RAVI MATHS TUITION CENTRE , WHATSAPP - 8056206308

Time : 180 Mins **MODEL PAPER 27 1** **Marks : 740**

1. What is the value of inductance L for which the current is a maximum in a series LCR circuit with C = 10 μF and ω= 1000/s?
   a) 10 mH **b) 100 mH** c) 1 mH d) cannot be calculated unless R is known

   Solution : -
   Now the current is maximum at resonance, so
   $\omega^2 = 1/LC$ or $L = 1/\omega^2 C$
   Now, $= 1/(1000)^2(10 \times 10^{-6}) = 0.1$ H or 100 mH

2. The internal resistance of a 2.1 V cell which gives a current of 0.2 A through a resistance of 10 Ω is:
   a) 1.0 Ω b) 0.2 Ω **c) 0.5 Ω** d) 0.8 Ω

   Solution : -
   I = E/(R+r)
   E = I x (R+r)
   Putting the values, 2.1 = 0.2 x (10+r)
   Solving for resistance r, 10+r = 21/2
   r = 10.5 - 10 = 0.5 Ω

3. A boy is trying to start a fire by focusing sunlight on a piece of paper using an equiconvex lens of focal length 10 cm. The diameter of the Sun is 1.39×10^9 m and its mean distance from the earth is 1.5×10^{11} m. What is the diameter of the Sun's image on the paper?
   a) 9.2×10^{-4} m b) 6.5×10^{-4} m c) 6.5×10^{-5} m d) 12.4×10^{-4} m

   Solution : -
   We have, $\left|\frac{v}{x}\right| = \frac{\text{Size of image}}{\text{Size of object}}$
   or, Size of image $= \left|\frac{v}{u}\right| =$ Size of object
   $= \left(\frac{10^{-1}}{1.5 \times 10^{11}}\right) \times \left(1.39 \times 10^9\right)$
   $= 0.92 \times 10^{-3}$ m $= 9.2 \times 10^{-4}$ m
   therefore the sun's image diameter $= 9.2 \times 10^{-4}$ m.

4. When an atomic gas or vapour is excited at low pressure, bypassing an electric current through it then
   a) emission spectrum is observed b) absorption spectrum is observed
   c) band spectrum is observed d) both (b) and (c)

5. Three moles of oxygen are mixed with two moles of helium. What will be the ratio of specific heats at constant pressure and constant volume for the mixture?

a) 2.5 b) 3.5 **c) 1.5** d) 1

Solution : -

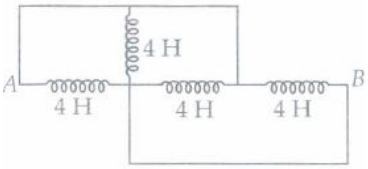
For a monatomic gas like helium

For a diatomic gas like oxygen $\gamma_{O_{32}} = \frac{7}{5}$

$$\therefore \gamma_{mix} = \frac{3 \times \gamma_{O_2} + 2 \times \gamma_{He}}{(3+2)}$$

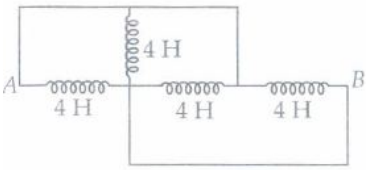
$$= \frac{3 \times \frac{7}{5} + 2 \times \frac{5}{3}}{5} = \frac{\frac{21}{5} + \frac{10}{3}}{5} = \frac{113}{15 \times 5} = 1.5$$

6. The equivalent inductance between A and B is

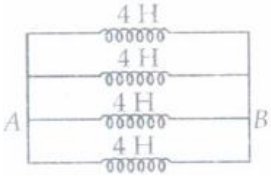


a) 1 H b) 4 H c) 0.8 H d) 16 H

Solution : -



'The equivalent circuit diagram is as shown in the figure.



Here, all the inductances are connected in parallel.

Hence, the equivalent inductance between A and B is

$$\frac{1}{L_{AB}} = \frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4} = \frac{4}{4} = 1$$

or L_{AB} =1 H

7. Find the amount of work done to increase the temperature of one mole of ideal gas by 30°C, if it is expanding under the condition $V \propto T^{2/3}$: (R = 8.31 J/mol-K)

a) 16.62 J **b) 166.2 J** c) 1662 J d) 1.662 J

Solution : -

$W = \int P dv = \int \frac{RT}{V} dv$

As $V = CT^{2/3}$

$\therefore \frac{dV}{V} = \frac{2}{3}\frac{dT}{T}$

So, $W = \frac{2}{3} R \int_{T_1}^{T_2} \frac{dT}{T} \times T = \frac{2}{3} R(T_2 - T_1)$

$= \frac{2}{3}$ x 8.31(30^0C)=166.2 J

However, as the force due to gravity decreases with altitude and lower portion of a body is somewhat closer to the surface of the earth than the upper, the centre of gravity is lie slightly below the centre of mass.

21. When a weight of 10 kg is suspended from a copper wire of length 3 m and diameter 0.4 mm, its length increases by 2.4 em. If the diameter of the wire is doubled, then the extension in its length will be :
    a) 7.6 cm b) 7.6 cm c) 1.2 cm **d) 0.6 cm**

    Solution : -

    Volume $=\pi r^2 l$

    So,for constant volume

    $l \propto \frac{1}{r^2}$

    So, $\frac{l_1}{l_2} = \left(\frac{r_2}{r_1}\right)^2$

    or, $l_2 = l_1\left(\frac{r_2}{r_1}\right)^2$

    = 2.4/4

    l_2=0.6cm

22. Order of magnitude of density of uranium nucleus is:
    a) 10^{20} kg m^{-3} **b) 10^{17} kgm^{-3}** c) 10^{14} kg m^{-3} d) 10^{11} kgm^{-3}

    Solution : -

    Order of magnitude of nuclear density = 10^{17} kg m^{-3}

23. Which of the following is not the name of a physical quantity?
    a) Time b) Impulse c) Mass **d) Kilogram**

    Solution : -

    The kilogram represents the unit of a physical quantity and not the physical quantity.

24. A coin of mass m and radius r, having moment of inertia 1 about the axis passing through its centre and perpendicular to its plane, is beaten uniformly to form a disc of radius 2r. What will be the moment of inertia of the disc about the same axis?
    a) I b) 2I **c) 4I** d) 16I

    Solution : -

    Moment of inertia of a coin of mass m and radius r about the axis passing through the centre of mass and perpendicular to its plane is:

    $I = mr^2/2$

    Moment of inertia of disc of mass m and radius 2r about the axis passing through the centre of mass and perpendicular to its plane is:

    $I' = \frac{m(2r)^2}{2} = 4I.$

25. The current amplification factor $\alpha$of a common base transistor and the current amplification factor β of a common emitter transistor are not related by
    a) $\alpha = \frac{\beta}{1+\beta}$ b) $\beta = \frac{\alpha}{1-\alpha}$ c) $\frac{1}{\alpha} - \frac{1}{\beta} = 1$ **d)** $\beta = \frac{\alpha}{1+\alpha}$

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Solution : -

$As\ \beta = \frac{\alpha}{1-\alpha},\ so\ \alpha = \frac{\beta}{1+\beta}\ and\ \frac{1}{\alpha} = \frac{1}{\beta} + 1$

26. Which of the following properties of a wave is independent of others?
    a) Velocity b) Frequency **c) Amplitude** d) Wavelength

    Solution : -

    Amplitude of a wave is independent of others.

27. Two bodies of masses 0.1 kg and 0.4 kg move towards each other with the velocities 1 m/s and 0.1 m/s respectively. After collision they stick together. In 10 see the combined mass travels:
    a) 120 m b) 0.12 m c) 12 m **d) 1.2 m**

    Solution : -

    According to conservation of momentum

    $m_1v_1 + m_2v_2 = (m_l + m_2)v$,

    where v is common velocity of the two bodies

    m_1 = 0.1 kg, m_2 = 0.4 k

    v_l = 1m/s, v_2 =- 0.1 m/s

    0.1 x 1 + 0.4 x (- 0.1) = (0.1 + 0.4) v

    0.1-0.04 = 0.5v,

    v=$\frac{0.06}{0.5} = 0.12m/s$

    Hence, distance covered = 0.12 x 10 = 1.2 m

28. The weight of an astronaut, In an artificial satellite revolving around the earth, is:
    a) zero b) equal to that on the earth c) more than that on the earth

    d) less than that on the earth

    Solution : -

    We know that when the satellite is revolving around the earth, the gravitational pull is balanced by the centripetal force. Therefore, there is no gravitational pull on the body. Thus, weight of the body is zero.

29. An electric dipole when placed in a uniform electric field E will have minimum potential energy, if the positive direction of dipole moment makes the following angle with E:
    a) π b) $\pi/2$ **c) Zero** d) $3\pi/2$

    Solution : -

    In an electric dipole, when angle θ = 0, then potential energy = - pE cos θ

30. By what percentage the energy of a satellite has to be increased to shift it from an orbit of radius r to 3/2 r?
    a) 66.7 % **b) 33.3 %** c) 75 % d) 20.3 %

31. The length of the wire between two ends of a sonometer is 100 cm. What should be the positions of two bridges below the wire so that the three segments of the wire have their fundamental frequencies in the ratio of 1: 3: 5?

$From\ the\ sectional\ diagram,$
$F = 6\text{mg},$
$As\ speed\ is\ constant,\ acceleration\ a = 0$
$\therefore 6\text{mg} = 6\text{ma} = 0, F = 6\text{mg}$
$\therefore\ T = 5\text{mg}, T' = 3\text{mg} T'' = 0$
$F_{\text{net}}\ on\ block\ of\ mass\ 2\ \text{m}\ = T - T' - 2\text{mg} = 0$

43. A new system of units is evolved in which the values of μ_0 and ε_0 are 2 and 8 respectively. Then the speed of light in this system will be:
a) 0.25 b) 0.5 c) 0.75 d) 1

Solution : -
$\text{Speed of light } = \frac{1}{\sqrt{\varepsilon_0 \mu_0}} = \frac{1}{\sqrt{8 \times 2}} = \frac{1}{4} = 0.25$

44. For a heat engine sink temperature is 280 K and its efficiency is 50%. What will be the temperature of source?
a) 327 K **b) 560 K** c) 283 K d) 227 K

Solution : -
Efficiency of heat engine is given by:
$\eta = 1 - \frac{T_2}{T_1}$
Where, T_1 is temperature of the source and T_2 is temperature of sink.
Hence, T_2 = 280 K and η= 50%
$\therefore \frac{50}{100} = 1 - \frac{280}{T_1}$
or $\frac{1}{2} = 1 - \frac{280}{T_1}$
T_1=560 K

45. In a certain region of space there are only 5 gaseous molecules per em" on an average. The temperature there is 3 K The pressure of this gas is
(k_B = 1.38 X 10^{-23} J mol^{-1} K^{-1})
a) 20.7 x 10^{-16} N m^{-2} **b) 20.7 x 10^{-17} N m^{-2}** c) 10.7 x 10^{-16} N m^{-2}
d) 10.7 x 10^{-17} N m^{-2}

Solution : -
Let n be the number of molecules in the gas
$PV = nK_BT$
or $P = \frac{nk_BT}{V}$
Here, $\frac{n}{V} = 5cm^{-3} = 5 \times 10^6 m^{-3}$
k_B = l.38 x 10^{-23} J mol^{-1} K^{-1}
∴ P = 5 X 10^6 x l.38 x 10^{-23} x 3
= 20.7 x 10^{-17} N m^{-2}

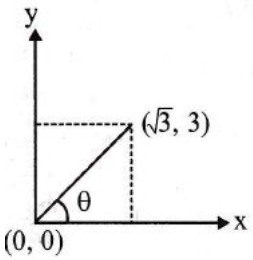
46. A beam of light composed of red and green rays is incident obliquely at a point on the face of a rectangular glass slab. When coming out on the opposite parallel face, then the red and green rays emerge from

a) two points propagating in two different non-parallel directions
b) two points propagating in two different parallel directions
c) one point propagating in two different directions
d) one point propagating in the same direction

47. If the number of turns per unit length of a coil of solenoid is doubled, the self-inductance of the solenoid will _____.
a) remain unchanged b) be halved c) be doubled **d) become four times**

Solution : -
A long solenoid is that whose length is very large as compared to its radius of cross-section. If N is total number of turns in the solenoid. A is area of each turn of the solenoid and I is length of solenoid, then self-inductance of solenoid is given by
$L = \frac{\mu_0 N^2 A}{l} \Rightarrow L = \mu_0 n^2 Al$
(n : number of turns per unit length)
So, Lμn^2
When n^2 is doubled, L becomes 4 times.

48. A particle starting from the origtn (0,0) moves in a straight line in the (x, y) plane. Its coordinates at a later time are ($\sqrt{3}$, 3). The path of the particle makes with the x-axis an angle of _____
a) 45° **b) 60°** c) 0° d) 30°

Solution : -


$Suppose\ \theta\ be\ the\ angle\ that\ the\ particle\ makes\ with\ x-axis.$
$From\ the\ above\ figure\ we$
$have\ \tan\theta = \frac{3}{\sqrt{3}} = \sqrt{3} \Rightarrow \theta = \tan^{-1}(\sqrt{3}) = 60^\circ$

49. A small coin is resting on the bottom of a beaker filled with a liquid . A ray of light from the coin travels up to the surface of the liquid and moves along its surface as shown in figure. How fast is the light travelling in the liquid?
a) $1.8 \times 10^8 ms^{-1}$ b) $2.4 \times 10^8 ms^{-1}$ c) $3.0 \times 10^8 ms^{-1}$ d) $1.2 \times 10^4 ms^{-1}$

50. A wheel has angular acceleration of 3.0 rad/sec^2 and an initial angular speed of 2.0 rad/see. In a time of 2 sec it has rotated through an angle (in radian) of:
a) 10 b) 12 c) 4 d) 6

Solution : -
Given: Angular acceleration, a = 3 rad/sec, initial velocity ω_i = 2 rad/s, time t = 2 sec
Using, $\theta = \omega_i t + \frac{1}{2}at^2$

Hence, oxidized to obtain ketone

69. Which of the following 0.10 M aqueous solution will have the lowest freezing point?
a) $Al_2(SO_4)_3$ b) $C_5H_{10}O_5$ c) KI d) $C_{12}H_{22}O_{11}$

Solution : -

We know that $\Delta T_f \propto i$ or $\Delta T_f \propto$ number of particles
For $Al_2(SO_4)_3$, $Al_2(SO_4)_3 \longrightarrow 2Al_3+ + 3SO_4^{2-}$ (5 ions)
For KI, $KI \rightleftharpoons K^+ + I^-$ (2 ions)
$C_5H_{10}O_5$ and $C_{12}H_{22}O_{11}$ do not give any ions so they behave as single particle.
Hence lowest freezing point is possible for $Al_2(SO_4)_3$.

70. Mark the incorrect statement from the following.
a) Benzene has a planar structure
b)
Benzene is an unsaturated hydrocarbon and shows addition reactions like alkenes
c) In benzene carbon uses two p-orbitals for hybridisation.
d)
Aromatic hydrocarbons contain high percentage of carbon hence burn with sooty flame.

Solution : -

Benzene can show both additions as well substitution reaction. It does not show an addition reaction like alkene. This is because, if it shows an addition reaction like alkene, then it will lose its aromaticity and become less stable.

71. Graphite is a good conductor of heat and electricity because it contains:
a) layers of carbon atoms b) sheet like structure **c) free electrons**
d) $p\pi - d\pi$ bonding

Solution : -

In graphite, since pi-electrons are free to move throughout the entire layers so graphite is a good conductor of electricity. Its conductivity increases with temperature.because of these free electrons it is heat conductor.

72. The oxidation number of phosphorus in pyrophosphoric acid is:
a) +3 b) +1 c) +4 **d) +5**

Solution : -

Pyrophosphoric acid $H_4P_2O_7$
Let oxidation state of phosphorus is x
(4 x 1 + (-2) x 7 + 2 x) = 0
2x = 10 or x = +5

73. The temperature of the gas is raised from 27°C to 927°C. The root mean square speed of the gas is :
a) $\sqrt{\frac{927}{27}}$ times of the earlier value b) Same as before c) Halved **d) Doubled**

Solution : -

Root mean square velocity of a gas is given by

$u_{rms} = \sqrt{\frac{3RT}{M}}$

At temperature 27°C or 300 K

$(u_{rms})_1 = \sqrt{\frac{3R\times300}{M}}$ ...(1)

At temperature 927°C or 1200 K

$(u_{rms})_2 = \sqrt{\frac{3R\times1200}{M}}$ ...(2)

From (1) & (2)

$\frac{(u_{rms})_2}{(u_{rms})_1} = \frac{\sqrt{\frac{3R\times1200}{M}}}{\sqrt{\frac{3R\times300}{M}}} = \sqrt{\frac{1200}{300}} = \sqrt{4} = 2$

74. Root mean square velocity of a gas molecule is proportional to :

a) $m^{\frac{1}{2}}$ b) m° **c)** $m^{-\frac{1}{2}}$ d) m

Solution : -

$u_{rms} = \sqrt{\frac{3RT}{M}} \propto \sqrt{\frac{1}{m}}$ or $m^{-1/2}$

75. An impure sample of silver (1.5 g) is heated with S to form 0.124 g of Ag_2S. What was the per cent yield of Ag_2S?

a) 21.6% **b) 7.2%** c) 1.7% d) 24.8%

Solution : -

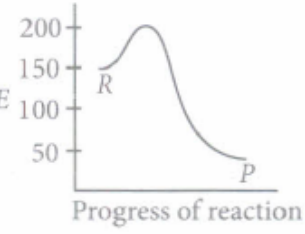
$\underset{2\times108=216}{2Ag} + S \longrightarrow \underset{248g}{Ag_2S}$

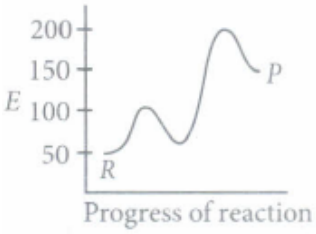
216 g of Ag forms 248 g of Ag_2S

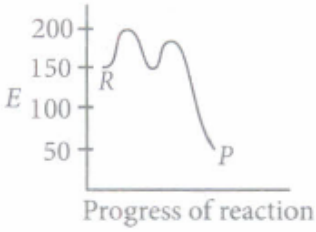
1.5 g of Ag forms $\frac{248}{216} \times 1.5$ = 1.722 g of Ag_2S

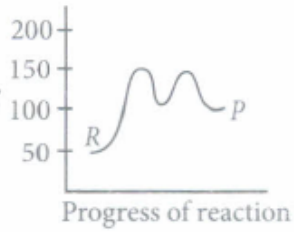
% yield of Ag_2S = $\frac{0.124}{1.722} \times 100$ = 7.2%

76. An exothermic chemical reaction proceeds by two stages. Reactants stage Intermediate stage Products The activation energy of state 1 is 50 kJ mol^{-1}. Theoverall enthalpy change for the reaction is-100 kJ mol. Which diagram could represent the energy level diagram for the reaction?

a) 

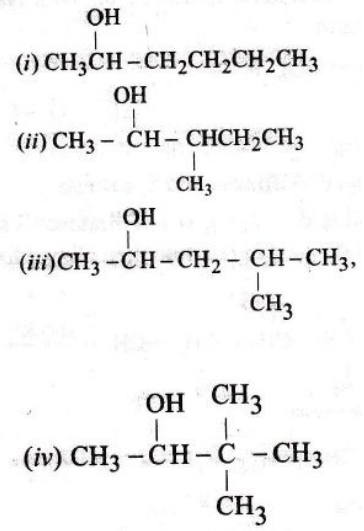
b) 

c) 

d) 

Solution : -

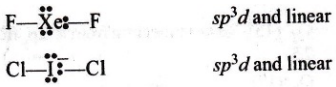
Four isomeric alcohols of molecular compound $CH_3CH(OH)$ which given positive iodoform test following that.



81. Which of the following conclusions could not be derived from Rutherford's a-particle scattering experiment?
    a) Most of the space in the atom is empty.
    b) The radius of the atom is about 10^{-10} m while that of nucleus is 10^{-15} m.
    c) Electrons move in a circular path of fixed energy called orbits.
    d) Electrons and the nucleus are held together by electrostatic forces of attraction.

82. XeF_2 is isostructural with
    a) TeF_2 **b)** ICl_2^- c) $SbCl_3$ d) $BaCl_2$

    Solution : -



83. Identify the alloy containing a non-mental as a constituent in it.
    a) Invar **b) Steel** c) Bell metal d) Bronze

    Solution : -

    $\text{Explaining: Invar} \Rightarrow \text{Ni(metal)} + \text{Fe (metal)}$
    $\text{Steel} \Rightarrow \text{C(non-metal)} + \text{Fe(metal)}$
    $\text{Bell metal} \Rightarrow \text{Cu(metal)} + \text{Sn(metal)} + \text{Fe(metal)}$
    $\text{Bronze} \Rightarrow \text{Cu (metal)} + \text{Sn(metal)}$

84. Which of the following is non-polar?
    a) SO_2 **b) CO_2** c) H_2O d) NH_3

    Solution : -

    $O \rightleftharpoons C \rightleftharpoons O$; Since the dipoles are in opposite directions, the net dipole moment is zero.

85. Number of possible spectral lines which may be emitted in Brackett series in H atom, if electrons present in 9th excited level returns to ground level, are
    a) 21 b) 6 c) 45 **d) 5**

    Solution : -

a)
If both assertion and reason are true and reason is the correct explanation of assertion.

b)
If both assertion and reason are true but reason is not the correct explanation of assertion.

c) If assertion is true but reason is false. **d) If both assertion and reason are false.**

Solution : -

In homogeneous mixture, the components completely mix with each other and hence the composition is uniform throughout. Formation of homogeneous mixture is a physical change as no chemical reaction occurs between the components and no new compound is formed, hence the components can be separated by physical methods.

91. The properties of Li are similar to those of Mg. This is because:
a) both have nearly the same size.
b) both has their charge to size ratio nearly the same.
c) both have similar electronic configurations d) both are found together in nature

Solution : -

The properties of lithium are similar to those of Mg because they are having diagonal relationship.

The elements having diagonal relationship show similar properties and the reason is because the both of them will have similar electronegativity and polarising power i.e. charge per size ratio of both the elements are nearly the same.

92. Heavy water is obtained by
a) boiling water b) heating H_2O_2 **c) prolonged electrolysis of H_2O** d) All of these.

Solution : -

Heavy water is obtained by prolonged electrolysis of H_2O which involves multi-stage electrolysis of ordinary water containing alkali.

93. Solubility of a M_2S salt is 3.5×10^{-6}, then its solubility product will be
a) 1.7×10^{-16} b) 1.7×10^{-6} c) 1.7×10^{-18} d) 1.7×10^{-12}

Solution : -

$$M_2S \rightleftharpoons \underset{2s}{2M^+} + S_s^-(\text{at equilibrium})$$

Solubility product = $(2s)^2(s) = 4s^3$

$= 4 (3.5 \times 10^{-6})3 = 1.7 \times 10^{-16}$

94. Which of the following ligands is expected to be bidentate?
a) CH_3NH_2 b) CH_3CN c) Br **d) $C_2O_4^{2-}$**

Solution : -

$C_2O_4^{2-}$ is a bidentate ligand because it has two donor atoms and can coordinate to the central ion at two positions.

95. Bithionol is generally added to the soaps as an additive to function as a/an:
a) buffering agent **b) antiseptic** c) softener d) dryer.

Solution : -

Bithionol is added to soap to impart antiseptic properties. It reduces odours produced by bacterial decomposition of organic matter on the skin.

Bithionol
(2, 2 sulfonediylbis
4, 6 dichlorophenol)

96. Consider the isoelectronic species, Na^+, Mg^{2+}, F^- and O^{2-}. The correct order of increasing length of their radii is

a) $F^- < O^{2-} < Mg^{2+} < Na^+$ **b) $Mg^{2+} < Na^+ < F^- < O^{2-}$** c) $O^{2-} < F^- < Na^+ < Mg^{2+}$

d) $O^{2-} < F^- < Mg^{2+} < Na^+$

Solution : -

For isoelectronic species, ionic radii decrease with increase in nuclear charge (i.e., no. of protons). Thus, the cation with greater +ve charge will have a smaller radius and the anion with greater -ve charge will have a larger radius. Thus, the correct order of increasing ionic radii is $Mg^{2+} < Na^+ < F^- < O^{2-}$.

97. Which of the following will have the highest f.pt. at one atmosphere?

a) 0.1 M NaCl solution **b) 0.1 M sugar solution** c) 0.1 M $BaCl_2$ solution

d) 0.1 M $FeCl_3$ solution

Solution : -

For the same concentration of different solvents any colligative property $\propto$ i

For NaCl, i = 2

Sugar solution, i = 1

$BaCl_2$, i = 3; $FeCl_3$, i = 4

Thus, for sugar solution depression in freezing point is minimum i.e., highest freezing point.

98. Electromagnetic radiation of wavelength 242 nm is just sufficient to ionise the sodium atom. What is the ionisation energy of sodium per atom?

a) 494.5 x 10^{-6} J/atom b) 8169.5 x 10^{-10} J/atom c) 5.85 x 10^{-15} J/atom

d) 8.214 x 10^{-19} J/atom

Solution : -

λ=242 nm = 242 x 10^{-9} m

Energy required to ionise one atom of Na, $E=\frac{hc}{\lambda}$

$=\frac{(6.626\times10^{-34}Js)\times(3\times10^{8}ms^{-1})}{242\times10^{-9}}$

=8.214 x 10^{-19} J/atom

99. At Boyle temperature:

136. Meiotic division of the secondary oocyte is completed _____

a) After zygote formation **b) At the time of fusion of a sperm with an ovum**

c) Prior to ovulation d) At the time of copulation

Solution : -

When sperm enters into the secondary oocyte, it provides the anaphase promoting factor that induces the completion of meiosis in the secondary ooclte.

137. Monothecous condition of stamens, i.e., presence of a single anther lobe is a characteristic of Family:

a) Cucurbitaceae **b) Malvaceae** c) Asteraceae d) Brassicaceae.

Solution : -

The anthers which contain only one anther lobe are called monothecous anthers. Monothecous anthers are bisporangiate (contain two pollen sacs), as in FamilyMalvaceae.

138. The core metal of chlorophyll is_____

a) iron **b) magnesium** c) nickel d) copper

Solution : -

Chlorophyll molecule, is made up of porphyrin ring which is a structure with alternating single and double bonds containing four small pyrrole rings. It has magnesium atom at the centre

139. Cross from corolla is found in

a) Cruciferae b) Compositae c) Leguminosae d) Malvaceae

140. About how many times does the nymph of the Periplaneta americana undergo moulting before becoming an adult?

a) 4 b) 2 c) 17 **d) 13**

Solution : -

Immediately after hatching, the nymphs undergo 13 successive moults. As nymphal development proceeds, the wing pads arise, body increases in size, colouration becomes darker and ultimately the adult takes its form with fully developed wings and genitalia.

141. The energy-releasing metabolic process in which substrate is oxidised without an external electron acceptor is called

a) Glycolysis **b) Fermentation** c) Aerobic respiration d) Photorespiration

142. Which of these is not correct regarding ribosomes?

a) Non-membrane bound b) Present in the cytoplasm and on RER

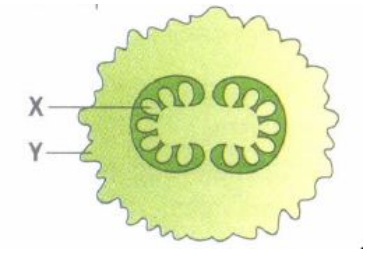
c) Absent in chloroplast and mitochondria d) Take part in protein synthesis

Solution : -

The organelle ribosome is found in plastids (plastidoribosomes) and mitochondria (mitoribosomes) which is 70S in nature.

143. If A, B, C, D, G, P, Q, R and S represent different species, then which of the following figures symbolises a biome?

170. Which of the labelled parts in the transverse section of tomato fruit, is/are diploid?



a) X b) Y **c) Both X and Y** d) None of these

171. The intravenous drug abusers are more likely to develop

a) cancer **b) AIDS** c) malaria d) typhoid

Solution : -

Drug abusers who take drugs intravenously are more likely to develop infections like AIDS and hepatitis B as these diseases can spread through infected needles.

172. Trophic level of man in ecosystem is/may be

a) First b) Second only c) Third only **d) Fourth**

173. An example of endomycorrhiza is :

a) Glomus b) Agaricus c) Nostoc d) Rhizobium

Solution : -

Fungi are also known to form symbiotic associations with plants (mycorrhiza). Many members of the genus Glomus form mycorrhiza.

174. Mass of living matter at a trophic level in an area at any time is called _____.

a) standing crop b) deteritus c) humus d) standing state

Solution : -

Mass of living matter at a trophic level in an area at any time is called standing crop. It is expressed in the form of number of biomass per unit area. Standing crop indicates the productivity and growth of an ecosystem.

175. Antigens are present_____

a) inside the nucleus **b) on cell surface** c) inside the cytoplasm
d) on nuclear membrane

Solution : -

Antigens (Ag) are foreign particles present on the surface of cell and when introduced in the blood they initiate a specific immune response against themselves

176. Which of the following eras, in geological time scale, corresponds to the period when life had not originated upon the earth?

a) Azoic b) Palaeozoic c) Mesozoic d) Archaeozoic

Solution : -

Azoic era is the era of no life. It existed about 4600 million years ago when only solar system had originated.

177. First step of CO_2 liberation during aerobic respiration is

a) PEP ⟶ Pyruvate **b) Pyruvate ⟶ Acetyl CoA** c) Isocitrate ⟶ Oxalosuccinate
d) Succinyl CoA ⟶ Succinate

178. Identify the possible link "A" in the following food chain: Plant ⟶ insect ⟶ frog ⟶ "A" ⟶ Eagle
a) Rabbit b) wolf **c) Cobra** d) Parrot

Solution : -
Cobra. Green plant _ Insect _ Frog _ Cobra _ Eagle. This is the proper sequence in food chain.

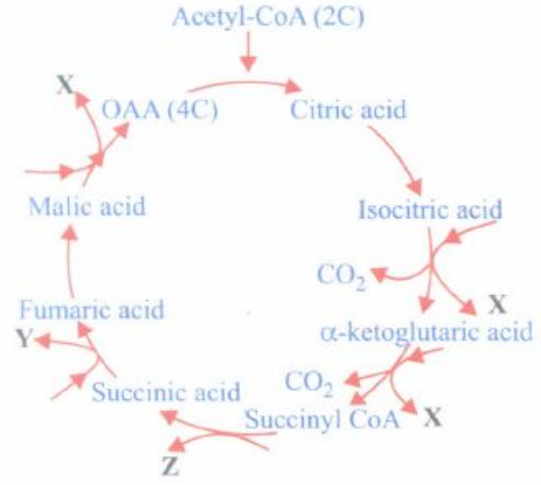
179. Match the trophic levels with their correct species examples in grassland ecosystem.

Column I	**Column - II**
(a) Fourth trophic level	(i) Crow
(b) Second trophic level	(ii) Vulture
(c) First trophic level	(iii) Rabbit
(d) Thirdhophic level	(iv) Grass

a) (iv) (iii) (ii) (i) b) (i) (ii) (iii) (iv) **c) (ii) (iii) (iv) (i)** d) (iii) (ii) (i) (iv)

Solution : -
(a) Fourth trophic level (ii) Vulture
(b) Second trophic level (iii) Rabbit
(c) First trophic level (iv) Grass
(d) Third trophic level (i) Crow

180. Identify X, Y and Z in the given diagram representing steps of citric acid cycle and select the correct option.



a)

X	**Y**	**Z**
GTP	**$NADH_2$**	**$FADH_2$**

b)

X	Y	Z
$FADH_2$	$NADH_2$	GTP

c)

X	Y	Z
$NADH_2$	$FADH_2$	GTP

d)

X	Y	Z
CO_2	$NADH_2$	ADP

Solution : -

Krebs' cycle also know as TCA cycle or citric acid cycle, is a common pathway of oxidative breakdown of carbohydrates, fatty acids and amino acids. Amino acids enter the Krebs' cycle directly as glutamate (for a-ketoglutarate) and asparate (for oxaloacetate) after their deamination. Fats produce fatty acids and glycerol. Glycerol is phosphorylated and oxidised to form glyceraldehyde 3-phosphate. Fatty acids undergo B-oxidation to produce acetyl CoA. Acetyl CoA enters Krebs' cycle.

181. DNA elements, which can switch their position, are called_____ .
a) exons b) introns c) cistrons **d) transposons**

Solution : -
Transposons are genetic elements varying from 750 base pairs to 40 kilo base pairs in length and can move from a site in one genome to another site in the same or in a different genome.

182. Removal of introns andioining of exons in a defined order during transcription is called ___
a) Looping b) Inducing c) Slicing **d) Splicing**

Solution : -
Removal of introns and joining of exons in a defined order during transcription is called splicing. During transcription process in eukaryotes, both coding (exons) and non-coding (introns) sequences are transcribed. But during processing of mRNA, these introns are removed from hnRNA. Then mRNA is formed.

183. Water passes into a cell due to
a) OP **b) DPD** c) turgor pressure d) diffusion

Solution : -
Cells gain or lose water among themselves on the basis of their water potential or DPD and not their solute or osmotic potentials only. Movement of water (solvent) takes place from lower DPD to high DPD or from higher water potential to lower water potential.

184. Which is least likely to be involved in stabilising the three dimensional folding of most proteins?
a) Ester bonds b) Hydrogen bonds c) Electrostatic interactions
d) Hydrophobic interactions

Solution : -
Various types of bonds or interactions such as covalent bonds, ionic bonds, hydrogen bonds, van der waals and hydrophobic bonds are found during the coiling of polypepetide.

185. Which of the following is ART?
a) IUDs b) GIFT c) ZIFT **d) Both (b) and (c)**

Solution : -
Intra uterine device (IUD) is a method of birth control.

186. Back bone in structure of DNA molecule is made up of-

a) Pentose Sugar and phosphate b) Hexose sugar and phosphate
c) Purine and pyrimidine d) Sugar and phosphate

187. An example of a seed with endosperm, perisperm and caruncle
a) Castor b) Cotton c) Coffee d) Lily

188. Match the following and choose the correct option from below.

A.	Meristem	-	(i)	Photosynthesis, storage
B.	Parenchyma	-	(ii)	Mechanical support
C.	Sollenchym	-	(iii)	Actively dividing cells
D.	Sclerenchyma	-	(iv)	Sclereids

a) A-(i), B-(iii), (-(v), D-(ii), E-(iv) **b) A-(iii), B-(i), (-(ii), D-(v), E-(iv)**
c) A-(ii), B-(iv), (-(v), D-(i), E-(iii) d) A-(v), B-(iv), (-(iii), D-(ii), Hi)

Solution : -
During reproductive phase of a shoot apex, the floral meristem broadens, becomes less conical and increases In size. This increase in size is due to an increase in rate of cell division in the central cells. In plants, floral morphogenesis is controlled by a network of genes.

189. Consider the following statements about biomedical technologies?
a) During open heart surgery blood is circulated in the heart-lung machine.
b) Blockage in coronary arteries is removed by angiography.
c)
Computerized axial tomography (CAT) shows detailed internal structure as seen in a section of body.
d) X-ray provides clear and detailed images of organs like prostate glands and lung.

Solution : -
During open-heart surgery blood is circulated in the heart-lung machine. Computerised Axial Tomography (CAT) shows detailed internal structure as seen in the section of body. These two statements are correct about biomedical technologies lt is not possible to repair intracardiac defects surgically while the heart is skin pumping. This is why many types of artificial lung machine have been developed to take the place of heart and lungs during the course of operation Angiography is a radiographic visualisation of blood vessels of a region/ organ after injecting a radio-opaque/contract agent computerised axial tomography (CAT) shows detailed internal structures as seen in a section of body (e.g. iodine) or fluoroscopic chemical.
Digital subtraction of angiography provides clear views of flowing blood in vessels and indicates the presence of blockage.
X-rays technique is generally employed for diagnosis disease of heart, lungs and bones.

190. Which one of the following pairs of animals is similar to each other pertaining to the feature stated against them?

Primary acceptor of CO_2 in C_4 plants is phosphoenol pyruvic acid (PEP). Carboxylation is catalysed by enzyme PEP carboxylase (PEPcase). First stable product in C_4 plant is OAA (oxaloacetic acid), a 4C compound.

196. The drug Cyclosporin used for organ transplant patients is obtained from is
a) Bacterium **b) Fungus** c) Virus d) Plant

197. A human male produces sperms with the genotypes AB, Ab, aB and ab, in equal proportions. What is the corresponding genotype of this person:
a) AaBb b) AaBB c) AABb d) AABB

198. Consider the following statements each with one or two blanks
(i) Trypsinogen is activated to trypsin by __(1)____.
(ii) Fatty acids and glycerol are absorbed into ____(2)___but glucose and amino acids are absorbed into ill.
Which one of the following options, give the correct fill ups for the respectives blanks (1) to (3) in the statements?
a) (1) - cholecystokinin, (2) - blood vessels, (3) - lacteals
b) (2) - lacteals, (3) - blood capillaries c) (c) (1) - enterokinase, (2) - blood capillaries
d) (d) (1) - chymotrypsinogen, (3) - lacteals

199. Montreal protocol was passed in:
a) 1985 b) 1986 **c) 1987** d) 1988

Solution : -
Fact.

200. Human Immunodeficiency Virus (HIV) has a protein coat and a genetic material which is___
a) single stranded DNA **b) single stranded RNA** c) double stranded RNA
d) double stranded DNA

Solution : -
AIDS (Acquired Immunodeficiency Syndrome) was first reported in USA in 1981 . It is caused by HIV (Human Immunodeficiency Virus). HIV is the member of retroviruses. Later are so named because they contain an enzyme reverse transcriptase, which mediates the formation of DNA from RNA. The genetic material of HIV is single stranded RNA (ssRNA).