Meritstore

NEET

1. Which one of the following units is not that of mutual inductance?
   a) Henry
   b) $(\text{Weber})^{-1}$
   c) Ohm second
   d) Volt second $(\text{ampere})^{-1}$

2. Farad is not equivalent to
   a) $\dfrac{q}{V}$
   b) qv^2
   c) $\dfrac{q^2}{J}$
   d) $\dfrac{J}{V^2}$

3. A body is thrown vertically up with a velocity u. It passes three points A, B and C in its upward journey with velocities $\dfrac{u}{2}, \dfrac{u}{3}$ and $\dfrac{u}{4}$ respectively. The ratio of the separations between points A and B and between B and C $i.e., \dfrac{AB}{BC}$ is
   a) 1
   b) 2
   c) $\dfrac{10}{7}$
   d) $\dfrac{20}{7}$

4. The second's hand of a watch has length $6\ cm$. Speed of end point and magnitude of difference of velocities at two perpendicular positions will be
   a) 6.28 and 0 mm/s
   b) 8.88 and 4.44 mm/s
   c) 8.88 and 6.28 mm/s
   d) 6.28 and 8.88 mm/s

5. The angular speed of a fly wheel making 120 $revolutions/minute$ is
   a) $2\pi\ rad/s$
   b) $4\pi^2\ rad/s$
   c) $\pi\ rad/s$
   d) $4\pi\ rad/s$

6. Which of the following quantities measured from different inertial reference frames are same
   a) Force
   b) Velocity
   c) Displacement
   d) Kinetic energy

7. A box is lying on an inclined plane what is the coefficient if static friction if the box starts sliding when an angle of inclination is 60°
   a) 1.173
   b) 1.732
   c) 2.732
   d) 1.677

8. A body is moved along a straight line by machine delivering a constant power. The distance moved by the body in time t is proportional to
   a) $t^{3/4}$
   b) $t^{3/2}$
   c) $t^{1/4}$
   d) $t^{1/2}$

9. If a ball is dropped from rest, its bounces from the floor. The coefficient of restitution is 0.5 and the speed just before the first bounce is 5ms^{-1}. The total time taken by the ball to come to rest is
   a) 2 s
   b) 1 s
   c) 0.5 s
   d) 0.25 s

10. A non-uniform thin rod of length L is placed along X-axis as such its one of ends is at the origin. The linear mass density of rod is $l = l_0 x$. The distance of centre of mass of rod from the origin is
    a) $\dfrac{L}{2}$
    b) $\dfrac{2L}{3}$
    c) $\dfrac{L}{4}$
    d) $\dfrac{L}{5}$

11. A uniform ring of mass M and radius r is placed directly above a uniform sphere of mass $8M$ and of same radius R. The centre of the ring is at a distance of $d = \sqrt{3}R$ from the centre of the sphere. The gravitational attraction beween the sphere and the ring is
    a) $\dfrac{GM^2}{R^2}$
    b) $\dfrac{3GM^2}{2R^2}$
    c) $\dfrac{2GM^2}{\sqrt{2}R^2}$
    d) $\dfrac{\sqrt{3}GM^2}{R^2}$

12. A rope 1cm in diameter breaks, if the tension in it exceeds 500 N. The maximum tension that may be given to similar rope of diameter 3 cm is
    a) 500 N
    b) 3000 N
    c) 4500 N
    d) 2000 N

13. The diagram shows a cup of tea seen from above. The tea has been stirred and is now rotating without turbulence. A graph showing the speed v with which the liquid is crossing points at a distance X from O along a radius XO would look like
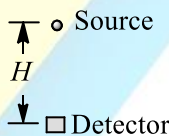

    a)

    b)

c)

d)
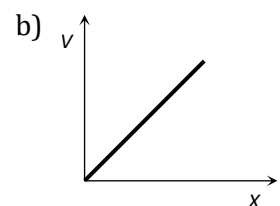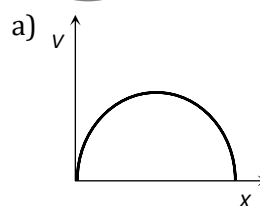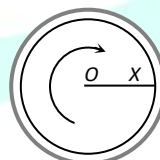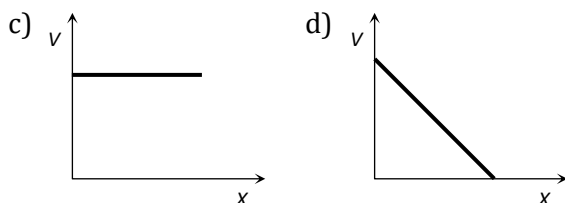
14. Water stands at level A in the arrangement shown in the figure. What will happen if a jet of air is gently blown into the horizontal tube in the direction shown in the figure?
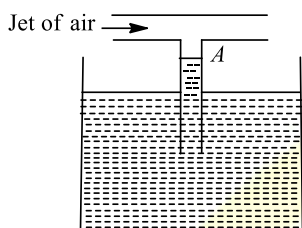
a) Water will rise above A in the capillary tube
b) Water will fall below A in the capillary tube
c) There will be no effect on the level of water in the capillary tube
d) Air will emerge from end B in the form of bubbles

15. A block of mass 100 gm slides on a rough horizontal surface. If the speed of the block decreases from 10 m/s to 5 m/s, the thermal energy developed in the process is
a) 3.75 J b) 37.5 J c) 0.375 J d) 0.75 J

16. 5.6 L of helium gas at STP is adiabatically compressed to 0.7 L. Taking the initial temperature to be T_1, the work done in the process is
a) $\dfrac{9}{8} RT_1$ b) $\dfrac{3}{2} RT_1$ c) $\dfrac{15}{8} RT_1$ d) $\dfrac{9}{2} RT_1$

17. Efficiency of Carnot engine is 100% if
a) $T_2 = 273\ K$ b) $T_2 = 0\ K$
c) $T_1 = 273\ K$ d) $T_1 = 0\ K$

18. RMS velocity of a particle is c at pressure p. If pressure is increased two times, then the rms velocity becomes
a) 0.5 c b) c c) 2 c d) 3 c

19. The bob of a pendulum of length l is pulled aside from its equilibrium position through an angle θ and then released. The bob will then pass through its equilibrium position with a speed v, where v equals
a) $\sqrt{2gl(1 - \cos\theta)}$
b) $\sqrt{2gl(1 + \sin\theta)}$
c) $\sqrt{2gl(1 - \sin\theta)}$
d) $\sqrt{2gl(1 + \cos\theta)}$

20. Which of the following figure represent(s)

damped simple harmonic motions?

(1)

(2)

(3)

(4)
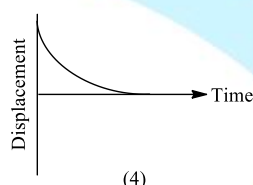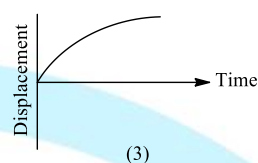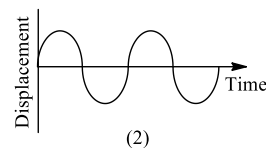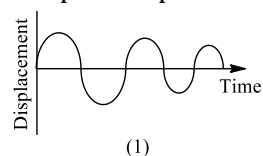
a) Fig. 1 alone
b) Fig. 2 alone
c) Fig. 4 alone
d) Fig. 3 and 4

21. A sound source is falling under gravity. At some time t=0, the detector lies vertically hallow sources at a depth H as shown in figure. If v is the velocity of sound and f_0 is frequency recorded after t=2s is

a) f_0

b) $\dfrac{f_0(v + 2g)}{v}$

c) $\dfrac{f_0(v - 2g)}{v}$

d) $f_0\left(\dfrac{v}{v - 2g}\right)$

22. On rotating a point charge having a charge q around a charge Q in a circle of radius r. The work done will be
a) $Q \times 2\pi r$ b) $\dfrac{q \times 2\pi Q}{r}$ c) Zero   d) $\dfrac{Q}{2\varepsilon_0 r}$

23. 100 capacitors each having a capacity of $10\mu F$ are connected in parallel and are charged by a potential difference of 100 kV. The energy stored in the capacitors and the cost of charging them, if electrical energy costs 108 $paise\ per\ kWh$, will be
a) $10^7\ joule$ and 300 $paise$
b) 5×10^6 joule and 300 $paise$
c) 5×10^6 joule and 150 $paise$
d) $10^7 joule$ and 150 $paise$

24. Identify the wrong statement.

a) The electrical potential energy of a system of two protons shall increase if the separation between the two is decreased.

b) The electrical potential energy of a proton-electron system will increase if the separation between the two is decreased.

c) The electrical potential energy of a proton-electron system will increase if the separation between the two is increased.

d) The electrical potential energy of system of two electrons shall increase if the separation between the two is decreased.

25. A uniform wire has resistance 24 Ω. It is bent in the form of a circle. The effective resistance between the two end points on any diameter of the circle is
    a) 6 Ω   b) 12 Ω   c) 3 Ω   d) 24 Ω

26. The steady current flows in a metallic conductor of non-uniform cross-section. The quantity/quantities constant along the length of the conductor is/are
    a) Current, electric field and drift velocity
    b) Drift speed only
    c) Current and drift speed
    d) Current only

27. If two electric bulbs have 40 W and 60 W rating at 220 V, then the ratio of their resistances will be
    a) 9 :4   b) 4 :3   c) 3 :8   d) 3 :2

28. A thin circular wire carrying a current I has a magnetic moment M. The shape of the wire is changed to a square and it carries the same current. It will have a magnetic moment
    a) M b) $\frac{4}{\pi^2}M$ c) $\frac{4}{\pi}M$ d) $\frac{\pi}{4}M$

29. The susceptibility of a paramagnetic material is K at 27°C. At what temperature will its susceptibility be $K/2$?
    a) 600°C   b) 287°C   c) 54°C   d) 327°C

30. The mathematical equation for magnetic field lines of force is
    a) $\vec{\nabla} \cdot \vec{B} = 0$ b) $\vec{\nabla} \cdot \vec{B} \neq 0\ 1$
    c) $\vec{\nabla} \cdot \vec{B} > 0$ d) $\vec{\nabla} \cdot \vec{B} < 0$

31. A solenoid 60 mm long has 50 turns on it and is wound on an iron rod of 7.5 mm radius. Find the flux through the solenoid when the current in it is 3A. The relative permeability of iron is 600
    a) 1.66 Wb   b) 1.66 nWb
    c) 1.66 mWb   d) 1.66 μWb

32. Power factor is maximum in an LCR circuit when
    a) $X_L = X_C$ b) $R = 0$ c) $X_L = 0$ d) $X_C = 0$

33. An ac supply gives 30 $V\ r.m.s.$ which passes through a 10 Ω resistance. The power dissipated in it is
    a) $90\sqrt{2}\ W$ b) $90\ W$ c) $45\sqrt{2}\ W$ d) $45\ W$

34. A layer of ionosphere does not reflect waves with frequencies greater than 10 MHz; then maximum electron density in this layer is
    a) $1.23 \times 10^{11}\ m^{-3}$ b) $1.23 \times 10^{10}\ m^{-3}$
    c) $12.3 \times 10^{10}\ m^{-3}$ d) $1.23 \times 10^{12}\ m^{-3}$

35. A ray of light passes through an equilateral prism such that the angle of incidence is equal to the angle of emergence and the latter is equal to $\frac{3}{4}$the angle of prism. The angle of deviation is
    a) 25°   b) 30°   c) 45°   d) 35°

36. The resolving power of an astronomical telescope is 0.2 seconds. If the central half portion of the objective lens is covered, the resolving power will be
    a) 0.1 sec b) 0.2 sec c) 1.0 sec d) 0.6 sec

37. If I_0 is the intensity of the principal maximum in the single slit diffraction pattern, then what will be its intensity when the slit which is doubled
    a) I_0 b) $\frac{I_0}{2}$ c) $2I_0$ d) $4I_0$

38. The work function of a substance is 4.0 eV. The longest wavelength of light that can cause photoelectron emission from this substance is approximately
    a) 540 nm b) 400 nm c) 310 nm d) 220 nm

39. If the work function for a certain metal is 3.2×10^{-19}J and it is illuminated with light of frequency $v = 8 \times 10^{14}$Hz, the maximum kinetic energy of the photoelectron would be
    a) 2.1×10^{-19}J   b) 3.2×10^{-19}J
    c) 5.3×10^{-19}J   d) 8.5×10^{-19}J

40. An alpha nucleus of energy $\frac{1}{2}mv^2$ bombards a heavy nuclear target of charge Ze. Then the distance of closest approach for the alpha nucleus will be proportional to
    a) v^2 b) $1/m$ c) $1/v^4$ d) $1/Ze$

41. An electron jumps from the 4th orbit to the 2nd orbit of hydrogen atom. Given the Rydberg's constant $R = 10^5 cm^{-1}$. The frequency in Hz of the emitted radiation will be
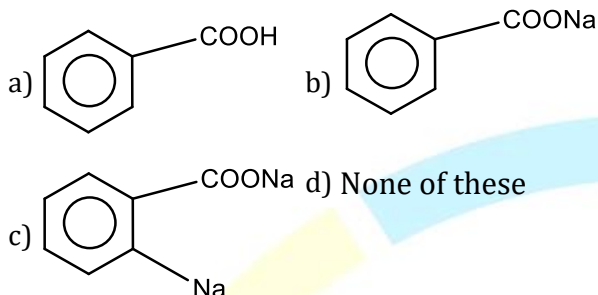
a) $\frac{3}{16} \times 10^5$ b) $\frac{3}{16} \times 10^{15}$

c) $\frac{9}{16} \times 10^{15}$ d) $\frac{3}{4} \times 10^{15}$

42. The mass defect in particular nuclear reaction if 0.3 g. The amount of energy liberated in kilowatt hour is (Velocity of light= $3 \times 10^8 \ ms^{-1}$)

a) 1.5×10^6 b) 2.5×10^6

c) 3×10^6 d) 7.5×10^6

43. In a triode amplifier, $\mu = 25, r_p = 40$ kilo ohm and load resistance $R_L = 10$ kilo ohm. If the input signal voltage is 0.5 volt, then output signal voltage will be

a) 1.25 volt b) 5 volt c) 2.5 volt d) 10 volt

44. An optical fibre communication system works on a wavelength of $1.3 \ \mu m$. The number of subscribers it can feed if a channel requires $20 \ kHz$ are

a) 2.3×10^{10} b) 1.15×10^{10}

c) 1×10^5 d) None of these

45. A laser beam is used for locating distant objects because

a) It is monochromatic
b) It is coherent
c) It is not absorbed
d) It has small angular speed

46. 100 tons of Fe_2O_3 containing 20% impurities will give iron by reduction with H_2 equal to

a) 112 tons b) 80 tons c) 160 tons d) 56 tons

47. Equivalent weight of a bivalent metal is 37.2. The molecular weight of its chloride is

a) 412.2 b) 216 c) 145.4 d) 108.2

48. Rutherford scattering formula fails for very small scattering angles because

a) The kinetic energy of α- particles is larger
b) The gold foil is very thin
c) The full nuclear charge of the target atom is partially screened by its electron
d) All of the above

49. Which has the highest e/m ratio?

a) He^{2+} b) H^+ c) He^+ d) D^+

50. In a given shell the order of screening effect is

a) $s > p > d > f$ b) $s > p > f > d$
c) $f > d > p > s$ d) $s < p < d < f$

51. The number of electrons involved in the bond formation of N_2 molecule

a) 2 b) 4
c) 6 d) 10

52. In which pair of species, both species do have the similar geometry?

a) CO_2, SO_2 b) NH_3, BH_3 c) CO_3^{2-}, SO_3 d) SO_4^{2-}, ClO

53. Amorphous solids are

a) Supercooled liquids
b) solid substances
c) Liquids
d) Substances with definite m.p.

54. For a chemical reaction, ΔG will always be negative if

a) ΔH and $T\Delta S$ both are positive
b) ΔH and $T\Delta S$ both are negative
c) ΔH is negative and $T\Delta S$ is positive
d) ΔH is positive and $T\Delta S$ is negative

55. $I_2(s) \rightleftharpoons I_2(g); \quad \Delta H = +40$ kcal, $\Delta S = 80$ cal . The sublimation point $I_2(s)$ will be

a) $100°C$ b) $127°C$ c) $227°C$ d) $500°C$

56. Which will not affect the degree of ionisation?

a) Temperature b) Concentration
c) Type of solvent d) Current

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. Which one of the following reaction is possible at anode?

a) $F_2 + 2e^- \longrightarrow 2F^-$

b) $2H^+ + \frac{1}{2}O_2 + 2e^- \longrightarrow H_2O$

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

d) $Fe^{2+} \longrightarrow Fe^{3+} + e^-$

59. The strength in volumes of a solution containing $30.36g/L$ of H_2O_2 is

a) 10 volume b) 20 volume
c) 5 volume d) None of these

60. Alkali metals act as

a) Good dehydrating agent
b) Good reducing agent
c) Good oxidising agent
d) None of these

61. Magnalium contains

a) $Al + Mg$ b) $Mg + Cu$
c) $Mg + Fe$ d) $Mg + Ag$

62. In the aluminothermic process, Al acts as a/an

a) Solder b) Oxidizing agent
c) Reducing agent d) Flux

63. The correct IUPAC name of the following compound is

$CH_3CH_2CH - C = C - CHCH_2CH_2 \ CH_2CH_3$
$\qquad\quad | \qquad\qquad | \qquad\quad |$
$\qquad\quad CH_3 \qquad C_2H_5 \quad C_2H_5$

a) 5, 6-dimethyl-8-methyl dec-6-ene

b) 6-butyl-5-ethyl-3-methyl oct-4-ene

c) 5, 6-diethyl-3-methyl dec-4-ene

d) 2, 4, 5-triethyl non-3-ene

64. Toluene reacts, with excess of Cl_2 in presence of sunlight to give a product, which on hydrolysis followed by reaction with NaOH gives

a) ![benzene ring with COOH]

b) ![benzene ring with COONa]

c) ![benzene ring with COONa and Na]

d) None of these

65. The compound that is most reactive towards electrophilic nitration is

a) toluene
b) benzene
c) benzoic acid
d) nitrobenzene

66. Atmospheric pollutant is

a) CO_2 b) CO   c) O_2 d) N_2

67. Coordination number of Zn in ZnS (zinc blende) is

a) 6   b) 4   c) 8   d) 12

68. Copper crystallises in fcc with a unit cell length of 361 pm. What is the radius of copper atom?

a) 108 pm b) 127 pm c) 157 pm d) 181 pm

69. Two solutions of KNO_3 and CH_3COOH are prepared separately. Molarity of both is 0.1 M and osmatic pressures are p_1 and p_2 respectively. The correct relationship between the osmatic pressures is

a) $p_1 = p_2$

b) $p_1 > p_2$

c) $p_2 > p_1$

d) $\dfrac{p_1}{p_1 + p_2} + \dfrac{p_2}{p_1 + p_2}$

70. Which of the following concentration units is independent of temperature?

a) Normality
b) Molarity
c) Molality
d) ppm

71. The product obtained at anode when 50% H_2SO_4 aqueous solution is electrolysed using platinum electrodes is

a) H_2SO_3 b) $H_2S_2O_8$ c) O_2 d) H_2

72. In Arrhenius plot intercept is equal to

a) $-E_a/R$
b) $\ln A$
c) $\ln k$
d) $\log_{10} a$

73. The term $\dfrac{-dc}{dt}$ in a rate equation refers to

a) The decrease in concentration of the reactant with time

b) The concentration of the reactant

c) The change in concentration of the reactant

d) The velocity constant of the reaction

74. The volume of a colloidal particle, V_C as compared to the volume of a solute particle in a true solution V_S, could be

a) $\dfrac{V_C}{V_S} \approx 10^3$

b) $\dfrac{V_C}{V_S} \approx 10^{-3}$

c) $\dfrac{V_C}{V_S} \approx 10^{23}$

d) $\dfrac{V_C}{V_S} \approx 1$

75. Purest form of iron is

a) Pig iron
b) Wrought iron
c) Cast iron
d) Steel

76. Which is not a mineral of aluminium?

a) Corundum
b) Anhydrite
c) Diaspore
d) Bauxite

77. When I_2 is dissolved in CCl_4, the colour that results is

a) Colourless
b) Brown
c) Bluish green
d) Violet

78. Which form of iron is least ductile?

a) Hard steel
b) Cast iron
c) Mild steel
d) Wrought steel

79. The 'spin –only' magnetic moment [in units of Bohr magneton, (μ_β)]of Ni^{2+} in aqueous solution would be (Atomic number of Ni=28)

a) 2.84   b) 4.90   c) 0   d) 1.73

80. The specific rotation of a pure enantiomer is + 16°. Its observed rotation if it is isolated from a reaction with 25% recemisation and 75% retention is

a) $-12°$ b) $+12°$ c) $+16°$ d) $-16°$

81. Which of the following ketones will not respond to iodoform test?

a) Methyl isopropyl ketone
b) Ethyl isopropyl ketone
c) Dimethyl ketone
d) 2-hexanone

82. Consider the following reaction,
$C_2H_5OH + H_2SO_4 \rightarrow$ Product
Among the following, which one cannot be formed as a product under any conditions?

a) Ethyl hydrogen sulphate
b) Ethylene
c) Acetylene
d) Diethyl ether

83. Propan-1-ol can be prepared from propane by

a) H_2O/H_2SO_4
b) $Hg(OAc)_2 H_2O$ followed by $NaBH_4$
c) B_2H_6 followed by H_2O_2
d) CH_3CO_2H/H_2SO_4

84. Potassium cyanate is heated with ammonium sulphate. The product formed is
    a) Urea
    b) Ammonia
    c) Potassium sulphate
    d) Ammonium cyanide

85. Which of the following reactions can produce aniline as main product?
    a) $C_6H_5NO_2 + Zn/KOH$
    b) $C_6H_5NO_2 + Zn/NH_4Cl$
    c) $C_6H_5NO_2 + LiAlH_4$
    d) $C_6H_5NO_2 + Zn/HCl$

86. Final product of hydrolysed alkyl cyanide is
    a) $RCOOH$
    b) $RCONH_2$
    c) $R - \underset{OH}{\overset{R-C=NH}{|}}$
    d) $R\!-\!\!C\!\!\equiv\!\!\overset{\oplus}{NH}$

87. Galactose is converted into glucose in
    a) Mouth
    b) Stomach
    c) Liver
    d) Intenstine

88. $CF_2 = CF_2$ is a monomer of
    a) Polystyrene
    b) Bakelite
    c) Glyptal
    d) Teflon

89. Head-to-tail addition takes place in chain-growth polymerization when monomer is
    a) $CH_2{=}CH{-}\langle\text{phenyl}\rangle$
    b) $CH_2 = CH - CH = CH_2$
    c) $CH_2{=}\underset{CH_3}{\overset{}{C}}{-}\overset{O}{\underset{O}{\overset{\|}{C}}}\,OCH_3$
    d) $CH_2 = CH - C \equiv N$

90. Select the detergent that is used to prepare cosmetics.
    a) DDBS
    b) Polyethylene glycol
    c) Cetyltrimethylammonium chloride
    d) LAS

91. Nomenclature given by Linnaeus is
    a) Binomial
    b) Trinomial
    c) Phylogenetic
    d) Natural

92. What is the old name of Indian Board of wildlife
    a) National Board of Wildlife Animal
    b) Central Board of Wildlife
    c) Board of Wildlife
    d) Wildlife Protection Board

93. By which chemical specimen for herbaria are treated to prevent fungal attack
    a) 0.1% mercuric chloride
    b) 0.1% mercurous chloride
    c) Carbon disulphide
    d) Acetic acid

94. Members of Ascomycetes are
    a) Sporophytic
    b) Decomposers
    c) Parasitic or coprophilous
    d) All of these

95. Consider the following statements about class-Oomycetes?
    I. Member may be obligate parasite on plants
    II. The mycelium is aseptate and coenocytic
    III. Asexual reproduction involves the formation of spore containing sac or sporangia. In aquatic conditions, the sporangia produces zoospores
    Which of the statements given above are correct?
    a) I and II
    b) I and III
    c) II and III
    d) I, II and III

96. Moss peat s used as a packing material for sending flowers and live plants to distant places because
    a) It is easily available
    b) It is hygroscopic
    c) It reduces transpiration
    d) It serves as a disinfectant

97. The plant body of bryophytes are thallus like, prostrate or erect and attached to substratum with the help of
    a) Unicellular or multicellular roots
    b) Unicellular or multicellular rhizoids
    c) Multicellular roots
    d) Unicellular roots

98. Which of the following is not correctly matched?
    a) Sycon   – Canal system
    b) Starfish   – Radial symmetry
    c) Ascaris   – Flame cell
    d) Prawn   - Haemocoel

99. Which of the following insect is not of any economic benefit?
    a) Silkworm
    b) Lac insect
    c) Locust
    d) Honey bee

100. In Pheretima, the red coloured round bodies in 4th, 5th and 6th segment above the alimentary canal are believed to be involved in
    a) Reproduction
    b) Digestion
    c) Excretion
    d) Leucocyte production

101. Cyathium inflorescence is found in
    a) Morus
    b) Dorstenia
    c) Ficus
    d) Euphorbia

102. Which of the following is a wheat fruit?

a) Achene   b) Cypsella
c) Caryopis   d) Endosperm

103. The smallest Angiospermic flower is
    a) *Wolffia*   b) *Ranunculus*
    c) *Rafflesia*   d) *Stellaria*

104. Petiole
    a) Helps to hold the leaf blade   b) Allows leaf blades to flutter wind
    c) Helps in cooling the leaf   d) All of the above

105. I. Epidermis
    II. Mesophyll
    III. Vascular system
    Which of the above component is made up of parenchyma and have chlorphyll?
    a) I and II   b) Only I
    c) Only III   d) Only II

106. Quiescent centre is found in plants at
    a) Root tip   b) Cambium
    c) Shoot tip   d) Tip

107. Which statement is correct about simple cuboidal epithelium?
    a) It consists of a single layer of cube-like cells   b) It is commonly found in ducts of glands
    c) Its main function is secretion and absorption   d) All of the above

108. Cockroach is
    a) Uriotelic
    b) Uricotelic
    c) Ammonotelic
    d) Ureo-ammonotelic

109. Which of the following is not present in cell vacuoles?
    a) Hydrolytic enzymes
    b) Latex of the rubber plant
    c) DNA
    d) Anthocyanins of the flowers

110. DNA is present in
    a) Chromosomes and dictyosomes
    b) Chloroplasts and lysosomes
    c) Mitochondria and chloroplasts
    d) Mitochondria and endoplasmic reticulum

111. The β-pleated sheet structure found in proteins is due to
    a) Linking together of two or more polypeptides   b) Coiling of polypeptide chains
    c) Formation of peptide bonds   d) Folding of the coiled polypeptide chains

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

113. Chiasmata are most appropriately observed in meiosis during
    a) Diakinesis   b) Diplotene
    c) Metaphase-II   d) Pachytene

114. At which stage of cell cycle colchicine arrests the spindle?
    a) Anaphase
    b) Prophase
    c) Telophase
    d) Interphase

115. A leaf peeling of *Tradescantia* is kept in a medium having 10% NaCl. After a few minutes, if we observe the leaf peel under the microscope, we are likely to see
    a) Entry of water into the cell
    b) The cells bursting out
    c) Diffusion of NaCl into the cell
    d) Exit of water from the cell

116. Which one of the following is part of symplast?
    a) Cytoplasm
    b) Protoplast
    c) Plasmodesmata
    d) All of these

117. Water potential and osmotic potential of pure water is
    a) Zero and zero
    b) 100 and zero
    c) 100 and 100
    d) Zero and 100

118. The bladder serving as floats for trapping insects is found in
    a) *Zizyphus*   b) *Utricularia*
    c) *Nephenthes*   d) *Acacia*

119. Maximum percentage of which element occurs in plant ash?
    a) Magnesium   b) Zinc
    c) Potassium   d) Calcium

120. Consider the following statements.
    I. The portion of the spectrum between 300-500 nm is also referred to as Photosynthetically Active Radiation (PAR).
    II. Magnesium, calcium and chloride ions play prominent roles in the photolysis of water.

III. In cyclic photophosphorylation, oxygen is not released (as there is no photolysis of water) and NADPH is also not produced.
  a) I is true; but II and III are false
  b) I and II are false; but III is true
  c) II is true; but I and III are false
  d) I and II are true; but III is false

121. Select the correct pathway for electron transport during photosynthesis
  a) $CO_2 \rightarrow$ RUBP $\rightarrow$ Glucose- ATP
  b) $H_2O \rightarrow$ PS-I $\rightarrow$ PS-II $\rightarrow$ NADPH $\rightarrow H^+$
  c) $H_2O \rightarrow$ PS-II $\rightarrow$ PS-I $\rightarrow$ NADPH $\rightarrow H^+$
  d) $H_2O \rightarrow$ PS-II $\rightarrow$ PS-I $\rightarrow$ ATP

122. Most of the biological energy is supplied by mitochondria through
  a) Breaking of proteins
  b) Reduction of $NADP^+$
  c) Breaking of sugars
  d) Oxidising TCA (tricarboxylic acid) substrate

123. In eukaryotes, photosynthesis occurs in
  a) Chloroplast
  b) Stomatal opening
  c) Bark
  d) Roots

124. The deteriorative processes in plants that naturally terminate their functional life, are collectively called
  a) Wilting
  b) Abscission
  c) Plasmolysis
  d) Senescence

125. Ethylene is used
  a) To decrease the senescence
  b) To increase the heights of stem
  c) For ripening of fruits
  d) For prevention of leaf fall

126. Phytohormone commonly called stress hormone is
  a) Auxin
  b) Abscisic acid
  c) Gibberellins
  d) cytokinins

127. Improper balance diet may cause
  a) Self-poisoning
  b) Scarcity of moisture in eyes
  c) Feeble muscles
  d) All of the above

128. Which of the following does not match?
  a) Pancreas- Glisson's capsule
  b) Antigen- Antibody
  c) Thyroid- Goitre
  d) Enzyme- Substrate

129. Severe Acute Respiratory Syndrome (SARS)
  a) Is caused by a variant of *Pneumococcus pneumoniae*
  b) Is caused by a variant of the common cold virus (corona virus)
  c) Is an acute form of asthma
  d) Affects non-vegetarians much faster than vegetarians

130. A muscular transverse partition in mammals that separates thorax from abdomen is called
  a) Diaphragm
  b) Pharynx
  c) Stomach
  d) Duodenum

131. Neutrophils are also called
  I. acidophils
  II. heterophils
  III. polymorphs
  Choose the option with suitable terms
  a) I and II
  b) II and III
  c) I and III
  d) All of these

132. Platelets are
  a) Also called thrombocytes
  b) Cell fragments
  c) Produced from megakaryocytes
  d) All of the above

133. Choose the correct order of urine formation in human
  a) PCT $\rightarrow$ ALH $\rightarrow$ DLH $\rightarrow$ DCT $\rightarrow$ CD
  b) ACH $\rightarrow$ DLH $\rightarrow$ PCT $\rightarrow$ DCT $\rightarrow$ CD
  c) PCT $\rightarrow$ DLH $\rightarrow$ ALH $\rightarrow$ DCT $\rightarrow$ CD
  d) CD $\rightarrow$ DCT $\rightarrow$ ACH $\rightarrow$ DLH $\rightarrow$ PCT

134. Volume of urine is regulated by
  a) Aldosterone
  b) Aldosterone and testosterone
  c) ADH
  d) Aldosterone and ADH

135. Ammonia is converted into urea in
  a) Kidney
  b) Lungs
  c) Liver
  d) Spleen

136. Which of the following are the properties of cardiac muscles?
  I. They are the muscles of the heart
  II. They are non-striated
  III. They are involuntary in their functions
  IV. They are made up of fascicles
  Select the correct option
  a) I and III
  b) II and IV
  c) I and IV
  d) II and III

137. Haversian canals are found in
  a) Internal ear of mammal
  b) External ear of mammal
  c) Long bone of rabbit
  d) Spinal cord

138. Centrum of 8th vertebra of frog is
  a) Procoelous
  b) Acoelous
  c) Amphicoelous
  d) Amphiplatyan

139. Select the correct arrangement of neural organization, according to the increasing

degree of complexity

a) Lower invertebrates → Vertebrates → Insects

b) Lower invertebrates → Insects → Vertebrates

c) Vertebrates → Insects → Lower vertebrates

d) Vertebrates → Lower invertebrates → Insects

140. Along with hypothalamus, limbic system is involved in the
I. thermoregulation
II. regulation of sexual behavior
III. expression of emotional reactions (*e. g.*, excitement, pleasure, rage and fear)
IV. motivation
Choose the correct option
a) All except I
b) Only I
c) I, III and IV
d) I, III and IV

141. ANF has exactly opposite function of which of hormone secreted
a) PTH
b) Estrogen
c) Aldosterone
d) Androgen

142. Progesterone
a) Supports the pregnancy
b) Acts on the mammary gland and stimulate the formation of alveoli
c) Both (a) and (b)
d) Controls secondary sexual characters in females

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

144. In diploid organism the gamete producing cells are called
a) Gamete mother cell
b) Meiocytes
c) Both (a) and (b)
d) None of these

145. Zygote is always
a) Haploid
b) Diploid
c) Triploid
d) Tetraploid

146. Which of the following is not true for double fertilization?
a) Discovered by Nawaschin
b) Male gamete and secondary nucleus fused to form endosperm nucleus
c) endosperm nucleus is diploid
d) endosperm nucleus nutrition to embryo

147. How many nuclei are found in female gametophyte?
a) 8
b) 7
c) 6
d) 5

148. Onset of menstruation of human female is called
a) Menopause
b) Puberty
c) Gestation
d) Menarche

149. Mainly which type of hormones control the menstrual cycle in human beings?
a) FSH
b) LH
c) FSH, LH, Oestrogen
d) Progesterone

150. Cauda epididymis lead to
a) Vas efferens
b) Vas deferens
c) Ejaculatory duct
d) Rete testis

151. Sertoli's cell are regulated by the pituitary hormone known as
a) FSH
b) GH
c) Prolactin
d) LH

152. Which of the following is a mechanical barrier used in birth control:
a) Loop
b) Copper-T
c) Diaphragm
d) Dalcon shield

153. Find out sexually transmitted diseases among the given below
I. AIDS   II. Syphilis
III. Gonorrhea   IV. Malaria
V. Hepatitis-B   VI. TB
a) I, II, V and VI
b) VI, I, II and III
c) I, II, III and V
d) I, II, III, IV, V and VI

154. Equatorial division and reductional division takes place in which types of cell division
a) Meiosis, mitosis
b) Mitosis, meiosis
c) Both (a) and (b)
d) Amitosis, meiosis

155. Select the incorrect statemant from the following.
a) Linkage is an exception to the principle of independent assortment in heredity
b) Galactosemia is an inborn error of metabolism
c) Small population size result in random genetic drift in a population
d) Baldness is a sex-limited trait

156. Albinism is caused by the deficiency of
a) Amylase
b) Tyrosinase
c) Phenylalanine
d) Xanthene oxidase

157. Enzyme responsible for reverse transcription is
a) Reverse transcriptase
b) Endonuclease
c) Hydrolase
d) Polymerase

158. A gene of operon which synthesizes a repressor protein is
a) Promoter gene
b) Structural gene
c) Operator gene
d) Regulator gene

159. Evidence that evolution of life forms has indeed taken place on earth has come from
    a) Fossils study (palaeontological evidence)
    b) Morphological and comparative anatomical study
    c) Biochemical study
    d) All of the above

160. Variations in a progeny takes place due to
    a) Mutation
    b) Recombination by gametogenesis
    c) Gene flow or genetic drift
    d) All of the above

161. The spleen
    I. is a large bean-shaped organ
    II. mainly contains lymphocytes and phagocytes
    III. acts as a filter of the blood by trapping blood-borne microorganisms
    Which of the statements given above are correct?
    a) I and II
    b) I and III
    c) II and III
    d) I, II and III

162. The name of Mary Mallon is related with the disease
    a) Typhoid
    b) Pneumonia
    c) Dengue
    d) AIDS

163. Candom(nirodh) is formed by
    a) Hindustan Liver Ltd
    b) Hindustan Latex Ltd
    c) Both (a) and (b)
    d) None of these

164. Which of the following is the main aim of evaluation of germplasm in plant breeding program?
    a) To identify plants with desirable combination of characters
    b) For effective exploitation of the natural genes
    c) Both (a) and (b)
    d) For collection of variability

165. Central Sugarcane Breeding Research Institute is situated at:
    a) Coimbatore
    b) Lucknow
    c) Delhi
    d) Bhopal

166. A sewage treatment process in which a part of decomposer bacteria present in the wastes is recycled into the starting of the process is called
    a) Cyclic treatment
    b) Activated sludge treatment
    c) Primary treatment
    d) Tertiary treatment

167. Cultivation of *Bt* cotton has been much in the news. The prefix *Bt* means
    a) 'Barium-treated' cotton seeds
    b) 'Bigger thread' variety of cotton with better tensile strength
    c) Produced by 'biotechnology' using restriction enzymes and ligases
    d) Carrying an endotoxin gene from *Bacillus thuringiensis*

168. Reverse transcriptase:
    a) Disintegrates host DNA
    b) Translates host DNA
    c) Transcribes viral RNA to DNA
    d) Polymerises host DNA

169. The key tools required for the recombinant DNA technology are
    I. restriction enzymes
    II. Polymerase enzymes
    III. host organism ligases
    IV. Vectors
    V. host organisms
    Select the correct option
    a) I, II and III
    b) I, III, IV and V
    c) I, II, III and V
    d) I, II, III, IV and V

170. 'Roise' cow known to produce a type of milk which has all the following characteristics
    I. protein content of 2.4 g/L
    II. human α-lactalbumin
    III. more nutritionally balanced for human babies than natural cow milk
    Which of the above statements are correct?
    a) I and II
    b) I and III
    c) II and III
    d) I, II and III

171. A .... infects the roots of tobacco plants which reduce the production of tobacco
    a) Nematode (*Meloidegyne incognitia*)
    b) Coleopterans (beetles)
    c) Lepidopterans (armyworm)
    d) Dipterans (mosquitoes)

172. First hormone prepared by genetic engineering is
    a) Oxytocin
    b) Somatotropin
    c) Adrenaline
    d) Insulin

173. Which one is the example of sexual parasite?
    a) An male agler fish (*Photocorynus*)
    b) Male *Bonellia*
    c) Male *Schistosoma*
    d) All of the above

174. Biotic potential or potential natality means
    a) Natural increase of population under ideal/optimum conditions
    b) Potential of organism in a biome
    c) Number of organisms in in a biome

d) Species of maximum number in a population

175. An individual transitional communities in ecological succession are termed as
a) Climax community
b) Pioneer community
c) Seral communities
d) Single community

176. Which ecosystem has the highest gross primary productivity
a) Rainforests
b) Coral reefs
c) Mangroves
d) Grass lands

177. Which one of the following shows maximum genetic diversity in India?
a) Rice
b) Maize
c) Mango
d) Groundnut

178. Which of the following statement are true?
I. Species diversity provides stability to the ecosystem
II. Communities with more species tends to be more stable than those with less species
III. Ecosystem with higher biodiversity are more productive than the ecosystem with lower biodiversity
IV. Biodiversity is not essential for the maintenance and health of ecosystem
Choose the correct option
a) I, II and III
b) I, II and IV
c) II, III and IV
d) I, II, III and IV

179. Which method is used to remove particulate matter present in exhaust of thermal power plant?
a) Wet scrubbers
b) Absorption
c) Electrostatic precipitator
d) Gravitational method

180. One of the chief causative factor of desertification is
a) Overgrazing
b) Human developmental activities
c) Irrigated agriculture
d) Population

: ANSWER KEY :

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

: HINTS AND SOLUTIONS :

Single Correct Answer Type

2 **(b)**

Capacitance $C = \frac{\text{Charge}}{\text{potential}} = \frac{q}{V}$

Also potential $= \frac{\text{work}}{\text{charge}}$ $\left(\because V = \frac{W}{q}\right)$

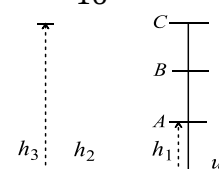$\therefore$ $C = \frac{q^2}{J}$ as well as $C = \frac{J}{V^2}$.

Thus, (a), (c), (d) are equivalent to farad but (b) is not equivalent to farad.

3 **(d)**

$A \Rightarrow \frac{u^2}{4} - u^2 = -2gh_1$

$B \Rightarrow \frac{u^2}{9} - u^2 = -2gh_2$

$C \Rightarrow \frac{u^2}{16} - u^2 = -2gh_3$

$$\therefore AB = \frac{u^2}{2g}\left\{\frac{8}{9} - \frac{3}{4}\right\} = \frac{u^2}{2g} \cdot \frac{5}{36}$$

$$BC = \frac{u^2}{2g}\left\{\frac{15}{16} - \frac{8}{9}\right\} = \frac{u^2}{2g} \cdot \frac{7}{144}$$

$$\therefore \frac{AB}{BC} = \frac{5}{36} \times \frac{144}{7} = \frac{20}{7}$$

4 **(d)**

$$v = r\omega = \frac{r \times 2\pi}{T} = \frac{0.06 \times 2\pi}{60} = 6.28 mm/s$$

Magnitude of change in velocity = $|\vec{v_2} - \vec{v_1}|$

$= \sqrt{v_1^2 + v_2^2} = 8.88\ mm/s$ [As $v_1 = v_2 = 6.28 mm/s$]

5 **(d)**

$120\ rev/\min = 120 \times \dfrac{2\pi}{60}\ rad/\sec = 4\pi\ rad/sec$

7 **(b)**

$\mu = \tan(\text{Angle of repose}) = \tan 60° = 1.732$

8 **(b)**

$P = \text{constant}$

$\Rightarrow Fv = P$ [$\because P = \text{force} \times \text{velocity}$]

$\Rightarrow Ma \times v = P$ [$\because F = Ma$]

$\Rightarrow va = \dfrac{P}{M}$

$\Rightarrow v \times \dfrac{vdv}{ds} = \dfrac{P}{M}$ $\left[\because a = \dfrac{vdv}{ds}\right]$

$\Rightarrow \displaystyle\int_0^v v^2 dv = \int_0^s \dfrac{P}{M} ds$

[Assuming at $t = 0$ it starts from rest, ie, from $s = 0$]

$\Rightarrow \dfrac{v^3}{3} = \dfrac{P}{M} s$

$\Rightarrow v = \left(\dfrac{3P}{M}\right)^{1/3} \times s^{1/3}$

$\Rightarrow \dfrac{ds}{dt} = ks^{1/3} \left[k = \left(\dfrac{3P}{M}\right)^{1/3}\right]$

$\Rightarrow \displaystyle\int_0^s \dfrac{ds}{s^{1/3}} = \int_0^t k\,dt$

$\Rightarrow \dfrac{s^{2/3}}{2/3} = kt$

$\therefore s = \left(\dfrac{2}{3}k\right)^{3/2} \times t^{3/2}$

$\Rightarrow s \propto t^{3/2}$

9 **(c)**

Acceleration $a = \dfrac{v-u}{t}$

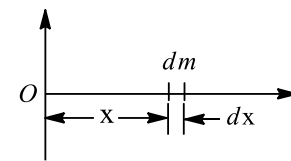Or $a = \dfrac{v-v_0}{t}$

Or $g = \dfrac{v-v_0}{t}$

$\therefore\ v = 0$

Speed before first bounce

$v_0 = -5 ms^{-1}$

$\therefore\ t = \dfrac{v_B - v_A}{g} = \dfrac{0(-5)}{10} = \dfrac{5}{10} = 0.5\ s$
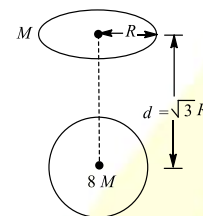
10 **(b)**

The mass of considered element is

$dm = \lambda dx = \lambda_0\, x dx$

$$\therefore\ x_{CM} = \frac{\int_0^L x\, dm}{\int dm} = \frac{\int_0^L x(\lambda_0 x dx)}{\int_0^L \lambda_0 x dx}$$

$$= \frac{\lambda \left[\frac{x^3}{3}\right]_0^L}{\lambda_0 \left[\frac{x^2}{2}\right]_0^L} = \frac{\lambda_0 \frac{L^3}{3}}{\lambda_0 \frac{L^2}{2}} = \frac{2}{3}L$$

11 **(d)**

From the figure the gravitational intensity due to the ring at a distance $d = \sqrt{3}R$ on its axis is

$$I = \frac{GM}{(d^2 + R^2)^{3/2}} = \frac{GM \times \sqrt{3}R}{(3R^2 + R^2)^{3/2}} = \frac{\sqrt{3}GM}{8R^2}$$

Force on sphere $= (8M)I = (8M) \times \dfrac{\sqrt{3}GM}{8R^2}$

$= \dfrac{\sqrt{3}GM^2}{R^2}$

12 **(c)**

Breaking stress for both ropes would be same.

$$\frac{T_{max_1}}{\pi \times \left(\frac{1}{2}\right)^2} = \frac{T_{max_2}}{\pi \left(\frac{3}{2}\right)^2}$$

$\Rightarrow T_{max_2} = 9 \times T_{max_2} = 4500\ N$

13 **(d)**

When we move from centre to circumference, the velocity of liquid goes on decreasing and finally becomes zero

14 **(a)**

When air is blown in the horizontal tube, the pressure of air decreases in the tube. Due to which the water will rise above the tube A

15 **(a)**

According to energy conservation, change in kinetic energy appears in the form of heat (thermal energy)

$\Rightarrow i.e.$ Thermal energy $= \dfrac{1}{2}m(v_1^2 - v_2^2)$ $\Big[\because$

$$\left.\begin{array}{c}W\\ \text{(Joule)}\end{array}=\begin{array}{c}Q\\ \text{(Joule)}\end{array}\right]$$

$$=\frac{1}{2}(100\times10^{-3})(10^2-5^2)=3.75J$$

16 **(a)**

At STP,

22.4 L of any gas is 1 mol,

$$\therefore\quad 5.6\ \text{L}=\frac{5.6}{22.4}=\frac{1}{4}\text{mol}=n$$

In adiabatic process,

$$TV^{\gamma-1}=\text{constant}$$

$$\therefore\quad T_2V_2^{\gamma-1}=T_1V_1^{\gamma-1}$$

$$\text{or}\quad T_2=T_1\left(\frac{V_1}{V_2}\right)^{\gamma-1}$$

$$\gamma=\frac{C_P}{C_V}=\frac{5}{3}\text{ for monoatomic He gas}$$

$$\therefore\quad T_2=T_1\left(\frac{5.6}{0.7}\right)^{\frac{5}{3}-1}=4T_1$$

Further in adiabatic process,

Q=0

$$\therefore W+\Delta U=0$$

$$\text{or }W=-\Delta U=-nC_V\Delta T$$

$$=-n\left(\frac{R}{\gamma-1}\right)(T_2-T_1)$$

$$=-\frac{1}{4}\left(\frac{R}{\frac{5}{3}-1}\right)(4T_1-T_1)$$

$$=-\frac{9}{8}RT_1$$

17 **(b)**

$\eta=1-\frac{T_2}{T_1}$ for 100%, efficiency $\eta=1$ which gives $T_2=0\ K$

18 **(b)**

RMS velocity does not change with pressure, till temperature remains constant.

19 **(a)**

When the bob of pendulum is brought to a position making an angle θ with the equilibrium position, then height of fall of pendulum will be, $h=l-l\cos\theta=l(1-\cos\theta)$.

Taking free fall of the

$u=0, a=g, g=h=l(1-\cos\theta), v=?$

Now, $v^2=u^2+2gh=0+2gl(1-\cos\theta)$

or $\quad v=\sqrt{2gl(1-\cos\theta)}$

20 **(a)**

Fig. (i) alone represents damped SHM

21 **(d)**
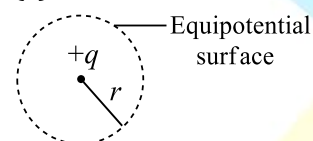
From $v=u+at$

$$v_s=0+g\times2=2g$$

As source is moving towards the observer.

$$\therefore f=\frac{v}{v-v_s}f_0=\frac{vf_0}{v-2g}$$

22 **(c)**

When a charge is moved from one point to the other over an equipotential surface, work done will be zero

23 **(c)**

Energy stored in the capacitor $=\frac{1}{2}CV^2\times100$

$$=\frac{1}{2}\times10\times10^{-6}\times(100\times10^3)^2\times100$$

$$=5\times10^6\ J$$

Electric energy costs $=108\ paise\ per\ kWH=\frac{108\ Paise}{3.6\times10^6\ J}$

$\therefore$ Total cost of charging $=\frac{5\times10^6\times108}{3.6\times10^6}=150\ Paise$

24 **(c)**

Potential energy

$$U=\frac{q_1q_2}{4\pi\varepsilon_0r}$$

Or $U\propto\frac{1}{r}$

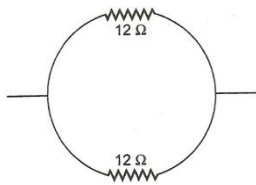When r decreases U increases and $vice-versa$. Moreover, potential energy as well as force is positive, if there is repulsion between the particles and negative if there is attraction.

25 **(a)**

Given, resistance of uniform wire=24Ω.

When the wire is bent in the form of a circle, then resistance will divide the wire in two equal at opposite point in parallel

The effective resistance between the two end points on any diameter of the circle.

$$R = \frac{12 \times 12}{12 + 12}$$

or $R = \frac{144}{24}$

or $R = 6\Omega$

26 (d)
Only current through the conductor of non-uniform area of cross-section is constant. Drift velocity or drift speed vary inversely with the area of cross-section of the conductor
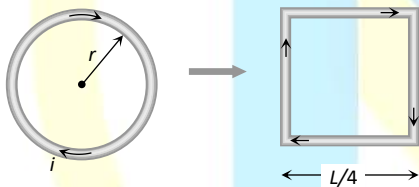
27 (d)
$$P_{Rated} \propto \frac{1}{R} \Rightarrow \frac{R_1}{R_2} = \frac{P_2}{P_1} = \frac{60}{40} = \frac{3}{2}$$

28 (d)
Initially for circular coil $L = 2\pi r$ and $M = 1 \times \pi r^2$
$$= i \times \pi \left(\frac{L}{2\pi}\right)^2 = \frac{iL^2}{4\pi} \qquad \ldots (i)$$
Finally for square coil $M' = i \times \left(\frac{L}{4}\right)^2 = \frac{iL^2}{16}$ ... (ii)

Solving equation (i) and (ii) $M' = \frac{\pi M}{4}$

29 (d)
For a para-magnetic material, $K \propto \frac{1}{T}$
$$\therefore \frac{K_2}{K_1} = \frac{T_1}{T_2}$$
$$\frac{K/2}{K} = \frac{27 + 273}{T_2}$$
$T_2 = 600K = 600 - 273 = 327°C.$

31 (c)
$$\phi = \mu_r \mu_0 \frac{N^2}{l} Ai$$
$$= 600 \times 4\pi \times 10^{-7} \times 50 \times 50\pi$$
$$\times \frac{(7.5 \times 10^{-3})^2 \times 3}{6 \times 10^{-1}}$$
$$= 1.66 \times 10^{-3} Wb = 1.66mWb$$

32 (a)
In LCR circuit; in the condition of resonance $X_L = X_C, i.e.,$ circuit behaves as resistive circuit. In resistive circuit power factor is maximum

33 (b)

$$P = \frac{V_{rms}^2}{R} = \frac{(30)^2}{10} = 90\ W$$

35 (b)
It is observed if $\angle i = \angle e$ deviation produced is minimum
And $i = \frac{A + \delta_m}{2}$
Here $A = 60°$
And $\angle i = \angle e = \frac{3}{4} \angle A$
$\delta_m = 2 \times \frac{3}{4} \times 60° - 60° = 30°$

36 (a)
Resolving power $= \frac{a}{1.22\lambda}$

37 (d)
If you divide the original slit into N strips and represents the light from each strip, when it reaches the screen, by a phasor, then at the central maximum in the diffraction pattern you add N phasors, all in the same direction and each with the same amplitude. The intensity is therefore N^2. If you double the slit width, you need $2N$ phasors, if they are each to have the amplitude of the phasors you used for the narrow slit. The intensity at the central maximum is proportional to $(2N)^2$ and is, therefore, four times the intensity for the narrow slit

38 (c)
$$\lambda_0 = \frac{hc}{W_0} = \frac{12400}{4}$$
$$= 3100Å = 310\ nm$$

39 (a)
Maximum KE $= hv - \phi_0$
$$= 6.63 \times 10^{-34} \times 8 \times 10^{14} - 3.2 \times 10^{-19}$$
$$= 2.1 \times 10^{-19} J$$

40 (b)
At distance of closest approach relative velocity of two particles is v. Here target is considered as stationary, so α-particle comes to rest instantaneously at distance of closest approach. Let required distance is r, then from work energy-theorem.
$$0 - \frac{mv^2}{2} = -\frac{1}{4\pi\varepsilon_0} \frac{Z_e \times Z_e}{r}$$
$$r \propto \frac{1}{m}$$
$$\propto \frac{1}{v^2}$$
$$\propto Ze^2$$

41 (c)
$$\frac{1}{\lambda} = R\left(\frac{1}{2^2} - \frac{1}{4^2}\right) = \frac{3R}{16} \Rightarrow \lambda = \frac{16}{3R} = \frac{16}{3} \times 10^{-5} cm$$

Frequency $n = \frac{c}{\lambda} = \frac{3 \times 10^{10}}{\frac{16}{3} \times 10^{-5}} = \frac{9}{16} \times 10^{15} Hz$

42 (d)

$$\Delta m = 0.3 g$$
$$= 0.3 \times 10^{-3} \text{ kg} = 3 \times 10^{-4} \text{ kg}$$

Energy liberated , $E = \Delta mc^2$
$$= 3 \times 10^{-4} \times (3 \times 10^8)^2$$
$$= 3 \times 10^{-4} \times 9 \times 10^{16}$$
$$= 27 \times 10^{12} \text{ J} = \frac{27 \times 10^{12}}{3.6 \times 10^6} \text{ kWh}$$
$$= 7.5 \times 10^6 \text{ kWh}$$

43 (c)

Voltage gain $= \frac{V_{out}}{V_{in}} = \frac{\mu}{1+\frac{r_p}{R_L}} \Rightarrow \frac{V_{out}}{0.05} = \frac{25}{1+\frac{40 \times 10^3}{10 \times 10^3}}$

$\Rightarrow V_{out} = 2.5 V$

44 (b)

Optical source frequency

$f = \frac{c}{\lambda} = \frac{3 \times 10^8}{1.3 \times 10^{-6}} = 2.3 \times 10^{14} Hz$

$\therefore$ Number of channels or subscribers $= \frac{2.3 \times 10^{14}}{20 \times 10^3}$
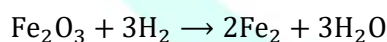
$= 1.15 \times 10^{10}$

45 (b)

A LASER (Light Amplification by Stimulated Emission of Radiation) is an optical source that emits photons in a coherent beam. The property of coherent beam is used I many military applications to enhance the locating of distant objects. Since, a laser beam typically has low divergence, the laser light appears as a small spot even at long distances, the user simply places the spot on the desired target and barrel of the gun is aligned.

46 (d)

In 100 tons of Fe_2O_3, pure Fe_2O_3
$$= 100 - \frac{100 \times 20}{100}$$
$$= 80 \text{ tons}$$
$$Fe_2O_3 + 3H_2 \longrightarrow 2Fe_2 + 3H_2O$$
$2 \times 56 + 48 \qquad\qquad 2 \times 56$
$\quad 160 \qquad\qquad\qquad 2 \times 56$

$\because 160 \text{ g } Fe_2O_3$ gives $Fe = 2 \times 56 \text{ g}$

$\therefore 80 \text{ tons } Fe_2O_3$ will give $Fe = \frac{2 \times 56 \times 80}{160}$

$= 56 \text{ tons}$

47 (c)

Equivalent weight of bivalent metal=37.2

$\therefore$ Atomic weight of metal=$37.2 \times 2 = 74.4$

$\therefore$ Formula of chloride=MCl_2

Hence, molecular weight of chloride
$MCl_2 = 74.4 + 2 \times 35.5$
$= 145.4$

48 (c)

According to Rutherford

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

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

49 (b)

e/m ratio for $He^{2+} = \frac{2}{4}$

e/m ratio for $H^+ = \frac{1}{1}$

e/m ratio for $He^+ = \frac{1}{4}$

e/m ratio for $D^+ = \frac{1}{2}$

$\therefore$ The e/m is highest for hydrogen.

50 (a)

The relative extent to which the various orbitals penetrate the electron clouds of other orbitals is $s > p > d > f$. Electron will experience the greatest effective nuclear charge when in s-orbital, then a p-orbital and so on. Ionisation energy increases with an increase in penetration power and thus, the order of screening effect is $s > p > d > f$.

52 (d)

Species having same hybridisation show similar geometry.

SO_4^{2-}:Hybridisation of $S \longrightarrow sp^3$
ClO_4^-:Hybridisation of $Cl \longrightarrow sp^3$
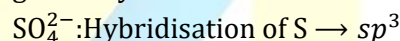
54 (c)

Gibbs-Helmholtz equation is as follows :
$$\Delta G = \Delta H - T\Delta S$$
From Gibbs-Helmholtz equation, it is clear that ΔG will always be negative, if ΔH is negative and $T\Delta S$ is positive.

55 (c)
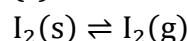
$I_2(s) \rightleftharpoons I_2(g)$
$$\Delta G = \Delta H - T\Delta S$$
At equilibrium, $\Delta G = 0$ and
$$T_{sub} = \frac{\Delta H}{\Delta S}$$
$$= \frac{40 \times 10^3}{80} = 500 \text{ K}$$
$$= (500 - 273)°C =$$
227°C

57 (c)

Let the oxidation state of sulphur in $Na_2S_4O_6$ is x.
$Na_2S_4O_6$
$1 \times 2 + 4 \times x + (-2) \times 6 = 0$
$2 + 4x - 12 = 0$

$$4x - 10 = 0$$
$$4x = 10$$
$$x = \frac{10}{4} = 2.5$$
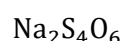
58 (d)
Oxidation takes place at anode (c) is not feasible, $i.e.$, Cr^{3+} is not oxidised to $Cr_2O_7^{2-}$ under given conditions. Hence, option (d) is correct.

59 (a)
Strength of H_2O_2 in $g/L = \frac{68}{22.4} \times V$

Given strength of $H_2O_2 = 30.36$ g/L

Or $\quad\quad\quad\quad V = \frac{30.36 \times 22.4}{68}$

$\quad\quad\quad\quad\quad\quad\quad = 10$ volumes

60 (b)
Alkali metals have only one electron in their ultimate shell, hence they can easily donate electron and act as reductant $e.g.,$
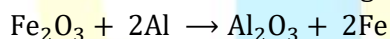
$$Fe_2O_3 + 6Na \rightarrow 2Fe + 2Na_2O$$

61 (a)
Magnalium is an alloy of Al and Mg.

62 (c)
Aluminium reduces Fe_2O_3 or Cr_2O_3 to respective metals and acts as a reducing agent
$$Fe_2O_3 + 2Al \rightarrow Al_2O_3 + 2Fe$$

64 (b)
Toluene reacts with excess of Cl_2 in presence of sunlight, the last product of this reaction is benzotrichloride which on hydrolysis gives benzoic acid, and it gives sodium benzoate on reaction with NaOH.

toluene → benzal chloride → benzo trichloride → benzoic acid → sod. benzoate
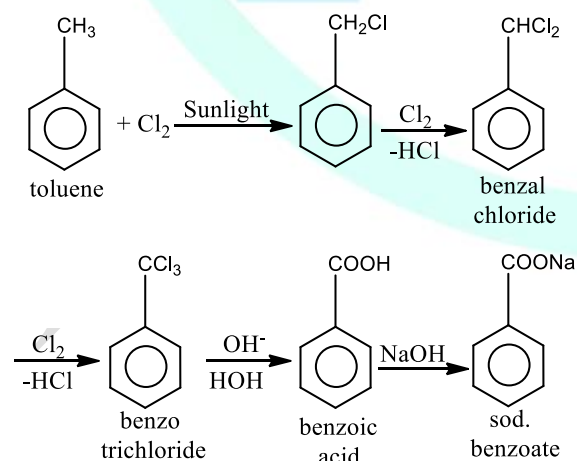
65 (a)
Toluene has electron releasing group (CH_3) thus it most reactive towards electrophilic nitration

67 (b)
In ZnS each sulphide ion is tetrahedrally surrounded by four zinc ions and each zinc ion is surrounded by four sulphide ions. Thus, zinc sulphide possesses 4 : 4 coordination.

68 (b)
In fcc unit cell
$$\sqrt{2}a = 4r \quad \Rightarrow r = \frac{\sqrt{2}\,a}{4}$$
$$= \frac{\sqrt{2} \times 361}{4} = 127 \text{ pm}$$

69 (b)
KNO_3 dissociates completely while CH_3COOH dissociates to a small extent hence, $p_1 > p_2$

70 (c)
Molality depends only upon weights, not on volumes whereas other given concentration terms depend upon the volume of solution. Volume of solution increases with rise in temperature but temperature does not affect the weights, therefore molality is independent of temperature .

71 (b)
50 % H_2SO_4 aqueous solution can be electrolysed by using Pt electrodes as
$$2H_2SO_4 \rightarrow 2HSO_4^- + 2H^+$$
$$2HSO_4^- \rightarrow H_2S_2O_8 + 2e^- \quad \text{(at anode)}$$
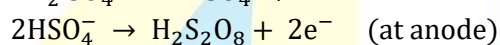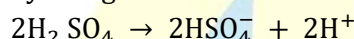
73 (a)
$\frac{dc}{dt}$ represent the change in concentration of reactant with time. As, in a reaction, concentration of reactant always decrease with time hence, rate of reaction is represented as $\frac{-dc}{dt}$.

74 (a)
Size of colloidal particles $=1$ to 100 nm (say 10 nm).
$$V_C = \frac{4}{3}\pi r^3 = \frac{4}{3}\pi (10)^3$$
Size of true solution particles ≈ 1 nm
$$V_S = \frac{4}{3}\pi (1)^3$$
Thus, $\frac{V_C}{V_S} = 10^3$

75 (b)
Wrought or malleable iron is the purest form of iron

76 (b)
Bauxite ($Al_2O_3 . 2H_2O$)
Corundum (Al_2O_3)
Diaspore ($Al_2O_3 . H_2O$)

77 (d)

$CCl_4 + I_2 \rightarrow$ Violet colour

78 (b)

Cast iron or pig iron contains 2 to 4.5% of carbon. It is least ductile and least pure form of iron. It is brittle and cannot be welded.

79 (a)
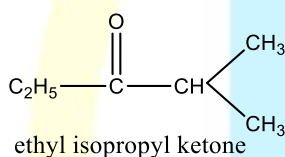
$Ni^{2+}=[Ar]3d^8$

↑↓	↑↓	↑↓	↑	↑

Number of unpaired electrons=2

Hence, magnetic moment=$\sqrt{n(n+2)}$

$=\sqrt{8}$=2.84

80 (b)

% Enantiomeric excess

$=\dfrac{\text{observed specific rotation}}{\text{specific rotation of pure enantiomer}} \times 100$

Observed specific rotation $= \dfrac{3/4}{100} \times (+16°) \times 100$

$= +12°$

81 (b)

All the except ethyl isopropyl ketone gives iodoform test in this question.

ethyl isopropyl ketone

82 (c)

$C_2H_5OH + H_2SO_4 \xrightarrow{\text{Room temp.}}$

$C_2H_5HSO_4$
ethyl hydrogen sulphate

$C_2H_5OC_2H_5$ $CH_2{=}{=}CH_2$
diethyl ether   ethylene

(a), (b), (d) may be formed but (c) is never formed Hence, correct choice→(c).

83 (c)

Alkenes undergo addition reaction with diborane. The addition compounds on hydrolysis with H_2O_2/OH^- yield alcohols

$CH_3 - CH = CH_2 \xrightarrow[H_2O_2]{B_2H_6} CH_3 - CH_2 - CH_2OH$

84 (a)

$2KCNO + (NH_4)_2SO_4 \rightarrow 2NH_4CNO + K_2SO_4$

$NH_4CNO \xrightarrow{\Delta} NH_2CONH_2$
                                urea

86 (a)

$R - C \equiv N \xrightarrow[\text{hydrolysis}]{\text{Partial}} R - CONH_2 \xrightarrow[\text{hydrolysis}]{\text{Complete}} RCOOH$

Alkyl cyanide   alkyl amide   carboxylic acid
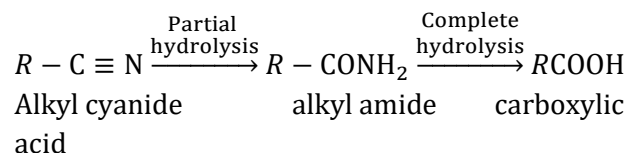
89 (a)

Vinyl derivatives containing electron releasing group readily undergo head to tail addition polymerization.

90 (c)

Cetyltrimethyl ammonium chloride is a cationic detergent. It is used to prepare cosmetics because it possesses germicidal properties.

91 (a)

Linnaeus proposed binomial nomenclature. According to this scientific name of organism consists of generic epithet and specific epithet, e.g., *Labeo rohita*.

92 (b)

Present Indian Board of Wildlife is former Central Board of Wildlife is former Central Board of Wildlife. IBWL concerned with conservation of wildlife and run project to save wildlife and public awareness

93 (a)

0.1% mercuric chloride solution are used to prevent fungal attack on herbarium nepthalene and carbon disulphide are common pesticides

94 (d)

Members of Ascomycetes are saprophytic, decomposers, parasitic or ceprophilous (growing on dung)

95 (d)

Members of class-Oomycetes are found in aquatic habitats and on decaying wood in moist and damp places or as obligate parasites on plants. Thallus is mycelial. The hypae are coenocytic (*i.e.*, aseptate and multinucleate). Asexual reproduction occurs by the formation of spores produced inside the sac-like sporangia. Terrestrial species produces aplanospores and aquatic species produces zoospores

96 (b)

Sphagnum is bryophyte, commonly called as bog moss or peat moss. It is hygroscopic and possesses a remarkable water holding capacity. Hence, it is used as a packing material in the transportation of flowers, live plants, tubers, bulbs, seedlings, etc. It is also used in seedbeds and in moss-sticks.

97 (b)
The plant body of bryophytes are multicellular, thallus like, prostate or erect, many celled thick and fixed to soil by unicellular or multicellular rhizods. These rhizoids are without vascular tissue and cytoplasm

98 (c)
Flame cells are excretory organ of Platyhelminthes. The excretory organ of *Ascaris* is protonephridia.

99 (c)
Locust are of no economic importance, instead are gregarious pests that may even destroy crops

100 (d)
Small red coloured follicular bodies called **blood glands** are found in these segments. These produce white blood corpuscles (leucocytes) and haemoglobin.

101 (d)
Euphorbia - Cyathium
Ficus – Hypanthodium
Dorstenia - Coenanthium

102 (c)
Caryopsis is a fruit of family-Gramineae, *e.g.*, wheat. Caryopsis fruit is characterized by fused fruit and seed wall.

103 (a)
Wolffia sp. (duck weed) is a floating, aquatic Angiospermic plant. It has the smallest flowers of about 1 mm diameter, while *Rafflesia arnoldi* (total root parasite) has the largest flowers of about 1 metre diameter.

104 (d)
Petiole is a cylindrical stalk of the leaf which fits into lamina above the level of stem so as to provide it with maximum exposure. Petiole helps to hold the blade to light. Long thin flexible petioles allow leaf blades to flutter in wind, thereby cooling the leaf and bringing fresh air to the leaf surface

105 (d)
Only II.
Mesophyll, which possesses chloroplasts and carry out photosynthesis, is made up of parenchyma

106 (a)
In many cases of root apices, a cup-like region of cells called quiescent centre is present lying between the root cap and the active meristematic region. The quiescent centre is an inactive region of root apices and is often said as reserve meristem.

107 (d)
Simple cuboidal epithelium is made up of a single layer of cube-like cells. This is mainly found in ducts of glands and its main functions are secretion and absorption

108 (b)
Cockroach is the uricotelic animal because uric acid is the main nitrogenous waste material they excrete

109 (c)
Vacuole is a single membrane bound space in plant cell. It contains cell sap. The cell sap have minerals dissolved in water. It also contains a water soluble pigment anthocyanin. DNA is absent here.

110 (c)
In an eukaryotic cell, DNA is found mainly in nucleus but mitochondria and chloroplasts both also contain a single copy of double stranded, circular DNA molecules.

111 (a)
Two or more polynucleotide chains may join together by intermolecular hydrogen bonds and may bend into parallel folds to form β-pleated sheet

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

113 (b)
Chiasmata formation is the consequence of crossing over. Each chiasma possesses the site of exchange of material between non-sister chromatids. It is produced by breakage and reunion between any two of the four strands present at each site. Chiasmata are most appropriately observed during **diplotene sub-stage** of **meiosis-I**.

114 (a)
Colchicine is an antimitotic drug (alkaloid) which is obtained from *Colchicum* (family-Lilliaceae). It binds to one tubulin molecule and prevents its polymerization. The depolymerisation of tubulin results in disappearance of mitotic spindle, blocking the cells mitotic chromosomal division of metaphase and anaphase

115 (d)
When a leaf peeling of *Tradescantia* is kept in a medium having 10% NaCl solution, the cells

shrink in size, this is followed by separation of protoplast from cell wall due to exosmosis. This phenomenon is called **plasmolysis**.

116 **(d)**

Apoplast pathway of water movement inside the root provide the least resistance to movement of water. However, the presence of lignin suberin layer interrupts the water movement. This layer is known as casparian strips

117 **(a)**

The water potential and osmotic potential of pure water is zero

118 **(b)**

Utricularia or bladderwort is a submerged aquatic insectivorous plant. Its rootless, floating stem bears highly dissected leaves. A portion of leaf is modified into sac-like bladders of about 1.3 mm in diameter. Each bladder is guarded by a small valve, which opens inwardly. Small insects flow into the bladder with water but not able to come out to the pressure of volve.

119 **(d)**

Calcium is the constituent of middle lamella of cell walls. It is required as cofactor by some enzymes involved in the hydrolysis of ATP and phospholipids. It also acts as a second messenger in metabolic regulation.

120 **(b)**

The portion of spectrum between 400-700 nm is referred to as Photosynthetically Active Radiation. Manganese and chloride ions play prominent role in photolysis of water.

121 **(c)**

Electrons during photosynthesis goes from the H_2O to the PS-II then by various cytochrome carrier. It reaches to PS-I then reaches to the $NADP^+$ and reduces it in the presence of H^+ to form $NADPH + H^+$

122 **(d)**

In TCA cycle TCA substrate oxidise by releasing $NADH + H^+$, which produces three ATP molecules. So, one glucose molecule through TCA produces $6\ NADH + H^+$. So 18 ATP produced through electron transport chain. 2 $FADH_2$ of Kreb's cycle produced 4 ATP

123 **(a)**

It is well known fact that photosynthesis in eukarytoes occurs in chloroplast whereas in prokaryotes it is in cytoplasm

124 **(d)**

Senescence occurs prior to death of an organ or organism. It can be defined as the total sum of deteriorative processes that naturally terminate the functional life of an organism.

125 **(c)**

Ethylene is a ripening agent thus involved in the ripening of fruits.

126 **(b)**

Abscisic acid is commonly called stress hormone because the production of this hormone is stimulated by drought, water logging and other adverse environmental conditions.

127 **(d)**

Balance diet possesses the major component it of the food in requisite proportion, which is required for the maintenance of health, activity, growth and development. Therefore, it must contain carbohydrates (60-70%), fats (15-25%), proteins (10-15%), vitamins, minerals electrolytes, etc.

128 **(a)**

Pancreas is a mixed gland, *i.e.*, pancreas secreted hormones and enzymes both. **Glisson's capsule** is present in liver.

129 **(b)**

SARS (Severe Acute Respiratory Syndrome) spread recently in China, Hong Kong and Singapore. It is a viral disease caused by Paramyxo virus. Paramyxo virus of SARS is related to corona virus family (corona virus causes common cold).

131 **(b)**

Neutrophils stain equally well with both basic and acidic dyes

132 **(d)**

Blood platelets occur only in mammals. They are non-nucleated, round or oval biconvex and bud from megakaryocytes. They are much smaller than RBC. Blood platelets are the source of thromboplastin, necessary for blood clotting

133 **(c)**

Proximal Convoluted Tubule (PCT)
↓
Descending Lop of Henle (DLH)
↓
Ascending Loop of Henle (ALH)
↓

Distal convoluted Tubule (DCT)

↓

Collecting Duct (CD)

134 (d)

Both Aldosterone and ADH regulate volume of urine. ADH (antidiuretic hormone) stimulates the reabsorption of water through the distal convoluted tubule of the kidney nephron in mammals and thus, limits the water content and the overall volume of urine. Aldosterone, secreted from adrenal cortex, increases the reabsorption of sodium ions and water and the release of potassium ions in the collecting duct and DCT.

135 (c)

Ammonia is converted into urea through urea cycle or Krebs-Henseleit cycle in liver.

136 (a)

Cardiac muscle as the name suggests, the muscles of heart. Many cardiac muscle cells assemble in a branching pattern to from a cardiac muscle. Based on appearance, they are striated. They are involuntary in nature as the nervous system does not control their activities directly

137 (c)

Haversian canals are characteristic feature of long bone of mammals. The Haversian canals are interconnected by Volkmann's canals to form **Haversian system**. Its main function is transportation of nutrients and O_2 through blood.

138 (c)

The centrum of 8th vertebra of frog is amphicoelous, $i.e.$, concave at both ends. Its transverse processes are somewhat narrower, pointed and directed straight outwards. The neural spine is somewhat flattened and directed upwards.

139 (b)

The neural organization is very simple in lower invertebrates. It is better organized in insects and more developed in vertebrates

140 (a)

All except I.

The inner parts of cerebral hemisphere and a group of associated deep structures like amygdala, hippocampus, etc. form a complex structure called the limbic lobe or limbic system along with hypothalamus. It is involved in the regulation of sexual behavior expression of emotional reactions, ($e.g.$, excitement, pleasure, rage and fear) and motivation

141 (c)

Aldosterone is a steroid hormone (mineralocorticoid family) produced by the outer section (zona glomerulosa) of the adrenal cortex in the adrenal gland. It plays a central role in the regulation of blood pressure mainly by acting on the distal tubules and collecting ducts of the nephron, increasing reabsorption of ions and water in the kidney, to cause the conservation of sodium, secretion of potassium increased water retention and increases blood pressure.

When dysregulated, aldosterone is pathogenic and contributes to the development and progression of cardiovascular and renal disease. Aldosterone has exactly the opposite function of the atrial natriuretic hormone secreted by the heart

142 (c)

Progesterone supports pregnancy. Progesterone also acts on the mammary glands and stimulates the formation of alveoli (sac-like structure which store milk and milk secretion)

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

144 (c)

Gamete mother cells are called gamete producing cells. In these the meiotic cell division takes place. Hence, they are also called meiocytes

145 (a)

Fusion of male and female **haploid** gametes leads to the formation of a diploid zygote

146 (c)

Double fertilization is characteristic feature of angiosperms. It was discovered by **S G Nawaschin** in 1898. In double fertilization, one male gamete fused with ovum to form diploid zygote and the second male gamete fused with diploid secondary nucleus to form the triploid primary endosperm nucleus, which develops into endosperm. The endosperm provides nutrition to the developing embryo.

147 (a)

Six out of the eight nuclei are surrounded by cell walls and organized into cells (egg cells and antipodal cells) and remaining two nuclei called polar nuclei are situated below the egg apparatus

in large central cell. Thus, a typical angiospermic embryo sac at maturity is 8-nucleate and 7-celled. Mature embryo sac

A diagrammatic representation of the mature embryo sac
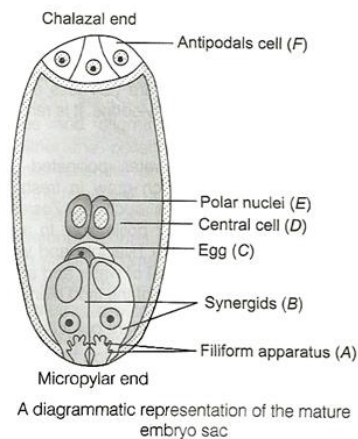
148 (d)
Menarche is the starting of menstruation in girl at about 13 year of age, whereas menopause is the period of life, when menstruation naturally stops.

149 (c)
Follicle Stimulating Hormone (FSH), Luteinzing Hormone (LH) and oestrogen, all play an important role in controlling the menstrual cycle in human females.

150 (b)
Vas deferens is large duct that arises from cauda epididymis and reach up to seminal vesicles.

151 (a)
Sertoli's cell are regulated by FSH (Follicle Stimulating Hormone) as the FSH receptors are confined to the Sertoli's cells.

153 (c)
TB is caused by *Tuberculosis* bacteria. It is a non-sexual disease.
Malaria is caused by protozoan protest called *plasmodium vivax*. When female *Anopheles* mosquito bites then these parasites goes into the human body and causes malaria

154 (b)
In mitosis cell division the chromosomal number remain the same that's way it is called equatorial division. In meiosis cell division the chromosomal number remain the half of the original one that is way it is called reductional division

155 (d)
Baldness is not a sex-limited trait. Balaness is a sex influenced trait.

Linkage is an exception to the principle of independent assortment in heredity.

Galactosemia is a hereditary disease that is

caused by the lack of a liver enzyme required to digest galactose.

Small population size results in random genetic drift in population.

156 (b)
Albinism is caused by the absence of enzyme **tyrosinase**, which is necessary for the synthesis of melanin.

157 (a)
The enzyme reverse transcriptase causes synthesis of DNA from RNA by a process named reverse transcription. It was discovered by **Temin** and **Baltimore.**

158 (d)
The activity of structural genes (*i.e*, the genes determining the amino acid sequence of proteins) is controlled by another genes called a **regulator gene**. The regulator gene carries the genetic code, which result in the production of a repressor protein.

159 (d)
There are many evidence of evolution these evidence of evolution mainly came from
(i) Evidences from the fossil (Palaeontological studies)
(ii) Morphological study
(iii) Anatomical study
(iv) Biochemical study
(v) Phylogenetic tree

160 (d)
Variations in progeny takes place only when there is a change in their genetic material. Mutation, recombination by gametogenesis, gene flow or genetic drift, these all are the ways to bring the change in the genetic material of progeny

161 (d)
The spleen is a large bean-shaped organ. It mainly contains lymphocytes and phagocytes. It acts as a filter of the blood by trapping blood-borne microorganisms. Spleen is a reservoir of erythrocytes

162 (a)
Many Mallon (Nicked name typhoid Mary born on September 23, 1869, Cookstown Country Tyrone, Ireland) Famous typhoid carrier who allegedly gave rise to multiple outbreaks of typhoid fever

163 (b)

Condom(Nirodh) is formed by Hindustan Latex Ltd.

164 (a)

Evalution. of germplasm is carried out to identify plants with desirable combination of characters

166 (b)

A sewage treatment process in which a part of decomposer bacteria present in the wastes is recycled into the starting of the process is called activated sludge treatment

167 (d)

In *Bt* cotton, *Bt* means carrying an endotoxin gene from *Bacillus thuringiensis.* Specific *Bt* toxin gene were isolated from *Bacillus thuringiensis* and incorporated into the several crop plants such as cotton, corn. The choice of genes depends upon the crop and the targeted pest as most *Bt* toxins are insect group specific. The toxin is coded by a gene named *cry*

169 (d)

Three types of 'biological tool' are used in the formation of recombinant DNA
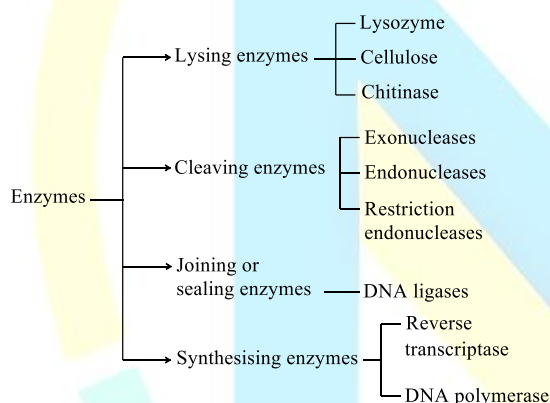
(ii) Cloning vectors (vehicle vectors)
(iii)Complementary host (for transformation with recombinant DNA)

170 (d)

In 1997, the first transgenic cow, Rosie produced human protein – enriched milk (2.4 g/L). The milk contained the human α-lactalbumin and was nutritionally balanced for human babies than natural cow milk

171 (a)

A nematode *Meloidegyne incognitia* infects the roots of tobacco plants, which reduce the production of tobacco

172 (d)

Insulin was the first hormone prepared by genetic engineering within the *E. coli* bacterium. Insulin is made up of two 20 and 30 chains of amino acid residues. Two different *E. coli* bacterial cultures were used to produced each of the insulin chain, these were then recovered from the bacterial and separated by β-galactosidase and finally, chemically joined to make human insulin.

173 (d)

Sexual parasite is type of parasitism in which a parasite live on the particular sex of the organism An angler fish (*Photocorynus*) male lives as a small parasite over the head of the female. In *Bonellia* the male is an internal parasite while in *Schistosoma* male lives in gynecophoral canal of the female

174 (a)

Biotic potential is natality under optimum condition. The actual birth rate under existing condition is called realized natality.

175 (c)

The various biotic communities that develop during biotic succession are termed as seral or transitional communities

176 (b)

Productivity is maximum in the because they grow in areas having good light and abundant nutrients

177 (a)

There are an estimated 2,00,000 varieties of rice in India alone. The diversity of rice in India is one of the richest in the world. Basmati rice has 27documentes varieties grown in India.

178 (a)

All are true except the (iv)
It is species diversity and not biodiversity, which is important for maintaining higher levels of productivity and ecosystem health

179 (c)

Electrostatic precipitator is used to remove particulate matter present in the exhaust of thermal power point. They are very efficient devices which remove 99% of particulates of 5-20 µm size present in the industrial and thermal plant exhausts

180 (b)

Human development activities.
Desertification is a type of land degradation in which a relatively dry land region becomes increasingly arid, typically losing its bodies of water as well as vegetation and wildlife. It is caused by a variety of factors, such as climate change and human activities