leads to tetany disorder. It causes the lowering of blood calcium level. Insulin deficiency leads to disease diabetes mellitus (hypoglycemia). Hypersecretion of growth hormone results of gigantism in children.
Relaxin deficiency prevents the process of parturition. Low secretion of thyroid hormone results of cretinism in infants and children. Deficiency of prolactin hinders the development of mammary glands and secretion of lactin.

142 **(c)**
Myxoedema (Gull's disease) occurs due to the deficiency of throxine in adults. It causes low BMR (by 30-40%). Low body temperature, tendency to retain water in tissues, reduced heart rate, pulse rate, blood pressure and cardiac output, low sugar and iodine level in blood, muscular weakness and oedema (accumulation of interstitial fluid that causes the facial tissues to swell and look fluffy).

143 **(c)**
Female gametes are called ovum in case of higher organism. The term egg is also used.
Interchangeably Archegonia also used for female gametes containing organs but in case of lower organism,*i.e.,* Bryophytes and pteridophytes

145 **(d)**
*Crotalaria*is a member of Papilionaceae (Fabacese), in which 10 stamens are present in a flower. Each stamen has four microsporangia, in which microspore mother cells are found. Each microspore mother cell gives rise toa pollen tetrad.
Thus, 10 flowers (with 10 stamens in each) having 30 microsporangia in each microsporangium will form **48,000** pollen grains.

146 **(c)**
Filiform apparatus are the special thickening of synergid cells for guiding the pollen tube and male gametes, so that the fusion takes place property

147 **(d)**
A-Hypocotyle, B-Radicle , C-Root cap

148 **(b)**
Doctors inject oxytocin hormone for the strong contraction of uterine wall.
Parturition
(i) The average duration of human pregnancy is about 9 months which is called the gestation period
(ii) The act of expelling the full term foetus from the mother's uterus at the end of gestation period is called parturition
(iii) It is induced by a complex neuroendocrine mechanism
(iv) Parturition signals originates from the fully developed foetus and the palcenta, which induce mild uterine contractions called foetus ejection reflex
(v) This triggers the release of oxytocin from the maternal pituitary
(vi) Oxytocin induces stronger uterine muscle contractions
(vii) Relaxin increases the flexibility of the pubic symphysis and ligaments that helps to dilate the uterine cervix during labour pain
(viii) This leads to the expulsion of baby

149 **(d)**
The amount of yolk determines the type of cleavage in the egg. In **superficial meroblastic cleavage**, the cleavage remains restricted to the peripheral portion of the egg. This type of cleavage occurs in arthropods especially insects.

i.e., centrolecithal eggs.

150 **(d)**
Gasrtulation is characterized by the presence of archenteron, three germinal layers (ectoderm, mesoderm, and endoderm) and morphogenetic movements.

151 **(c)**
Due to lack of progesterone, uterine endmetrium, epithelial glands and connective tissue are broken in menstrual cycle.

152 **(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

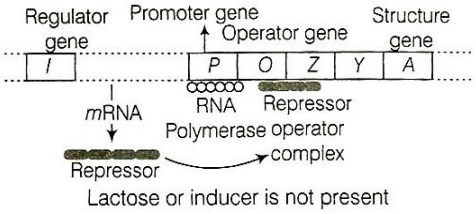
153 **(d)**
The term 'reproductive health' simply refers to healthy reproductive organs with normal functions. However, it has broader perspectives and includes emotional, physical and social aspects of reproduction also

154 **(b)**
If both parents have blood group-AB then the possible blood groups of children are A, B and AB.

155 **(b)**
In sex-linkage, the speciality is criss-cross inheritance. Criss cross inheritance is a type of sex linked inheritance where a parent passes the traits to the grand child of the same sex through offspring of the opposite sex, that is father passes the traits to grandson through his daughter while the mother transfers traits to her grand daughter through her son, criss cross inheritance establish the relationship between gene and the sex chromosomes.

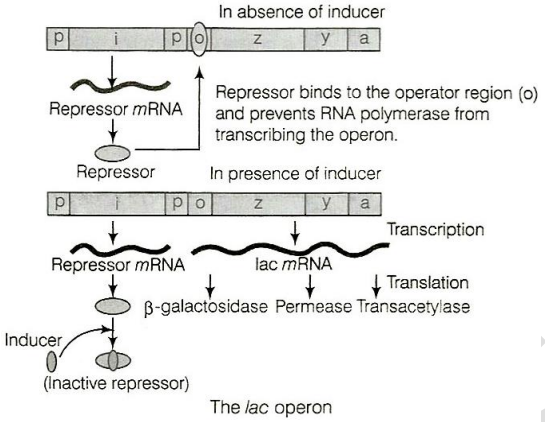
156 **(a)**
Law of purity of gamete states characters recovered in F_2-generation that was hiden F_1.
Principle of Law of Segregation This law is also called the purity of gametes. This law states that the two factors of a character present in individual keep their identity distinct separate at the time of gametogenesis (meiosis) or sporogenesis, factors get randomly distributed to different gametes and then get paired again in different offspring as per the principle of probability. The principal of segregation can be deduced in Punnett square

157 **(a)**
Working of *lac* operon
(i) When lactose is absent
1. *i*-gene (regular gene) produces *m*RNA which makes repressor proteins
2. Repressor proteins binds with the operator genes as a result RNA polymerase cannot bind with the promoter
3. Transcription do not takes place and *lac* operon is switched off



(ii) When lactose is present

1. Lactose acts as an inducer which binds to the repressor and forms an inactive repressor
2. The repressor fails to bind to the operator region
3. The RNA polymerase binds to the operator and transcript *lac m*RNA
4. *lac m*RNA is polycistronic. *i.e.*, produces all the three enzymes, β-galactosidase, permease and transacetylase
5. The *lac* operon is switched on



The *lac* operon

158 **(c)**

Various steps of protein synthesis are amino acid activation and involvement of *t*RNA. Duing amino acid activation, amino acid binds with ATP to form amino acyl AMP+P-P. The process of shifting of amino acids form A-site of ribosome to P-site is called **translocation.**

159 **(d)**

Darwin's finches of Galapagos islands has common ancestors, later on whose beaks modified according to their feed habit. These provide evidence of biogeographical evolution.

160 **(c)**

After the aggregates became so large, some organisms developed the ability to ingest smaller organic molecules. This is heterotrophic nutrition. As the seas became filled, some developed the ability to change the light energy into usable energy called glucose. This is autotrophic nutrition and according to the heterotroph hypothesis, autotrophic nutrition came after heterotrophic nutrition

161 **(a)**

Edward Jenner(1796), an English physician prepared the first vaccine when he injected the fluid from the sore of milkmaid suffering from cowpox into the body of a healthy boy which when exposed later to smallpox, exhibited resistance to the disease.

Louis Pasteur (1879) found that ageing cultures of cholera bacteria were too weak to cause disease, when injected into chickens. But chickens injected with these cultures became immune of fowl-cholera. By using this method, Pasteur developed a vaccine against rabies in 1885.

162 **(a)**

Interferons block viral reproduction in healthy cells. Measles is caused by the measles virus. Typhoid is a bacterial disease.

Filariasis is a parasite disease (usually an infectious tropical disease) that is caused by thread-like nematodes. Malaria is caused by a protozoan (*Plasmodium* sp.) but carried by the female *Anopheles* mosquito

163 **(b)**

Both sickle cell anaemia and Huntington's chorea are congenital genetic disorders. Sickle cell anaemia was first reported by James Herrick (1904). In this disease, the patient's haemoglobin level reduced to half of the normal and the RBCs becomessickle shaped. A single mutation in a gene can cause sickle cell anaemia. Huntington's chorea is caused by autosomal mutation, which is dominant. The gene is present on 4-chromosome numbers.

164 **(d)**

Tissue culture technique can be utilized for the production of virus-free plants either by meristem culture chemotherapy or selective chemotherapy of larger explants from donor plants. Shoot apex consists of meristematic-cells, thus shoot apex culture is successful to obtain virus-free clones in crop improvement programmes

165 **(c)**

When a hybrid is produced by fusion of somatic cells of two varieties or species, it is called as somatic hybrid. The process of producing somatic hybrids is called somatic hybridisation. The hybrid protoplast contains characters of both parental protoplast

166 **(a)**

In the sewage treatment when Biochemical Oxygen Demand (BOD) of sewage has reduced, the effluent is passed into settling tank. Here, the bacterial flocs settle and the sediment is called activated sludge

168 **(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)**

Nematodes is a group of organisms, which parasites a large number of plants and animals including human being. One of the common nematodes *Meloidegyneincognitia* infects the roots of tobacco plants and causes a great loss by causing reduction in yield.

This infestation was prevented by using a novel strategy, which was based on the process of RNA interference (RNAi). RNA is powerful reverse genetic tool to study gene function

171 **(b)**

White revolution – Milk production

Golden revolution – Egg production

Blue revolution – Fish production

172 **(c)**

PCR is a technique, in which a small fragment of DNA is rapidly cloned or duplicated to produce multiple DNA copies. Thus, it helps in the diagnosis of a genetical disorder. This technique was conceived by American biochemist **Kary B Mullis.**

173 **(b)**

A number of mangroove plants possess small negatively geotrophic vertical roots called pneumatophores. Pneumatophores have lenticels for gaseous exchange. They are connected with internal arenchymatous tissue. It is a plant adaptation to saline environment

174 **(b)**

5th June-world environment day

22nd April-world earth day

175 **(b)**

Net primary productivity is the weight of the organic matter stored by the producers in a unit area/volume for unit time. It is given by NPP = GPP – R (Gross Primary Productivity) where, R = Respiration losses. It is utilised by hetertrophs

177 **(c)**

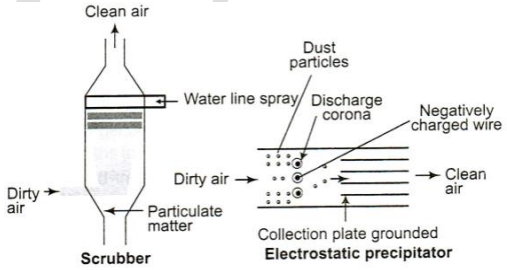
Extinction vertex is a combination of genetic and demographic factors

178 **(b)**

The reflectivity percentage of incident light on earth is meteorologically called albedo.

179 **(b)**

A-Dirty air, B-Clean air, C-Water line spray, D-Particulate matter



180 **(d)**

Ultraviolet (UV) light is electromagnetic radiation with a wavelength shorter than that of visible light but longer than X-rays. It is classified as non-ionising radiation, and can cause inactivation of protein, pigments and nucleic acids.