Meritstore

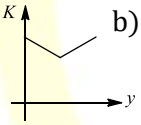
NEET

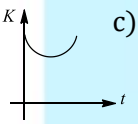
FULL PORTION

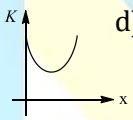
TEST ID: Day 27 – Test 1

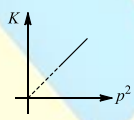
Time : 03:00:00

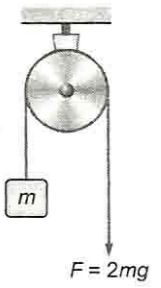
Marks : 720

1. The unit of potential energy is
   a) $g(cm/\sec^2)$ b) $g(cm/\sec)^2$
   c) $g(cm^2/\sec)$ d) $g(cm/\sec)$
2. Which physical quantities have same dimensions?
   a) Force and power b) Torque and energy
   c) Torque and power d) Force and torque
3. A body falling from a high Minaret travels $40\ m$ in the last 2 seconds of its fall to ground. Height of Minaret in meters is (take $g = 10\ m/s^{-2}$)
   a) 60 b) 45 c) 80 d) 50
4. A particle is projected up from a point at an angle with the horizontal. At any time t if p =linear momentum, y =vertical displacement, x =horizontal displacement, then the kinetic energy (K) of the particle plotted against these parameters can be
   a) 

   b) 

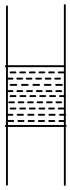
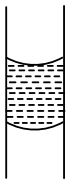
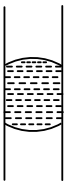
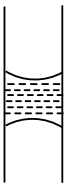
   c) 

   d) 

5. A small disc is on the top of a hemisphere of radius R. What is the smallest horizontal velocity v that should be given to the disc for it to leave the hemisphere and not slide down it? [There is no friction]
   a) $v = \sqrt{2gR}$ b) $v = \sqrt{gR}$
   c) $v = \dfrac{g}{R}$ d) $v = \sqrt{g^2R}$
6. In the arrangement shown in figure, if a force $2\ mg$ is applied at the free end of the rope, the mass m will ascend with an acceleration of
   

   a) $\dfrac{g}{3}$ b) $\dfrac{g}{2}$ c) g d) 2 g
7. A block is gently placed on a conveyor belt moving horizontally with constant speed. After 4s the velocity of the block becomes equal to the velocity of belt. If the coefficient of friction between the block and the belt is 0.2, then velocity of the conveyor belt is
   a) 2 ms^{-1} b) 4 ms^{-1}
   c) 6 ms^{-1} d) 8 ms^{-1}
8. An athlete in the Olympic covers a distance of 100 m in 10 s. His kinetic energy can be estimated to be in the range
   a) 200 J-500 J b) 2×10^5 J $- 3 \times 10^5$ J
   c) 20000 J−50000 J d) 2000 J − 5000 J
9. When a disc is rotating with angular velocity ω, a particle situated at a distance of 4 cm just begins to slip. If the angular velocity is doubled, at what distance will the particle start to slip?
   a) 1 cm b) 2 cm c) 3 cm d) 4 cm
10. A spherical solid ball of 1 kg mass and radius 3 cm is rotating about an axis passing through its centre with an angular velocity of 50 rad s^{-1}. KE of rotation is
    a) 450 J b) 45 J c) 90 J d) 0.45 J
11. The periodic time of a communication satellite is
    a) 6 $hours$ b) 12 $hours$
    c) 18 $hours$ d) 24 $hours$
12. When a spring is stretched by a distance x, it exerts a force, given by $F = (-5x - 16x^3)N$. The work done, when the spring is stretched from 0.1 m to 0.2 m is
    a) $8.7 \times 10^{-2}J$ b) $12.2 \times 10^{-2}J$
    c) $8.7 \times 10^{-1}J$ d) $12.2 \times 10^{-1}J$
13. A hollow cylinder of mass m made heavy at its bottom is floating vertically in water. It is tilled from its vertical position through an angle θ and is left. The restoring force acting on it is
    a) $mg\cos\theta$ b) $mg\sin\theta$
    c) $mg\left[\dfrac{1}{\cos\theta} - 1\right]$ d) $mg\left[\dfrac{1}{\cos\theta} + 1\right]$
14. A vertical glass capillary tube, open at both ends, contains some water. Which of the

following shapes may be taken by the water in the tube?

a)  b)  c)  d) 

15. A gas undergoes an adiabatic change. Its specific heat in the process is
a) Zero b) 1
c) ∞ d) None of these

16. The work done in which of the following process is zero?
a) Isothermal process b) Adiabatic process
c) Isochoric process d) None of these

17. If $\gamma = 2.5$ and volume is equal to $\frac{1}{8}$ times to the initial volume then pressure P is equal to (initial pressure $= P$)
a) $P' = P$ b) $P' = 2P$
c) $P' = P \times (2)^{15/2}$ d) $P' = 7P$

18. The molar heat capacity at constant volume of oxygen gas at STP is nearly $\frac{5R}{2}$ and it approaches $\frac{7R}{2}$ as the temperature is increased. This happens because at higher temperature
a) Oxygen becomes triatomic
b) Oxygen does not behaves as an ideal gas
c) Oxygen molecules rotate more vigorously
d) Oxygen molecules start vibrating

19. When the amplitude of a body executing SHM become twice what happens?
a) Maximum potential energy is doubled
b) Maximum kinetic energy is doubled
c) Total energy is doubled
d) Maximum velocity is doubled

20. Starting from the origin a body oscillates simple harmonically with a period of 2 s. After what time will its kinetic energy be 75% of the total energy?
a) $\frac{1}{6}$s b) $\frac{1}{4}$s c) $\frac{1}{3}$s d) $\frac{1}{12}$s

21. The extension in a string obeying Hooke's law is x. The speed of transverse waves in the stretched is v . If the extension in the string is increased to 1.5 x, the speed of transverse waves in it will be
a) 1.22 v b) 0.61 v c) 1.5 v d) 0.75 v

22. A sphere of radius R has a uniform distribution of electric charge in its volume. At a distance x from its centre, for $x < R$, the electric field is directly proportional to
a) $\frac{1}{x^2}$ b) $\frac{1}{x}$ c) x d) x^2

23. A parallel plate air capacitor is charged to a potential difference of V. After disconnecting the battery, distance between the plates of the capacitor is increased using an insulating handle. As a result, the potential difference between the plates
a) Decreases b) Increases
c) Becomes zero d) Does not change

24. Two spherical conductors A and B of radii 1 mm and 2 mm are separated by a distance of 5 cm and are uniformly charged. If the spheres are connected by a conducting wire, then in equilibrium condition, the radio of the magnitude of the electric fields at the surfaces of spheres A and B is
a) 4 : 1 b) 1 : 2 c) 2 : 1 d) 1 : 4

25. Emf is most closely related to
a) Mechanical force b) Potential difference
c) Electric field d) Magnetic field

26. A wire of length $5m$ and radius 1 mm has a resistance of 1 ohm. What length of the wire of the same material at the same temperature and of radius 2 mm will also have a resistance of 1 ohm
a) 1.25 m b) 2.5 m c) 10 m d) 20 m

27. Antimony and bismuth are usually used in a thermocouple, because
a) Negative thermal e.m.f. is produced
b) Constant thermal e.m.f. is produced
c) Lower thermal e.m.f. is produced
d) Higher thermal e.m.f. is produced

28. A particle with $10^{-11} coulomb$ of charge and $10^{-7} kg$ mass is moving with a velocity of $10^8 m/s$ along the y-axis. A uniform static magnetic field $B = 0.5\ tesla$ is acting along the x-direction. The force on the particle is
a) $5 \times 10^{-11} N$ along $\hat{\imath}$ b) $5 \times 10^3 N$ along $\hat{k}$
c) $5 \times 10^{-11} N$ along $-\hat{\jmath}$ d) $5 \times 10^{-4} N$ along $-\hat{k}$

29. Curie's law can be written as
a) $\chi \propto (T - T_c)$ b) $\chi \propto \frac{1}{T - T_c}$
c) $\chi \propto \frac{1}{T}$ d) $\chi \propto T$

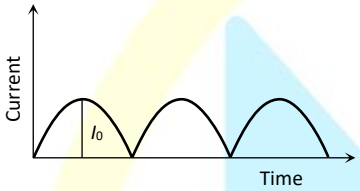
30. When a ferromagnetic material is heated to temperature above its curie point, the material
a) Is permanently magnetized
b) Remains ferromagnetic

c) Behaves like a diamagnetic material
d) Behaves like a paramagnetic material

31. A horizontal straight wire 20 m long extending from east to west is falling with a speed of $5.0 ms^{-1}$,at right angles to the horizontal component of the earth's magnetic field $0.030 \times 10^{-4} Wbm^{-2}$. the instantaneous value of the emf induced in the wire will be
a) 6.0 mV b) 3 mV
c) 4.5 mV d) 1.5 mV

32. The frequency of ac mains in India is
a) 30 c/s or Hz b) 50 c/s or Hz
c) 60 c/s or Hz d) 120 c/s or Hz

33. The output current versus time curve of a rectifier is shown in the figure. The average value of output current in this case is



a) 0 b) $\frac{I_0}{2}$ c) $\frac{2I_0}{\pi}$ d) I_0

34. An expression for the magnetic field strength B at the point between the capacitor plates indicates in figure express B in terms of the rate of change of the electric field strength $ie, dE/dt$ between the plates
a) $\frac{\mu_0 i}{2\pi r}$ b) $\frac{\varepsilon_0 \mu_0 r}{2} dE/dt$
c) Zero d) $\frac{\mu_0 i}{2r}$

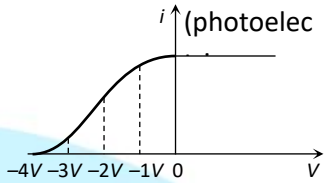
35. The angular magnification of a simple microscope can be increased by increasing
a) Focal length of lens b) Size of object
c) Aperture of lens d) Power of lens

36. We use flint glass prism to disperse polychromatic light because light of different colours
a) Travel with same speed
b) Travel with same speed but deviate differently due to the shape of the prism
c) Have different anisotropic properties while travelling through the prism
d) Travel with different speeds

37. In an experiment of Newton's rings, the diameter of the 20th dark ring was found to be 5.82 mm and that of the 10th ring 3.36 mm. If the radius of the plano-convex lens is 1 m, the wavelength of light used is
a) 5646 Å b) 5896 Å c) 5406 Å d) 5900 Å

38. Dual nature of radiation is shown by
a) Diffraction and reflection
b) Refraction and diffraction
c) Photoelectric effect alone
d) Photoelectric effect and diffraction

39. The value of stopping potential in the following diagram



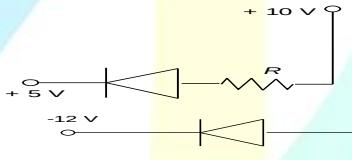
a) $-4V$ b) $-3\ V$ c) $-2V$ d) $-1\ V$

40. In a hydrogen atom, the electron in a given orbit has total energy -1.5 eV. The potential energy is
a) 1.5 eV b) -1.5 eV c) 3.0 eV d) -3.0 eV

41. The activity of a radioactive element decreases to one-third of the original activity A_0 in a period of 9 yr. After a further lapes of 9 yr, its activity will be
a) A_0 b) $\frac{2}{3}A_0$ c) $\frac{A_0}{9}$ d) $\frac{A_0}{6}$

42. The principle of controlled chain reaction is used in
a) Atomic energy reactor
b) Atom bomb
c) In the core of sun
d) Artificial radioactivity

43. In the following, which one of the diodes is reverse biased?

a)


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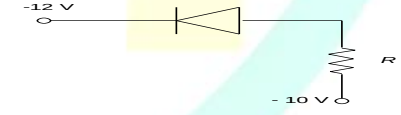
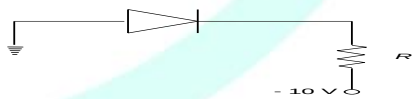
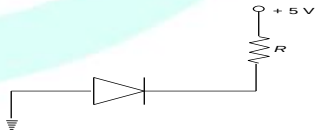


c)


d)


44. The carrier frequency generated by a circuit containing 1 nF capacitor and 10 μH inductor is
a) 1592 Hz b) 1592 kHz
c) 159.2 Hz d) 15.92 kHz

45. Quality of transmission depends only
a) Nature of medium only
b) Nature of signal only

c) Both (a) and (b)
d) Neither (a) nor (b)

46. An alkaloid contains 17.28% of nitrogen and it's molecular mass is 162. The number of nitrogen atoms present in one molecule of alkaloid is
a) 5 b) 4 c) 3 d) 2

47. Carbon dioxide contains 27.27% of carbon, carbon disulphide contains 15.79% of carbon and sulphur dioxide contains 50% of sulphur. This data is an agreement with
a) Law of conservation of mass
b) Law of definite proportions
c) Law of multiple proportions
d) Law of reciprocal proportions

48. When the azimuthal quantum number has the value of 2, the number of orbitals possible are
a) 7 b) 5 c) 3 d) 0

49. The wave nature of electron is verified by
a) De-Broglie
b) Davisson and Germer
c) Rutherford
d) All of these

50. The elements having the electronic configuration $[Kr]\ 4d^{10}f^{14}, 5s^2p^6d^2, 6s^2$ belongs to
a) s-block b) p-block
c) d-block d) f-block

51. The dipole moment of o, p and m-dichlorobenzene will be in the order
a) $o > p > m$
b) $p > o > m$
c) $m > o > p$
d) $o > m > p$

52. Which one of the following pairs of species have the same bond order?
a) CN^- and NO^+
b) CN^- and CN^+
c) O_2^- and CN^-
d) NO^+ and CO

53. The energy of an ideal gas depends only on its
a) Pressure b) Volume
c) Number of moles d) Temperature

54. For a reaction $\Delta H = (+3\text{kJ}), \Delta S = (+10\ \text{J/K})$ beyond which temperature this reaction will be spontaneous?
a) 300 K b) 200 K c) 273 K d) 373 K

55. When ice melts into water, the entropy
a) Becomes zero b) Remains same
c) Decreases d) Increases

56. The buffering action of an acidic buffer is maximum when its pH is equal to
a) 5 b) 7 c) 1 d) pK_a

57. In the ionic equation,
$BiO_3^- + 6H^+ + xe^- \longrightarrow Bi^{3+} + 3H_2O$
The values of x is
a) 6 b) 2 c) 4 d) 3

58. What is the oxidation number of chlorine in ClO_3^-?
a) +5 b) +3 c) +4 d) +2

59. Hydrogen directly combines with
a) Cu b) Au c) Ca d) Ni

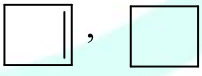
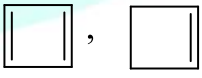
60. In which of the following reactions, MgO is not formed?
a) $Mg + CO_2 \rightarrow$ b) $Mg + \text{dil. } HNO_3 \rightarrow$
c) $Mg + NO \xrightarrow{\Delta}$ d) $Mg + B_2O_3 \rightarrow$

61. $(CH_3)_2SiCl_2$ undergoes hydrolysis but $(CH_3)_2CCl_2$ does not why?
a) Low lying d-orbitals present in Si but not in C
b) Only $3p$ orbital is involved in C
c) Silicon is more acidic
d) $Si - Cl$ bond is more polar than $C - Cl$ bond

62. Formula of felspar is
a) $K_2O.Al_2O_3.6SiO_2$
b) $K_2O_3.Al_2O_3.6Si_2O_2.2H_2O$
c) $Al_2O_3.2SiO_2.2H_2O$
d) $3MgO.4SiO_2.H_2O$

63. Percentage of hydrogen is maximum in .
a) C_2H_4 b) CH_4 c) C_2H_2 d) C_6H_6

64. Which of the following fraction of coal-tar distillation is obtained at $270° - 360°C$?
a) Light oil b) Middle oil
c) Green oil d) Heavy oil

65. $A(C_4H_6) \xrightarrow[1\text{ mole}]{H_2,Ni} B(C_4H_8) \xrightarrow{O_3/H_2O/Zn} CH_3CHO$
Thus, A and B are
a)  ,
b)  ,
c) $CH_3CH_2C \equiv CH, CH_3CH = CHCH_3$
d) $CH_2 = CH - CH = CH_2, CH_3CH = CH - CH_3$

66. Depletion of ozone layer over Antarctica takes place
a) In November
b) In the months of September and October
c) In the months of October and November

d) In summers

67. The ability of a given substance to assume two or more crystalline structure is called
a) Amorphism b) Isomorphism
c) Polymorphism d) Isomerism

68. If the radius of K^+ and F^- are 133 pm and 136 pm respectively, the distance between K^+ and F^- in KF is
a) 269 pm b) 134.5 pm c) 136 pm d) 3 pm

69. What is the molarity of 0.2 N Na_2CO_3 solution?
a) 0.1 M b) 0 M c) 0.4 M d) 0.2 M

70. In which ratio of volume 0.4 M HCl and 0.9 M HCl are to be mixed such that the concentration of the resultant solution becomes 0.7 M ?
a) 4 : 9 b) 2 : 3 c) 3 : 2 d) 1 : 1

71. Corrosion of iron is essentially an electrochemical phenomenon where the cell reactions are
a) Fe is oxidised to Fe^{2+} and dissolved oxugen in water is reduced to OH^-
b) Fe is oxidised to Fe^{3+} and H_2O is reduced to O_2^{2-}
c) Fe is oxidised to Fe^{2+} and H_2O is reduced to O_2^-
d) Fe is oxidised to Fe^{2+} and H_2O is reduced to O_2

72. The activation energy for a simple chemical reaction $A \rightarrow B$ is E_a in forward direction. The activation energy for the reverse reaction
a) Is negative of E_a
b) Is always less than E_a
c) Can be less than or more than E_a
d) Is always double of E_a

73. The half-life period for zero order reaction $A \rightarrow$ product, is 100 min. How long will it take in 80% completion?
a) 80 min b) 160 min c) 100 min d) 200 min

74. According to Freundlich adsorption isotherm, which of the following is correct?
a) $\frac{x}{m} \propto p^1$
b) $\frac{x}{m} \propto p^{1/n}$
c) $\frac{x}{m} \propto p^0$
d) All of the above are correct for different ranges of pressure

75. Electrolytic reduction of alumina to aluminium by Hall-Heroult process is carried out
a) In the presence of NaCl
b) In the presence of fluorite
c) In the presence of cryolite which forms a melt with lower melting point
d) In the presence of cryolite which forms a melt with high melting point

76. Ore pitch blende is main source of
a) Ra b) Th c) Mg d) Ce

77. Which one is true peroxide?
a) NO_2 b) MnO_2 c) BaO_2 d) SO_2

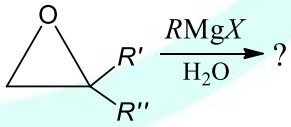
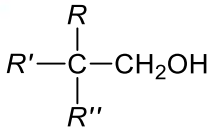
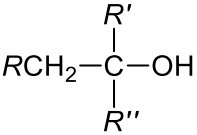
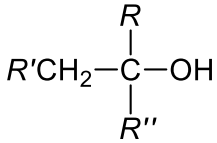
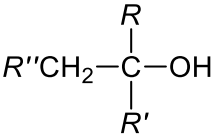
78. Copper exhibits only +2 oxidation state in its stable compounds. Why?
a) Copper is transition metal in +2 state.
b) +2 state compounds of copper are formed by exothermic reactions.
c) Electron configuration of copper in +2 state is $[Ar]3d^9\ 4s^0$.
d) Copper gives coloured compounds in +2 state.

79. Which of the following ions has a magnetic moment of 5.93 BM?
(At. no. V=23, Cr=24, Mn=25, Fe=26)
a) Mn^{2+} b) Fe^{2+} c) Cr^{2+} d) V^{3+}

80. The first organic compound prepared in the laboratory was
a) Acetic acid b) Acetylene
c) Urea d) Methane

81. Which one of the following possess highest m.pt. ?
a) Chlorobenzene b) *o*-dichlorobenzene
c) *m*- dichlorobenzene d) *p*- dichlorobenzene

82. When phenol is treated with excess of bromine water, it gives
a) *m*-bromophenol
b) *o*-and *p*-bromophenols
c) 2, 4-dibromophenol
d) 2, 4, 6-tribromophenol

83. 
Product obtained is
a) 
b) 
c) 
d) 

84. Acetone + mercaptan $\xrightarrow{HCl} X \xrightarrow{4[0]} Y$; Identify `$Y'$ in the above sequence
a) Sulphonal b) Trional
c) Tetronal d) None of these

85. The molecular formula of benzonitrile is
a) C_6H_5CN b) C_6H_5NC
c) C_6H_5CNO d) C_6H_5NCO

86. Reduction of nitrobenzene in the presence of Zn/NH_4Cl gives
a) Azobenzene
b) Hydrazobenzene
c) N-phenyl hydroxylamine
d) Aniline

87. The highest calorific value is found in
a) Proteins b) Fats
c) Vitamins d) Carbohydrates

88. Polystyrene, Dacron and orlon are classified respectively as
a) Chain growth; step growth; step growth
b) Chain growth; chain growth; step growth
c) Chain growth; step-growth; chain growth
d) Step growth; step growth; chain growth

89. The polymer used in making synthetic hair wigs is made up of
a) $CH_2 = CHCI$
b) $CH_2 = CHCOOCH_3$
c) $C_6H_5CH = CH_2$
d) $CH_2 = CH - CH = CH_2$

90. A synthetic detergent is a
a) Cleansing agent b) Drug
c) Catalyst d) Soap

91. The biological definition of a species depends on
a) The geographical distribution of two groups of organism
b) Reproductive isolation of two groups of organism
c) Anatomical and development differences between the two groups of organism
d) Difference in the adaptation of two groups of organism

92. Who coined the term 'Phylum'?
a) Cuvier b) Aristotle c) Ernst Haeckel d) Hooker

93. A species is a group of organisms which
a) Can interbreed freely
b) Do not interbreed
c) Can live together
d) Can interbreed occassionally

94. Which of the following does not secrete toxins during storage conditions of crop plants?
a) *Aspergillus* b) *Penicillum*
c) *Fusarium* d) *Colletotrichum*

95. Which of the following conditions would be favoured by thermoacidophiles?
a) Hot and alkaline b) Snow and acidic
c) Hot and sulphur spring d) Gut of cows

96. *Chlamydomonas nivalis* is responsible for
a) Red snow b) Red rust of tea
c) Yellow snow d) Brown snow

97. 'Club moss' belongs to
a) Algae b) Pteridophyta
c) Fungi d) Bryophyte

98. Pneumatic bones are expected to be found in
a) House lizard b) Flying fish
c) Pigeon d) Tadpole of frog

99. Symmetry in Cnidaria is
a) Radial b) Bilateral
c) Pentamerous d) Spherical

100. Food storage in *Leucosolenia* occurs by
a) Ostia b) Osculum
c) Thesocytes d) Spongocoel

101. I. When carpels are free, they are called ...A... .
II. When the carpels fused, they are called ...B... .
Here, A and B refers to
a) A-syncarpous; B-apocarpous b) A-apocarpous; B-syncarpous
c) A-monocarpous; B-multicarpous d) A-multicarpous; B-monocarpous

102. Pappus is present in Compositae for
a) Air pollination b) Insect pollination
c) Water pollination d) Air dispersal

103. Tetradynamous condition is found in
a) *Hibiscus rosa-sinensis*
b) *Petunia hybrid*
c) *Helianthus annuus*
d) *Brassica campestris*

104. Which is odd one?
a) China rose b) Maize
c) Mango d) Sunflower

105. Meristem consists of
a) Undivided cells
b) Cells in continuous state of cell divisions
c) Dead cells
d) Cells which divide rarely

106. In dicotyledonous stem, the sequence of tissue from outside to inside is
a) Phellem → b) Pericycle → c) Xylem → Endoder d) Stele → Endoder

Endodermis → Pericycle → Phloem	Endoderm is → Pericycle → Phloem	mis → Pericycle → Phloem	mis → Pericycle → Pheloem

107. In terms of descending order of percentage proportions of leucocytes in human blood, which one is correct?
a) Neutrophils → lymphocytes → monocytes → eosinophils → basophils
b) Neutrophils → basophils → lymphocytes → eosinophils → monocytes
c) Neutrophils → monocytes → lymphocytes → eosinophils → basophils
d) Neutrophils → eosinophils → basophils → lymphocytes → monocytes

108. Which of the following nephridia is also called as enteronephric nephridia in earthworm?
a) Pharyngeral nephridia
b) Septal nephridia
c) Integumentary nephridia
d) Both (a) and (b)

109. Which of the following is structural subunit of DNA?
a) Protein b) Carbohydrate
c) RNA d) Nucleotides

110. Cellulose, the most important constituent of plant cell wall is made up of
a) Branched chain of glucose molecules linked by α 1-6 glycosidic bond at the site of branching
b) Unbranched chain of glucose molecules liked by α, 1-4 glycosidic bond
c) Branched chain of glucose molecules linked by β,1-4 glycosidic bond in straight chain and α, 1-6 glycosidic bond at the site of branching
d) Unbranched chain of glucose molecules liked by β, 1-4 glycosidic bond

111. Double sugar is
a) Table sugar
b) Milk sugar
c) Sugar in germinating seeds
d) All of the above

112. Which of the following is incorrect?
a) In cellular organisms, DNA is genetic material
b) Adenylic acid is nucleoside
c) Cytidine is nucleoside
d) N-bases (A, G, C, T, U) have heterocyclic rings

113. From the following identify the two correct statements with reference to meiosis
1. Bead-like structures are absent on chromosomes.
2. Displacement of chiasmata occurs in diakinesis.
3. Separation of two basic sets of chromosomes.
4. No division of centromere.
a) II,III b) II,IV c) III,IV d) I,III

114. Most cytogenic activities occur during
a) Interphase b) Telophase
c) Prophase d) Anaphase

115. If water enters in a cell, the pressure exerted by its swollen protoplast is
a) Turgor pressure b) DPD
c) Osmotic pressure d) Imbibition

116. Root endodermis has the ability to actively transport ions ...A... because of ...B... . Choose the correct pair
a) A-bidirectionally; B-plasmodesmata b) A-undirectionally; B-casparion strips
c) A-undirectionally; B-plasmalemma d) A-bidirectionally; B-casparion strips

117. The factor, most important in regulating transpiration, is
a) Temperature b) Light
c) Wind d) Relative humidity

118. Ca^{2+} is an essential elements in plants. The major function it performs is
a) Selective permeability of the cell membrane b) Maintenance of the cell turgidity c) Energy transfer d) Increases hardness of the cell wall

119. Maximum amount of macronutrients that are generally present in plant tissue is
a) 10.5 m mole kg^{-1} of dry matter b) 9.5 m mole kg^{-1} of dry matter c) 1.0 m mole kg^{-1} of dry matter d) 10 m mole kg^{-1} of dry matter

120. Rubisco enzyme is absent in
a) Mesophyll cell b) Bundle sheath cell
c) C_3-plants d) C_4-plants

121. Which of the following is wrongly matched?

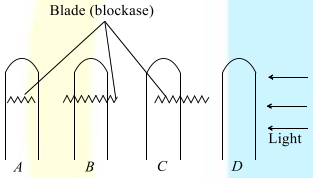
a) Sorghum – Kranz anatomy
b) PEP carboxylase – Mesophyll cells
c) Blackman – Law of limiting factors
d) Photorespiration – C_3- plants

122. The reaction which is catalysed by a protein that is not found in the matrix of mitochondria is
a) Conversion of pyruvic acid to acetyl coenzyme-A
b) Oxidative Decarboxylation of α-ketoglutaric acid
c) Oxidation of Succinic acid
d) Cleavage of Succinyl coenzyme-A

123. In plants the cells in the interior parts are
a) Dead and for mechanical support
b) Live and for various purpose
c) Both (a) and (b)
d) None of the above

124. Cell elongation in intermodal regions of the green plants takes place due to
a) Indole acetic acid
b) Cytokinins
c) Gibberellins
d) Ethylene

125. Four coleoptile for experiment



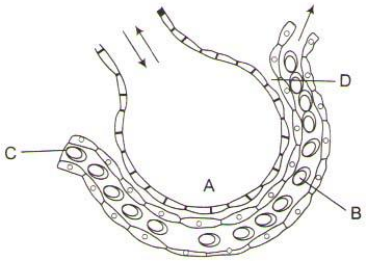
Which coleoptile bend toward the light?
Choose the correct option
a) *A* and *B* b) *C* and *D* c) *A* and *D* d) *C* and *B*

126. Which one is an example of redifferentiation?
a) Cork cambium
b) Secondary cortex
c) Meristems
d) Interfasicular cambium

127. Which one of the following elements is essential for the life of animal and not for plants?
a) Calcium
b) Iodine
c) Phosphorus
d) Potassium

128. The layer of cells that secretes enamel of tooth is
a) Dentoblast
b) Ameloblast
c) Osteoblast
d) Odontoblast

129. The figure given below shows a small part of human lung where exchange of gas takes place. In which one of the options given below, the one part A, B, C or D is correctly identified along with its function.



a) A – Alveolar cavity - main site of exchange of respiratory gases
b) D – Capillary wall - exchange of gases takes place here
c) B - Red blood cell - transport of mainly haemoglobin
d) C - Arterial capillary – passes oxygen to tissues

130. Primary site of the gaseous exchange in humans is
a) Lungs
b) Alveoli
c) Bronchus
d) Diaphragm

131. ECG is a measure of
a) Rate of heart beat
b) Difference in electric potential
c) Volume of blood pumped
d) Ventricular contraction

132. Which of the following is incorrect?
a) Heart is endodermal in origin
b) Human heart is situated in the between the two lungs slightly tilted to left
c) Heart is a double walled membranous bag
d) Human heart has two atria and two ventricles

133. I. Ureter II. Renal pelvis, III. Calyx IV. Urinary bladder V. Urethra
Choose the correct sequence of urine route to outside
a) I→II→III→IV→V
b) V→IV→III→II→I
c) V→III→IV→I→II
d) III→II→I→IV→V

134. Autoregulation of GFR (Glomerulus Filtration Rate) is takes place by
a) Renin angiotensis mechanism
b) Juxtaglomerulus apparatus
c) Vasopressin
d) All of the above

135. Which of the following is responsible for excretion of dilute urine?
a) More secretion of insulin
b) Less secretion of vasopressin
c) More secretion of Aldosterone
d) Less secretion of glucagon

136. Which statement is correct for muscle contraction?

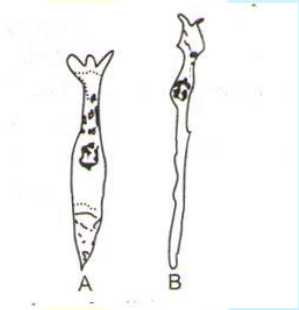
a) Length of H-zone is decreased
b) Length of A-band remains constant
c) Length of I-band gets increased
d) Length of two Z-line get increased

137. During skeletal muscle contraction following events occur-
I. I-band shortens II. A-band shortens
III. H-zone shortens IV. Sarcomere contract
V. ATP changes to ADP and Pi
Choose the option with incorrect events
a) Only I b) Only III c) IV and V d) Only II

138. The term 'innominate' is related with
a) Nerve b) Artery
c) Skeleton d) None of these

139. Which part of brain controls intellectual ability?
a) Frontal lobe b) Parietal lobe
c) Temporal lobe d) Occipital lobe

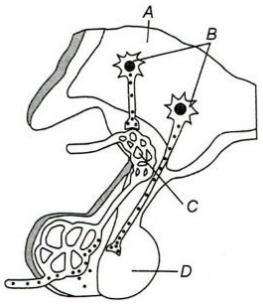
140. Examine the diagram of the two cell types A and B given below and select the correct option.



a) Cell-A is the rod cell found evenly all over retina
b) Cell-A is the cone cell more concentrated in the fovea centralis
c) Cell-B is concerned with colour vision in bright light
d) Cell-A is sensitive to low light intensities

141. Pineal gland secretes which hormones
I. Serotonin
II. ACTH
III. MSH
IV. PRL
V. Melatonin
VI. FSH
The correct option is
a) I and II b) III and IV c) V and VI d) I and V

142. Identify *A* to *D* in the given figure and choose the correct combination



a) A-Hypothalamic neuron, B-Hypothalamus, C-Portal circulation, D-Posterior pituitary
b) A-Hypothalamus, B-Hypothalamic neuron, C-Portal circulation, D-Posterior pituitary
c) A-Hypothalamus, B-Hypothalamic neuron, C-Posterior pituitary, D-Portal circulation
d) A-Hypothalamus, B-Hypothalamic neuron, C-Posterior pituitary, D-Neurohypophysis

143. Which of the following is wrongly matched pair?
a) Tuber-Potato b) Rhizome-Ginger
c) Bulbil-Agave d) Leaf buds-Banana

144. Many scientists consider viruses as living entities because these:
a) Respire
b) Can cause diseases
c) Reproduce (inside host)
d) Respond to tough environment

145. Why seed dormancy takes place?
a) Due to favourable conditions
b) Due to unfavourable conditions
c) Due to embryonic conditions
d) Due to specific endosperm conditions

146. What is pollen grain?
a) Microspore mother cell
b) Male gamete
c) Male gametophyte
d) Partially developed embryo

147. Thalamus contributes in the fruit formation in
a) Apple b) Strawberry
c) Cashewnut d) All of these

148. Fertilization of ovum by the sperm takes place in
a) Ampulla of oviduct b) Isthmus of oviduct
c) Fimbriae of oviduct d) None of the above

149. The number of autosomes in human primary spermatocyte is
a) 46 b) 44 c) 23 d) 22

150. Which of the following is a mechanical barrier used in birth control?
a) Tubectomy b) Dalcon shield
c) Vasectomy d) Diaphragm

151. Primary spermatocyte differs form

spermatogonium in
a) Number of chromosomes
b) Size and volume
c) DNA content
d) Size of chromosomes

152. Injections and implants (the progesterone or progesterone oestrogen combination) are used by the females under the
a) Skin of the inner arm above elbow
b) Vagina
c) Stomach's upper skin
d) Cervix

153. Amniocentesis is a technique to:
a) Estimate essential amino acids in the body
b) Detect chromosomal anomalies in the foetus
c) Reverse sex of the foetus
d) Correct genetic disorders of the foetus

154. *Triticale* has been produced by the intergenic hybridization of
a) Wheat and rice b) Wheat and rye
c) Wheat and aegilops d) Rice and maize

155. Symbol A, B and C indicates

a) Carrier female
b) Effected female
c) Death of female
d) Normal female

156. The similar and dissimilar sex chromosomes of females and males are described as
a) Hormomorphic b) Heteromorphic
c) Both (a) and (b) d) Isomorphic

157. (−) sign and (+) sign for DNA strand stands for
a) Non-coding strand and coding strand
b) Template strand and non-template strand
c) Antisense strand and sense strand
d) All of the above

158. Methyle guanosine triphosphate added to the …A… end of *hn*RNA is the process of …B…
a) A- 5' end; B- Splicing b) A- 5' end; B- Tailing c) A- 5' end; B- Copping d) A- 3' end; B- Capping

159. Trilobites were evolved during which of the following periods?
a) Silurian b) Cambrian
c) Ordovician d) Precambrian

160. Thorns of *Bougainvillea* and tendrils of *Cucurbita* are examples of
a) Analogous organs
b) Homologous organs
c) Vestigial organs
d) Retrogressive evolution

161. The complexes formed during immune complex mediated hypersensitivity are removed by
a) Eosinophils and T_c cells
b) Monocytes and B-lymopocytes
c) Eosinophils and monocytes
d) Eosinophils and basophils

162. Genetic counsellors can identify heterozygous individuals by
a) Height of individuals
b) Colour of individuals
c) Screening procedures
d) All of the above

163. HIV can not be transmitted through the following options except by
a) Hugging b) Sharing foods c) Using public toilet d) Sharing razor blades

164. Emasculation of flowers is carried out through removal of:
a) Sigma b) Sepals and petals
c) Anthers d) Entire organism

165. Which of the following terms is used to describe the component isolated from a plant, for *in vitro* culturing in the specific medium?
a) Callus
b) Embryoid
c) Synthetic seeds
d) Explant

166. An organism used as a biofertilizer for raising soyabean crop production is
a) *Azospirillum* b) *Rhizobium*
c) *Nostoc* d) *Azotobacter*

167. Isinglass, a type of byproduct of fish industry is principally used for
a) Feeding cattle, pigs and poultry
b) Preparation of paints and varnishes
c) Clarification of vinegar, wines and beer
d) Production of insulin

168. In plants, the tumour inducing plasmid (Ti) of *Agrobacterium tumefaciens* is used as a cloning vector. This statement is
a) True
b) False
c) Sometimes (a) and sometimes (b)
d) Neither (a) nor (b)

169. Which is non-invasive technique of genetic

counselling?
a) Amniocentesis
b) Chorionic biopsy
c) Foetal blood sampling
d) Ultrasonography

170. In 1983, Eli Lilly an American company, first prepared two DNA sequences corresponding to A and B-chains of the human insulin and introduced them in the plasmids of *Escherchia coli* to produce insulin chains. Chains A and B were prepared separately, extracted and combined by creating
a) Hydrogen bond
b) Disulphide bond
c) Covalent bond
d) Peptide bond

171. Agrochemical based agriculture includes
a) Fertilisers and pesticides
b) Genetically modified crops
c) RNA interference
d) DNA interference

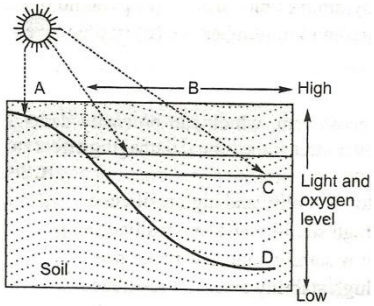
172. What is true about *Bt* toxin?
a) The inactive protoxin gets converted into active form in the insect gut
b) *Bt* protein exists as active toxin in the *Bacillus*
c) The activated toxin enters the ovaries of the pest to sterilize it and thus, prevent its multiplication
d) The concerned Bacillus has antitoxins

173. Organisms which breed only once in their lifetime
a) Pacific salmon fish b) Bamboo
c) Both (a) and (b) d) None of these

174. Logistic growth occurs when there is
a) No resistance from increasing population
b) Unlimited food
c) Fixed carrying capacity
d) All of the above

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

176. Choose the correct combination of labelling of the zones in water in a lake.



a) A- Limnetic zone B-Profundal zone C-Littoral zone D-Benthic zone
b) A- Littoral zone B-Benthic zone C-Profundal zone D-Limnetic zone
c) A- Littoral zone B-Limnetic zone C-Profundal zone D-Benthic zone
d) A- Limnetic zone B-Littoral zone C-Benthic zone D-Profundal zone

177. Plant for which India is secondary centre for domestication is
a) Tobacco b) Rice c) Potato d) Maize

178. Which one is not the renewable energy of natural resources?
a) Tidal energy b) Wind energy
c) Fossil fuel d) Solar energy

179. Which of the following statement is correct about DDT?
a) It is a biomagnifying biodegradable pollutant
b) It is non-biomagnifying biodegradable pollutant
c) It is biomagnifying non-biodegradable pollutant
d) It is not a pollutant

180. Biochemical Oxygen Demand (BOD) is a measure of
a) industrial wastes poured into water bodies
b) Extent to which water is polluted with organic compound
c) amount of carbon monoxide inseparably combined with haemoglobin
d) amount of oxygen needed by green plants during night

Meritstore
NEET

FULL PORTION

TEST ID: 28

Time : 03:00:00

Marks: 720

: ANSWER KEY :

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

Mukesh Sir's Group Tuitions

Date : NEET FULL PORTION **TEST ID: 28**
Time : 03:00:00 **PCB** **Marks :** 720

: HINTS AND SOLUTIONS :

Single Correct Answer Type

1 **(b)**

Potential energy $= mgh = g\left(\frac{\text{cm}}{\text{sec}^2}\right)\text{cm}$

$= g\left(\frac{\text{cm}}{\text{sec}}\right)^2$

2 **(b)**

Force = Mass × acceleration

$\therefore$ Dimensions of force $= [\text{M}][\text{LT}^{-2}] = [\text{MLT}^{-2}]$

$$\text{Power} = \frac{\text{Work}}{\text{Time}}$$

$\therefore$ Dimensions of power $= \frac{[\text{ML}^2\text{T}^{-2}]}{[\text{T}]} = [\text{ML}^2\text{T}^{-3}]$

$$\text{Torque} = \text{Force} \times \text{displacement}$$

$\therefore$ Dimensions of torque

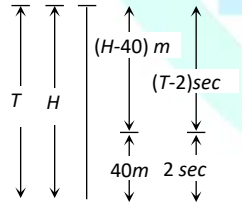
$= [\text{MLT}^{-2}][\text{L}] = [\text{ML}^2\text{T}^{-2}]$

And dimensions of energy $= [\text{ML}^2\text{T}^{-2}]$

Hence, torque and energy have same dimensions.

3 **(b)**

Let height of minaret is H and body take time T to fall from top to bottom



$H = \frac{1}{2}gT^2$ ...(i)

In last 2 sec body travels distance of 40 m so in $(T-2)\ sec$ distance travelled $= (H-40)m$

$(H-40) = \frac{1}{2}g(T-2)^2$ ...(ii)

By solving (i) and (ii), $T = 3\ sec$ and $H = 45m$

4 **(b)**

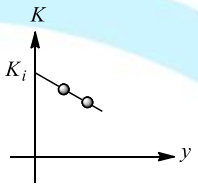
From conservation of mechanical energy

$K = K_i - mgy$ ....(i)

(Here K_i= initial kinetic energy = constant)

$ie, K-y$ graph is straight line. It first decreases linearly becomes minimum at highest point and then becomes equal to K_i in the similar manner.

Therefore, $K-y$ graph should be as shown below



Eq. (i) we can written as

$K = K_i - mg\left(u_y t - \frac{1}{2}gt^2\right)$

$ie, K-y$ graph is a parabola. Kinetic energy first decreases and then increases.

Eq. (i) can also written as

$K = K_i - mg\left(x\tan\theta - \frac{gx^2}{2u_x^2}\right)$

Again $K-x$ graph is a parabola

Further, $p^2 = 2Km\ ie, p^2 = 2Km\ ie, p^2 = K$ or $K\ versus\ p^2$

Graph is a straight line passing through origin

6 **(d)**

Force $2mg$ applied at the free end of the string acts on mass m. Therefore, its acceleration

$a = \frac{\text{Force}}{\text{mass}}$

$= \frac{2mg}{m} = 2\text{g}$

7 **(d)**

For block to continue motion on belt, acceleration

$a = +\mu g = 0.2 \times 10 = 2\ \text{ms}^{-2}$

$\therefore$ Velocity of belt = Velocity of block after 4 s $= 2 \times 4$

$= 8\ \text{ms}^{-1}$

8 **(d)**

Question is somewhat based on approximations.

Let mass of athlete is 65 kg.

Approx velocity is 10 ms^{-1}

So, KE $= \frac{65\times100}{2} = 3750\ J$

So, option(d) is most probable answer.

9 **(a)**

Angular velocity $= \omega$

Centripetal force $F = mr\omega^2$

or $r \propto \frac{1}{\omega^2}$

$\therefore \quad \frac{r_1}{r_2} = \frac{\omega_2^2}{\omega_1^2}$

or $\frac{4}{r_2} = \frac{4\omega^2}{\omega^2}$

or $r_2 = 1$ cm

10 **(d)**

$E = \frac{1}{2} I\omega^2 = \frac{1}{2} \times \left(\frac{2}{5} mr^2\right)\omega^2 = \frac{1}{5} mr^2\omega^2$

$= \frac{1}{5} \times 1 \times (3 \times 10^{-2})^2 \times (50)^2 = 0.45$ J

12 **(a)**

$F = -5x - 16x^3 = -(5 + 16x^2)x = -kx$

$\therefore k = 5 + 16x^2$

Work done, $W = \frac{1}{2}k_2x_2^2 - \frac{1}{2}k_1x_1^2$

$= \frac{1}{2}[5 + 16(0.2)^2](0.2)^2 - \frac{1}{2}[5 + 16(0.1)^2](0.1)^2$

$= 2.82 \times 4 \times 10^{-2} - 2.58 \times 10^{-2} = 8.7 \times 10^{-2} J$

13 **(c)**

Let l be the length of the cylinder in water it is in the vertical position and A be the cross-sectional area of the cylinder. As cylinder is floating so Weight of cylinder = upward thrust $mg = A\, l\, \rho$ g or $m = Al\rho$

When the cylinder is tilled through an angle θ, length of cylinder in water $= \frac{l}{\cos\theta}$

Weight of water displaced $= \frac{l}{\cos\theta} A\, \rho$ g

Restoring force $= \frac{l\, A\, \rho\, g}{\cos\theta} = l\, A\, \rho$ g

$= l\, A\, \rho$ g $\left[\frac{1}{\cos\theta} - 1\right] = mg\left[\frac{1}{\cos\theta} - 1\right]$

14 **(d)**

For water-glass interface, the angle of contact is less than 90°, so the shape of liquid meniscus is concave upward on both faces

15 **(a)**

$c = \frac{\Delta Q}{m.\Delta T} = \frac{\Delta Q}{m \times 0} = 0$

16 **(c)**

Isochoric process takes place at constant volume.

Since, there is no change of volume ($\Delta V = 0$) therefore

$W = p\, \Delta V = 0$

17 **(c)**

$\frac{P_2}{P_1} = \left(\frac{V_1}{V_2}\right)^{\gamma} \Rightarrow \frac{P'}{P} = (8)^{5/2} \Rightarrow P' = P \times (2)^{15/2}$

19 **(d)**

$v_{\max} = A\omega$

When A becomes twice $v_{\max}$ is also doubled.

20 **(a)**

KE of a body undergoing SHM is given by

KE $= \frac{1}{2} m\omega^2 A^2 \cos^2 \omega t$ and $\text{KE}_{\max} = \frac{m\omega^2 A^2}{2}$

[symbols represent standard quantities]

From given information

$\text{KE} = (\text{KE}_{\max}) \times \frac{75}{100}$

$\Rightarrow \quad \frac{m\omega^2 A^2}{2} \cos^2 \omega t = \frac{m\omega^2 A^2}{2} \times \frac{3}{4}$

$\Rightarrow \quad \cos \omega t = \pm \frac{\sqrt{3}}{2}$

$\Rightarrow \quad \omega t = \frac{\pi}{6}$

$\Rightarrow \quad \frac{2\pi}{T} \times t = \frac{\pi}{6}$

$\Rightarrow \quad t = \frac{T}{12} = \frac{1}{6}$ s

21 **(a)**

As $x \propto F$, therefore, when x becomes 1.5 times, F becomes 1.5 times.

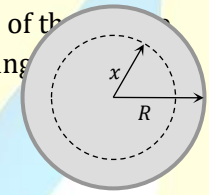
As $v = \sqrt{\frac{T}{m}} = \sqrt{\frac{F}{m}}$, therefore.

$v' \propto \sqrt{1.5}v = 1.22v$

22 **(c)**

Let sphere has uniform charge density $\rho \left(= \frac{3Q}{4\pi R^3}\right)$ and E is the electric field at distance x from the centre of th

Applying



$E.4\pi x^2 = \frac{q}{\varepsilon_0} = \frac{\rho V'}{\varepsilon_0} = \frac{\rho}{\varepsilon_0} \times \frac{4}{3}\pi x^3$

[V' = Volume of dotted sphere]

$\therefore E = \frac{\rho}{3\varepsilon_0} x \Rightarrow E \propto x$

23 **(b)**

$V = \frac{Q}{C} = \frac{Qd}{\varepsilon_0 KA} \Rightarrow V \propto d$

24 **(c)**

Here $\frac{r_1}{r_2} = \frac{1\text{mm}}{2\text{mm}} = \frac{1}{2}$. when the spheres are connected by a conducting wire $V_1 = V_2$

Or $\frac{q_1}{4\pi\varepsilon_0 r_1} = \frac{q_2}{4\pi\varepsilon_0 r_2} \Rightarrow \frac{q_1}{q_2} = \frac{r_1}{r_2} = \frac{1}{2}$

Now, $\frac{E_1}{E_2} = \frac{q_1}{q_2}.\left(\frac{r_2}{r_1}\right)^2 = \frac{1}{2} \times \left(\frac{2}{1}\right)^2 = 2:1$

26 **(d)**

$$R \propto \frac{1}{r^2} \Rightarrow \frac{R_1}{R_2} = \frac{l_1}{l_2} \times \frac{r_2^2}{r_1^2} \Rightarrow \frac{1}{1} = \frac{5}{l_2} \times \left(\frac{2}{1}\right)^2 \Rightarrow l_2 = 20m$$

28 **(d)**

$\vec{F} = q(\vec{v} \times \vec{B}) = 10^{-11}(10^8 \hat{j} \times 0.5\hat{i})$

$= 5 \times 10^{-4}(\hat{j} \times \hat{i}) = 5 \times 10^{-4} N(-\hat{k})$

30 **(d)**

Ferromagnetic substance are strongly attracted by a magnet, show all properties of a paramagnetic substance to a much higher degree. While paramagnetic substances are feebly attracted by a magnet. When ferromagnetic substance is heated, then at a definite temperature the ferromagnetic property of the substance suddenly disappears and the substance becomes paramagnetic. The temperature above which a ferromagnetic substance becomes paramagnetic is called the curie temperature (point) of the substance.

31 **(b)**

Induced emf

$$e = B_H l v = 0.30 \times 10^{-4} \times 20 \times 5.0 = 3\text{mV}$$

33 **(c)**

$$I_{av} = \frac{\int_0^{T/2} i\, dt}{\int_0^{T/2} dt} = \frac{\int_0^{T/2} I_0 \sin(\omega t) dt}{T/2}$$

$$= \frac{2I_0}{T}\left[\frac{-\cos \omega t}{\omega}\right]_0^{T/2} = \frac{2I_0}{T}\left[-\frac{\cos\left(\frac{\omega T}{2}\right)}{\omega} + \frac{\cos 0°}{\omega}\right]$$

$$= \frac{2I_0}{\omega T}[-\cos \pi + \cos 0°] = \frac{2I_0}{2\pi}[1+1] = \frac{2I_0}{\pi}$$

34 **(b)**

$$B = \frac{\mu_0}{4\pi}\frac{2i_D}{r} = \frac{\mu_0}{4\pi} \times \varepsilon_0 \frac{d\phi_E}{dt}$$

$$= \frac{\mu_0}{2\pi}\frac{2i_D}{r} = \frac{\mu_0}{4\pi}\frac{2}{r} \times \varepsilon_0 \frac{d\phi_E}{dt}$$

$$= \frac{\mu_0 \varepsilon_0 \pi r^2 dE}{2\pi r dt} = \frac{\mu_0 \varepsilon_0 r}{2}\frac{dE}{dt}$$

35 **(d)**

$$m \propto \frac{1}{f} \propto P$$

37 **(a)**

In the Newton's Ring interference experiment the diameter of the nth dark ring is given by $D_n = 2\sqrt{n.\lambda.R}$ where R is the radius of curvature of the lens and λ is the wavelength

Using the formula we have

$$\lambda = \frac{D_{n+m}^2 - D_n^2}{4m.R} = \frac{D_{20}^2 - D_{10}^2}{4(20-10)R}$$

$$= \frac{(5.82 \times 10^{-3})^2 - (3.36 \times 10^{-3})^2}{4 \times 10 \times 1} = 5646[\text{Å}]$$

38 **(d)**

$\left.\begin{matrix}\text{Photoelectric effect} \rightarrow \text{Particle nature} \\ \text{Diffraction} \rightarrow \text{Wave nature}\end{matrix}\right\}$ Dual nature

39 **(a)**

Stopping potential is that negative potential for which photo electric current is zero

40 **(d)**

PE= 2 × total energy

$= 2(-1.5)\text{ eV} = -3.0\text{ eV}$

41 **(c)**

$$\frac{A_0}{3} = A_0\left(\frac{1}{2}\right)^{9/T_{1/2}}$$

$$A' = \frac{A_0}{3}\left(\frac{1}{2}\right)^{9/T_{1/2}}$$

$$\therefore \frac{A'}{A_0/3} = \frac{1}{3}$$

or $A' = \frac{A_0}{9}$

43 **(d)**

For reverse biasing of an ideal diode, the potential of n-side should be higher than potential of p-side. Only option (d) is satisfying the criterion for reverse biasing.

44 **(b)**

$C = 1\,n\text{F} = 10^{-9}\text{F}, \text{L} = 10\mu\text{H} = 10^{-5}\text{H}$

$$v = \frac{1}{2\pi\sqrt{\text{LC}}} = \frac{1}{2\pi\sqrt{10^{-5} \times 10^{-9}}} = \frac{10^7}{2\pi}$$

$= 1.592 \times 10^4$ Hz $= 1592$ kHz

46 **(d)**

100 g alkaloid contains nitrogen=17.28 g

∴ 162 g alkaloid will contain nitrogen

$$= \frac{17.28 \times 162}{100}\text{g}$$

$= 27.9\text{ g} \approx 28\text{ g}$

Atomic weight of nitrogen=14

So, number of atoms of nitrogen present in one molecular of alkaloid= $\frac{28}{14} = 2$

47 **(d)**

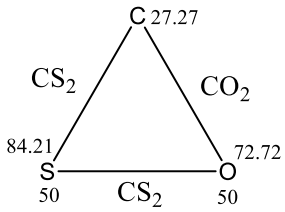
In CS_2

C : S mass ratio is 15.79 : 84.21

15.79 parts of carbon combine with sulphur = 84.21

∴ 27.27 parts of carbon will combine with

$$S = \frac{84.21}{15.79} \times 27.27 = 145.434$$

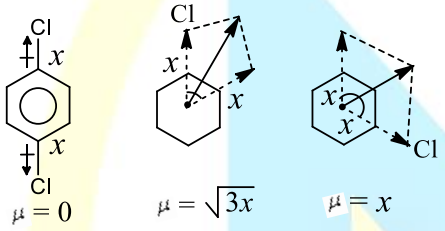


Hence, ratio of S: O is 145.434:72.73 *ie*, 2 : 1
In SO_2, the ratio of S: O is 1 : 1
Since, the ratio of S: O is a simple whole number ratio,
Therefore law of reciprocal proportions is proved.

48 **(b)**
Given, azimuthal quantum number (l)=2
Number of orbital's =$(2l+1)$
$= (2 \times 2 + 1) = 4 + 1 = 5$

50 **(c)**
Since, the d-orbital of the element is incompletely filled, it is a d-block element

51 **(d)**



In p-dichlorobenzene, two C − Cl dipole cancel each other
$\therefore \mu = 0$
In, o-dichlorobenzene, two C − Cl dipoles (say x) are inclined at an angle of 60°.Therefore, according to parallelogram law of forces, the resultant
$= \sqrt{x^2 + x^2 + 2x \times \cos 60°}$
$= \sqrt{x^2 + x^2 + 2x^2 \times 1/2}$
$= \sqrt{3x^2} = \sqrt{3x}$
In m-dichlorobenzene, the two dipoles are inclined to each other at an angle of 120°, therefore, resultant
$= \sqrt{x^2 + x^2 + 2x \times \cos 120°}$
$= x^2 + x^2 + 2x^2 \times (-1/2)$
$= \sqrt{x^2} = x$
Thus ,the decreasing order of dipole moments:
$o > m > p$

52 **(a)**
CN^- and NO^+ both have same number of electrons and same bond order (3).

54 **(a)**
$\Delta G = \Delta H - T\Delta S$
For the spontaneous reaction the ΔG must be negative.
$\Delta H = +3\text{kJ} = +3000\text{ J}$
$\Delta S = +10\text{ J/K}$
If $T = 300\text{ K}$
$\Delta G = 3000 - 300 \times 10 = 0$
If $T = 200\text{ K}$
$\Delta G = 3000 - 200 \times 10 = 1000\text{ J}$
If $T = 273\text{ K}$
$\Delta G = 3000 - 273 \times 10 = 270\text{ J}$
If $T = 373\text{ K}$
$\Delta G = 3000 - 373 \times 10 = -730\text{ J}$
Hence, beyond 300 K temperature the reaction will be spontaneous.

55 **(d)**
Entropy is the measure of randomness. In liquids randomness is more than solids.
∴ When ice melts, randomness increases,
(solid → liquid)
∴ Entropy increases.

56 **(d)**
Buffer capacity of an acidic buffer is maximum when the ratio of HA *to* A^- is unity.
Since, pH of acidic buffer $= \text{p}K_a + \log\frac{[A^-]}{[\text{H}A]}$
For maximum buffer capacity, $[A^-] = [\text{H}A]$
$\therefore \quad \text{pH} = \text{p}K_a$

57 **(b)**
$BiO_3^- + 6H^+ + 2e^- \longrightarrow Bi^{3+} + 3H_2O$
$x = 2$

58 **(a)**
Oxidation number of Cl in ClO_3^-.
$ClO_3 = -1$
$x + 3(-2) = -1$
$x = +6 - 1$
$x = +5$

59 **(c)**
H_2 does not react with Au, Cu or Ni. with Ca, it gives CaH_2

60 **(b)**
$Mg + 2HNO_3 \longrightarrow Mg(NO_3)_2 + H_2\uparrow$
dil.
Hence, MgO is not formed in this reaction.

61 **(a)**
$(CH_3)_2SiCl_2$ undergoes hydrolysis but $(CH_3)_2CCl_2$ does not because in Si, low lying d-orbital is present but in C, it does not present.

62 **(a)**

Felspar is an ore of Al. Its composition is $KAlSi_3O_8$ or $K_2O.Al_2O_3.6SiO_2$.

63 **(b)**

CH_4 has highest ratio of H to C

64 **(c)**

Green oil (anthracene oil) is obtained at 270-360°C by distillation of coal tar. It mainly has anthracene and phenanthrene.

66 **(b)**

During spring season *ie*, in the month of September and October, the sunlight returs to the Antarctica and breaks up the clouds and photolysis HOCl and Cl_2

$$HOCl \xrightarrow{h\nu} \dot{O}H + \dot{C}l$$

$$Cl_2 \xrightarrow{h\nu} 2\,\dot{C}l$$

These $\dot{C}l$ free radical again reacts with ozone molecules and leads to ozone depletion

67 **(c)**

The phenomenon by which a certain crystalline compound exists in two or more different crystalline forms, is called polymorphism *e.g.,* $CaCO_3$ occurs in two polymorphic forms, *i. e.*, calcite (rhombohedral) and aragonite (orthorhombic).

68 **(a)**

Distance between K^+ and F^- in KF

$$= r_{K^+} + r_{F^-} = 133 + 136 = 269 \text{ pm}$$

69 **(a)**

$$\text{Molarity} = \text{normality} \times \frac{\text{equivalent weight}}{\text{molecular weight}}$$

Given, normality of Na_2CO_2 solution =0.2 N

Equivalent weight = M

Molecular weight 2 M (∵ Na_2CO_3 is dipositive.)

$$\therefore \text{Molarity} = 0.2 \times \frac{M}{2M}$$

$$= 0.1 \text{ M}$$

70 **(b)**

Let the volume of 0.4 M HCl is V_1 and that of 0.9 M HCl is V_2.

We know that,

$$NV = N_1V_1 + N_2V_2$$

(Mixture) (for 0.4 M HCl) (for 0.9 M HCl)

$$0.7(V_1 + V_2) = 0.4 \times V_1 + 0.9 \times V_2$$

[∵1m HCl = 1N HCl]

$$0.7V_1 + 0.7V_2 = 0.4\ V_1 + 0.9\ V_2$$

$$0.7V_1 + 0.4V_1 = 0.9V_2 + 0.7V_2$$

$$0.3V_1 = 0.2V_2$$

$$\frac{V_1}{V_2} = \frac{0.2}{0.3} = \frac{2}{3}$$

71 **(a)**

$Fe \rightarrow Fe^{2+} + 2e^-$ (anode reaction)

$O_2 + 2H_2O + 4e^- \longrightarrow 4OH^-$ (cathode reaction)

The overall reaction is

$$2Fe + O_2 + 2H_2O \rightarrow 2Fe(OH)_2$$

$Fe(OH)_2$ may be dehydrated to iron oxide FeO, or further oxidized to $Fe(OH)_3$ and then dehydrated to iron rust, Fe_2O_3.

73 **(b)**

For zero order reaction

$$k = \frac{a}{2t_{1/2}} = \frac{a}{2 \times 100} = \frac{a}{200}$$

When 80% completion take place

$$k = \frac{x}{t}$$

$$\frac{a}{200} = \frac{0.80a}{t}$$

$$t = 200 \times 0.8 = 160 \text{ min}$$

75 **(c)**

In the extraction of Al, Al_2O_3 is melted with cryolite[$Na_3(AlF_6)$]. Cryolite improves the electrical conductivity of the alumina and lowers the m.p. of the mixture to about 950°C

76 **(a)**

Ore pitch blende is main source of radium

77 **(c)**

The true peroxide contains $O_2^{2-}(O-O)^{2-}$ ion.

∵ Out of given choices only BaO_2 has O_2^{2-} in its structure.

∴ BaO_2 is true peroxide.

78 **(b)**

The Stability of Cu^{2+} (aq) rather than Cu^+ (aq) is due to much more negative $\Delta_{hyd}H^0$ of Cu^{2+} (aq) than Cu^+ , which more than compensates for 2nd ionization enthalpy of Cu.

79 **(a)**

Magnetic moment =$\sqrt{n(n+2)}$ BM

Where, n =number of unpaired electrons

$5.93=\sqrt{n(n+2)}$

n =5

Mn^{2+} ion ($3d^5$) has 5 unpaired electrons and magnetic moment is 5.93 BM.

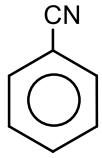
81 **(d)**

p- dichlorobenzene molecule has symmetrical structure. It can fit well in its crystal lattice. The intermolecular forces of attraction are strong.

Hence, it possesses highest melting point.

85 **(a)**

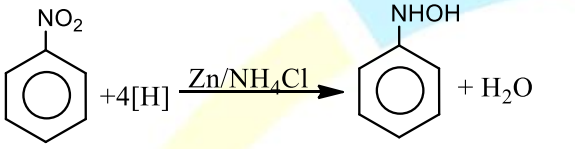
Molecular formula of benzonitrile is C_6H_5CN.



phenyl cyanide or
benzonitrile

86 **(c)**

Reduction of nitrobenzene by Zn and NH_4CI gives N-phenyl hydroxylamine.



N-phenyl hydroxylamine

87 **(b)**

1 g fat provide 37 kJ of energy on oxidation while 1 g carbohydrate on oxidation gives 17 kJ of energy. Hence, fat has highest calorific value

88 **(c)**

Polystyrene and orlon, being vinyl derivative, are chain growth polymers while Dacron is a step growth polymer

89 **(a)**

SARAN, a polymer of vinyl chloride ($CH_2 = CHCI$) and vinylidene chloride, is used for making synthetic hair wigs.

91 **(b)**

Mayr (1942) defined species as an array of actually or potentially interbreeding natural populations that are reproductively isolated from other such groups under natural conditions.

92 **(a)**

Term phylum was coined by Cuvier. Aristole is regarded as Father of Zoology as well as Biology. Earnst Haeckel proposed Biogenetic Law. Benthon and Hooker are pioneer workers in classification of organisms

93 **(a)**

Species is a group of actually or potentially inbreeding population that are reproductively isolated from other such groups

94 **(d)**

Aspergillus, *Penicillium*and*Fusarium* are quite common fungi infesting food and food stuffs and secrete toxins.

95 **(c)**

Hot sulphur spring.

Archaebacteria is a primitive group of bacteria

The three main groups of archaebacteria are methanogens, halophiles and thermoacidophiles.

Methanogens are found in the musk of swamps and marshes, the rumen of cattle, sewage, sludges and gut of termites

Halophiles are named so because they usually occur in salt rich substrata like salt pans, salt beds and salt marshes

Thermoacidophiles have dual ability to tolerate high temperature as well as high acidity. They often live in hot sulphur springs where the temperature may be as high as 80°C. and pH as low as 2

96 **(a)**

Chlamydomonas nivalis grows in polar regions imparting red colour to snow, hence the name red snow.

97 **(b)**

The club mosses (division-Lycophyta) are now limited to representatives a few centimeters in height. Their leaves are small and scale like, resembling the leaf like structures of mosses. Club mosses of the genus—*Lycopodium*, commonly known as ground pine, form a beautiful ground cover in some temperate coniferous and deciduous forests.

98 **(c)**

Bones of Aves (*e.g.,* pigeon) are pneumatic. Pneumatic bones contain air cavities to reduce weight. Pneumatic bones help in aerial mode of life.

99 **(a)**

Radial symmetry is the characteristic feature of coelenterates and echinoderms. Section of these animals in two or more planes produces halves which are approximately mirror images of each other.

Bilateral symmetry occurs in most metazoans. These have only one plane in which they can be divided into two halves, which are mirror images of each other. In spherical symmetry, the body of the individual can be divided into similar halves by any plane passing through the centre. This type of symmetry is found in *Volvox*, a colonial green algae.

100 **(c)**

Food storage in *Leucosolenia* occurs by **thesocytes**. Thesocytes with rounded pseudopodia are food laden amoebocytes.

101 **(b)**
A-apocarpous, B-syncarpous.
Placentation The arrangement of ovules within the ovary is known as placentation. The placentation are of different types namely marginal, axile, parietal, basal, central and free central.
Each ovary bears one or more ovules attached to flattened, cushion like structure, called placenta

102 **(d)**
In several members of Compositae (*i.e.*, *Taraxacum*, *Tragopogon*), Dipsacaceae, Vallerianaceae, the calyx is modified into hairy pappus. It helps the fruit to float in air by parachute mechanism.

103 **(d)**
Tetradynamous condition is the characteristic feature of *Brassica campestris* (mustard), in which out of six stamens four are long and two are short.

104 **(b)**
Maize is a monocotyledonous plant, whereas China rose, mango and sunflower are dicotyledonous plants.

105 **(b)**
Meristem consists of cells in state of continuous cell division. These cells are most active and show high rate of cell division and metabolism.

106 **(a)**
In dicotyledonous stem, the sequence of tissue from the outside to the inside is
Phellem → endodermis → pericycle → phloem → xylem

107 **(a)**
Refer Ans. 30.

108 **(d)**
Pharyngeal nephridia in earthworm are present as three paired tufts in the segments 4 to 6. They discharge excretory matter into the gut by these paired ducts. Therefore, they are called as enteronephric nephridia. Septal nephridia also open into alimentary canal

109 **(d)**
The DNA molecule is a polymer like molecule (heteropolymeric) and is made up of several thousand pairs of nucleotide manomers. A nucleotide is formed by the union of a phosphate group with a nucleoside.

110 **(d)**
Cellulose $(C_6H_{10}O_5)_n$ is the most abundant organic polymer. It is a polysaccharide and consists of long unbranched chains of glucose residues linked by β, 1-4 glycosidic bonds.

111 **(d)**
All of the above. Double sugar is sucrose (table sugar) and milk sugar is lactose. Sugar in germinating seeds is also an example of double sugar

112 **(b)**
Adenylic acid is not a nucleoside, it is a nucleotide

113 **(a)**
In meiosis-I displacement of chiasmata takes place in diakinesis and homologous chromosomes segregate at anaphase-I.

114 **(a)**
Interphase is the period between the end of one cell division to the beginning of next cell division. During this phase, the cell is metabolically very active and prepares itself for the next division.

115 **(a)**
The turgidity of cell increases, if water enters in a cell. As a result of turgidity, turgor pressure is exerted by its swollen protoplast.

116 **(b)**
A-unidirectionally, B-casparian strips

118 **(d)**
One of the major function of Ca^{+2} or calcium ion is to increase the handnsi of cell well other function are
(i) Organisation of mitotic spindle
(ii) Meristematic activity
(iii) Metabolism
(iv) Prevention of mineral and organic acid toxicity
(v) Secondary messenger for some hormonal signals

119 **(d)**
Macronutrients are generally present in plant tissues in large amount (in excess of 10 m mole kg^{-1} of dry matter)

120 **(a)**
In mesophyll cells the PEP carboxylase is present and RuBisCo is absent.
In bundle sheath cells the RuBisCo is present and PEP carboxylase is absent

121 **(d)**

Pigment system-II (PS-II) has absorption maxima at 680 nm and is called P_{680}.

122 **(c)**
The oxidation of Succinic acid to Fumaric acid in Krebs' cycle is catalyzed by Succinic dehydrogenase. Succinic dehydrogenase is attach to mitochondrial inner membrane.

123 **(c)**
It is a fact that the living cells are organised in thin layers inside and beneath the bark. They also have dead cells in the interior which provide mechanical support

124 **(c)**
Gibberellin promotes internodal elongation in a wide range of species. This internodal elongation phenomenon is known as blotting. Giberellin is a plant growth hormone, which was first obtained from a fungus
Gibberella fujikuroi (*Fusarium moniliformi*).

125 **(b)**
Phototropism is the movement of coleoptile (plant organ) towards the light (due to auxin)
Figure 1 shows incomplete blockage of auxin, but direction of blockage does not favour the bending of coleoptile towards the light source
Figure 2 shows in complete blockage of auxin movement from apical part to lateral part. So, no bending of coleoptile is there
Figure 3 shows incomplete blockage, but the direction favours the bending of coleoptile towards the source
Figure 4 shows no blockage hence, the bending of coleoptile takes place easily

126 **(b)**
Redifferentiation as the name suggest, indicates again differentiation. When dedifferentiated cell again get differentiated, the phenomena is called redifferentiation. *e*. *g*., secondary cortex

127 **(b)**
Iodine is essential for the life of animals. It is required for the formation of thyroxine hormone, which controls **basal metabolic rate** (BMR). This hormone stimulates protein synthesis and therefore, promote growth of body tissues.

128 **(b)**
Enamel is the hardest part of human body. It covers the dentine in the crown. There are two types of cells, which are dentine forming **odontoblasts** and **enamel forming ameloblasts.**

129 **(b)**
Alveoli are the primary sites of exchange of gases. The exchange of gases ($O_2$and CO_2) between the alveoli and the blood capillary occurs by simple diffusion.

130 **(b)**
Alveoli are the primary site of exchange of gases. Exchange of gases also occur between the blood and tissue. O_2 and CO_2 are exchanged in these sites by simple diffusion, mainly based on pressure concentration gradient

131 **(b)**
ECG or EKG (electrocardiogram) is a record of difference in electric potential during the working of heart.

132 **(a)**
Heart is mesodermal in origin

133 **(d)**
Sequence of urine route
Calyx → Renal pelvis → Ureter → Urinary bladder → Urethra

134 **(d)**
Renin angiotensin mechanism, vasopressin and juxta-glomerular apparatus autoregulate the GFR

135 **(b)**
ADH (Antidiuretic hormone) or vasopressin produced in the hypothalamus of the brain and released into the blood steam from the pituitary gland, enhances fluid retention by making the kidneys to reabsorb more water. Hyposecretion of vasopressin leads no water absorption in the collecting ducts, which results in secretion of dilute urine.

136 **(b)**
During muscle contraction, actin and myosin interact to form actomyosin. According to sliding filament theory, cross bridge are formed by myosin filament to slide actin filament. During muscle contraction, length of A- band remains constant.

137 **(d)**
During muscle contraction the hydrolysis of ATP to ADP + Pi takes place in breaking and forming of cross bridges between the actin and myosin filaments

138 **(c)**
Innominate (means no name) bone is one of the two bones that from each half of the pelvic girdle in adult vertebrates. This bone is formed by the fusion of ilium, ischium and pubis.

139 **(a)**

Frontal lobe of brain controls intellutectual ability. **Parietal lobe** contains somesthetic area for general sensation and area of taste and speech. **Temporal lobe** is concerned with hearing and reading. **Occipital lobe contains** visual area for visual sensation.

140 **(b)**

Cell-A is the cone cell more concentrated in the fovea centralis, the region of keenest vision. It is located in the centre of the retina, in direct line with the centre of the lens and cornea. The acuity of an animal's eye depends on the density of cones in the fovea. Cell-B is the rod cell found at the peripheral parts of the retina. Rods are high sensitivity receptors for dim light.

141 **(d)**

Pineal gland secretes two biogenic hormones *i.e.*, melatonin and serotonin. Melatonin is secreted in a diurnal cycle (the amount changes throughout 24 hour period) where the amount remains low during daylight hours but increases during dark hours.

Serotonin

Serotonin secretion is induced by light. It act as vasoconstrictor and helps to increase the blood pressure

142 **(b)**

A-Hypothalamus B-Hypotha lamic neurons
C-Portal circulation D-Posterior pituitary

145 **(c)**

As the seed matures, its water content is reduced and seed becomes relatively dry (10-15% moisture by mass). The general metabolic activity of the embryo slows down. The embryo may enter a state of inactivity called dormancy. When favourable condition are available (adequate moisture, oxygen, suitable temperature) seeds germinate

146 **(c)**

Pollen grain is the haploid (n) small, male gametophyte covered by two membrane outer 'exine' and inner 'intine'.

147 **(d)**

In most of the plants the fruit develops from the ovary (true fruits) and other floral part degenerate and fall off. However in a few species such as apple, strawberry, cashew, etc., the thalamus also contributes to fruit formation such fruits are called false fruit

148 **(a)**

Oviduct has four regions, infundibulum, ampulla, isthmus, and uterine part. Ampulla is the long, wide, thin walled major part of the fallopian tube or oviduct. It lies next to the infundibulum and is a site for fertilization.

149 **(b)**

Human cell contain 46 chromosomes including 44 autosomes. Primary spermatocyte contain $2n$ number of chromosome *i.e.,* the number of autosomes, will be 44.

150 **(d)**

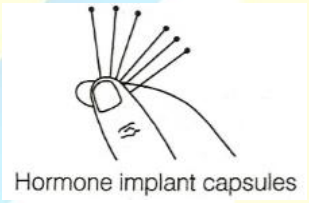
Condoms, cervical caps, diaphragms and intrauterine contraceptive devices (IUCDs) are all mechamical irth control devices.

151 **(b)**

Undifferentiated primordial germ cells undergo mitotic division to produce spermatogonia. Each spermatogonium grows to a large primary spermatocyte by obtaining nutrients from the nursing cells. The DNA content remains same ($2n$) in both spermatogonia and primary spermatocyte.

152 **(a)**

Six matchstick-sized capsules containing steroids are inserted under the skin of the inner arm above the elbow. These steroid capsules slowly releases the synthetic progesterone for about five years



Hormone implant capsules

154 **(a)**

Triticale is the hybrid variety, which is obtain by crossing between wheat and rye.
'*Triti*' is for wheat and 'cale' is for rye together it is called *Triticale*. Its production value is higher than both wheat (*Triticum*) and rye (*Secale*)

155 **(a)**

There are three symbols for the carrier (heterozygous condition). ⊙ ⊗ and ◑ Generally, the carriers are females so there is rounded structure

156 **(c)**

In most of cases the female produce similar sex chromosome called homomorphic. In most of cases the male produce dissimilar sex

chromosome called hetermorphic

157 **(d)**
Non coding strand, minus (−) strand, template strand, anti sense strand all these. These are the synonyms used for 3'-5' strand.
Coding strand, non-template strand, sense strand, positive (+) strand, all there are the synonyms used for 5'-3' strand

158 **(c)**
A- 5' end; B-Capping

159 **(b)**
The origin of trilobites is considered about 505-510 millions of years ago during **Cambrian** period. They became extinct in Permian period.

160 **(b)**
Thorns of *Bougainvillea* and tendrils of *Cucurbita* are **homologous organs**. These are modified branches and are axillary in position. It means axillary branches in *Bougainvillea* are modified into thorns for protection from burrowing animals and in

*Cucurbita*into tendrils for climbing.

161 **(a)**
Eosinophils are non-phagocytic and play a role in immune system. T-cytotoxic cells (T_c −cells) are responsible for destruction of host cells, which are infected by pathogens thus, involve in cell mediated immunity.

162 **(c)**
Genetic screening is a part of genetic counselling, which includes prenatal diagnosis, carrier diagnosis and predictive diagnosis.

163 **(d)**
HIV can be transmitted from an infected person to another through. Blood (including menstrual blood), infected needles and synthesis, semen, sexual intercourse with infected person vaginal secretions, breast milk

165 **(d)**
The plant tissue or organ excised and used for *in vitro* culture is known as explant. Any plant part such as shoot tip, root tip, leaf tip, pollen grains, etc., may be used as an explant. The choice of explant depends mainly on the objective of the culture and the regeneration potential of the different organs of a plant species

166 **(b)**
Rhizobium leguminosarum is a symbiotic bacteria found in root nodules of legume. This bacterium has nitrogen *nif* gene and fixing N_2. Soyabean is a legume. Thus, *Rhizobium* is used as a biofertilizer for raising soyabean crop.

167 **(c)**
Isinglass is produced from air bladder of cat fishes and carps. Isinglass is principally used for clarifying wines, beer and making purse, honey, comb, book and ribbon. The Isinglass prepared in Russia is of best quality in the world.

168 **(a)**
True. In plants, the tumour inducing plasmid (T_i) of *Agrobacterium tumefaciens* is used as a cloning vector

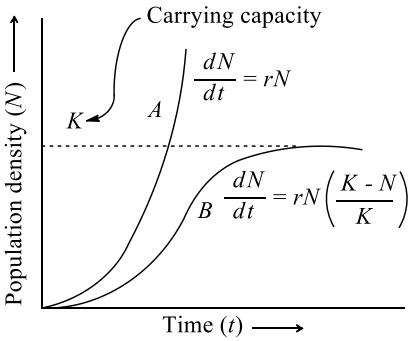
170 **(b)**
Production of insulin by recombinant DNA techniques was achieved by an American company, Eli Lilly, in 1983. They prepared two DNA sequences corresponding to A and B-chains of the human insulin and introduction them into the plasmids of *E. coli* for production. The A and B chains produced were separated, extracted and combined by creating disulphide bonds to form human insulin

171 **(a)**
Agrochemical based agriculture includes fertilisers and pesticides. Agrochemicals are expensive for farmers in developing countries and also have harmful effects on environment

172 **(a)**
Bacillus thuringiesis toxin is an inactive protoxin, which gets converted into active form in the insect gut. It works as an insecticide.

173 **(c)**
The organism which breed only once in their life time is called monocarpic. *e*. *g*., salmon fish, bamboo

174 **(c)**
Logistic Growth Model No population can continue to grow exponentially, as the resource availability become limiting at certain point of time. Logistic growth model have fixed carrying capacity
It is described by the equation $\frac{dN}{dt} = rN\left(\frac{K-N}{K}\right)$
Rate of change of population density
N = Population density at time
N = Population density
r = Intrinsic rate of natural increase
K = Carrying capacity



Population growth curve *A* when resources are not limiting. Plot is exponential or geometrical curve *B*. When resources are limiting the growth, plot is logistic

'*K*' is carrying capacity

175 **(a)**

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

176 **(c)**

Major zones in fresh water body as lake are :

(i) **Littoral zone** is the uppermost zone, which is shallow-water region.

(ii) **Limnetic zone** is an open-water zone to depth, where effective light can penetrate, it is the chief 'producing region' in lakes.

(iii) **Profundal zone** is zone of bottom and deep water area, where effective light cannot penetrate. It is found to be absent in ponds.

(iv) **Benthic zone** is deep oceanic zone, which is cold, dark and devoid of producer organisms. Benthos are either detritus feeders or carnivores.

177 **(c)**

India is secondary centre for domestication of potato

178 **(c)**

Fossil fuel, coal, petroleum, natural gas, etc, are non-renewable energy sources. These are available only in a limited quantity and are not able to reproduce or replace themselves or to increase. Once, the non-renewable resources are consumed, they are forever. Hence, it is believed that these will be exhausted in near future.

179 **(c)**

DDT has been recently banned because it is non-biodegradable and biomagnifying pollutant. Biomagnifications means the increase in amount of DDT in the body of organism alongwith the trophic level. Hence, the amount of DDT in first trophic level will be minimum and in top consumer will be maximum.

180 **(b)**

Biochemical Oxygen Demand (BOD) is a measure of pollution by organic matter present in a sample of water.BOD is higher in polluted sewage water and is connected with both microbes and organic matter. More the organic pollution, specially sewage, more would be the BOD of water.