

AIPMT 2011 (MAINS) — QUESTION PAPER

Max. Marks: 472

Questions: 118

Section A (MCQ) — 118 questions

Q.1 The density of a material in CGS system of units is 4 g cm^{-3} . In a system of units in which unit of length is 10 cm and unit of mass is 100 g, the value of density of material will be [AIPMT 2011 (Mains)]

- (1) 0.04 (2) 0.4 (3) 40 (4) 400

Scan or tap for the full solution



Q.2 A particle covers half of its total distance with speed v_1 and the rest half distance with speed v_2 . Its average speed during the complete journey is [AIPMT 2011 (Mains)]

- (1) $\frac{v_1 + v_2}{2}$ (2) $\frac{v_1 v_2}{v_1 + v_2}$ (3) $\frac{2v_1 v_2}{v_1 + v_2}$ (4) $\frac{v_1^2 v_2^2}{v_1^2 + v_2^2}$

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Q.3 A projectile is fired at an angle of 45° with the horizontal. Elevation angle of the projectile at its highest point as seen from the point of projection, is [AIPMT 2011 (Mains)]

- (1) 45° (2) 60°
 (3) $\tan^{-1}\left(\frac{1}{2}\right)$ (4) $\tan^{-1}\left(\frac{\sqrt{3}}{2}\right)$

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Q.4 A conveyor belt is moving at a constant speed of 2 m s^{-1} . A box is gently dropped on it. The coefficient of friction between them is $\mu = 0.5$. The distance that the box will move relative to belt before coming to rest on it, taking $g = 10 \text{ m s}^{-2}$, is [AIPMT 2011 (Mains)]

- (1) 0.4 m (2) 1.2 m (3) 0.6 m (4) zero

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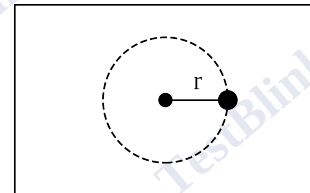
Q.5 A mass m moving horizontally (along the x -axis) with velocity v collides and sticks to a mass of $3m$ moving vertically upwards (along the y -axis) with velocity $2v$. The final velocity of the combination is [AIPMT 2011 (Mains)]

- (1) $\frac{3}{2}\hat{v}_i + \frac{1}{4}\hat{v}_j$ (2) $\frac{1}{4}\hat{v}_i + \frac{3}{2}\hat{v}_j$
 (3) $\frac{1}{3}\hat{v}_i + \frac{2}{3}\hat{v}_j$ (4) $\frac{2}{3}\hat{v}_i + \frac{1}{3}\hat{v}_j$

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Q.6 A small mass attached to a string rotates on a frictionless table top as shown. If the tension in the string is increased by pulling the string causing the radius of the circular motion to decrease by a factor of 2, the kinetic energy of the mass will [AIPMT 2011 (Mains)]



- (1) decrease by a factor of 2
 (2) remain constant
 (3) increase by a factor of 2
 (4) increase by a factor of 4

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Q.7 A particle of mass m is thrown upwards from the surface of the earth, with a velocity u . The mass and the radius of the earth are, respectively, M and R . G is gravitational constant and g is acceleration due to gravity on the surface of the earth. The minimum value of u so that the particle does not return back to earth, is [AIPMT 2011 (Mains)]

- (1) $\sqrt{\frac{2GM}{R^2}}$ (2) $\sqrt{\frac{2GM}{R}}$
 (3) $\sqrt{\frac{2gM}{R^2}}$ (4) $\sqrt{2gR^2}$

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Q.8 A particle of mass M is situated at the centre of a spherical shell of same mass and radius a . The magnitude of the gravitational potential at a point situated at $\frac{a}{2}$ distance from the centre, will be : [AIPMT 2011 (Mains)]

- (1) $\frac{GM}{a}$ (2) $\frac{2GM}{a}$ (3) $\frac{3GM}{a}$ (4) $\frac{4GM}{a}$

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Q.9 A mass of diatomic gas ($\gamma = 1.4$) at a pressure of 2 atmospheres is compressed adiabatically so that its temperature rises from 27°C to 927°C . The pressure of the gas in the final state is [AIPMT 2011 (Mains)]

- (1) 8 atm (2) 28 atm (3) 68.7 atm (4) 256 atm

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Q.10 Two particles are oscillating along two close parallel straight lines side by side, with the same frequency and amplitudes. They pass each other, moving in opposite directions when their displacement is half of the amplitude. The mean positions of the two particles lie on a straight line perpendicular to the paths of the two particles. The phase difference is [AIPMT 2011 (Mains)]

- (1) $\frac{\pi}{6}$ (2) 0 (3) $\frac{2\pi}{3}$ (4) π

Scan or tap for the full solution



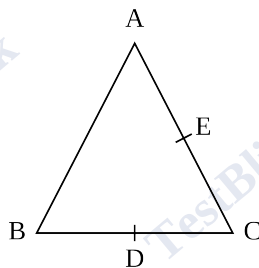
Q.11 Two identical piano wires, kept under the same tension T have a fundamental frequency of 600 Hz. The fractional increase in the tension of one of the wires which will lead to occurrence of 6 beats/s when both the wires oscillate together would be [AIPMT 2011 (Mains)]

- (1) 0.01 (2) 0.02 (3) 0.03 (4) 0.04

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Q.12 Three charges, each $+q$, are placed at the corners of an isosceles triangle ABC of sides BC and AC, $2a$. D and E are the mid points of BC and CA. The work done in taking a charge Q from D to E is [AIPMT 2011 (Mains)]



- (1) $\frac{3qQ}{4\pi\epsilon_0 a}$ (2) $\frac{3qQ}{8\pi\epsilon_0 a}$ (3) $\frac{qQ}{4\pi\epsilon_0 a}$ (4) zero

Scan or tap for the full solution



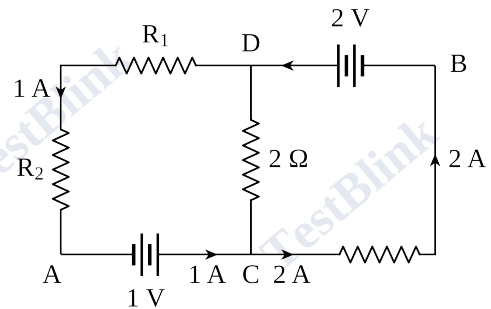
Q.13 The electric potential V at any point (x, y, z) , all in metres in space is given by $V = 4x^2$ volt. The electric field at the point $(1, 0, 2)$ in volt/metre, is [AIPMT 2011 (Mains)]

- (1) 8 along negative X-axis
(2) 8 along positive X-axis
(3) 16 along negative X-axis
(4) 16 along positive X-axis

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Q.14 In the circuit shown in the figure, if the potential at point A is taken to be zero, the potential at point B is [AIPMT 2011 (Mains)]



- (1) +1 V (2) -1 V (3) +2 V (4) -2 V

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Q.15 A galvanometer of resistance, G , is shunted by a resistance S ohm. To keep the main current in the circuit unchanged, the resistance to be put in series with the galvanometer is [AIPMT 2011 (Mains)]

- (1) $\frac{G}{(S+G)}$ (2) $\frac{S^2}{(S+G)}$
(3) $\left(\frac{SG}{S+G}\right)$ (4) $\frac{G^2}{(S+G)}$

Scan or tap for the full solution



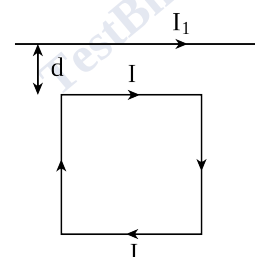
Q.16 Charge q is uniformly spread on a thin ring of radius R . The ring rotates about its axis with a uniform frequency f Hz. The magnitude of magnetic induction at the centre of the ring is [AIPMT 2011 (Mains)]

- (1) $\frac{\mu_0 q f}{2\pi R}$ (2) $\frac{\mu_0 q f}{2R}$ (3) $\frac{\mu_0 q}{2fR}$ (4) $\frac{\mu_0 q}{2\pi f R}$

Scan or tap for the full solution



Q.17 A square loop, carrying a steady current I , is placed in a horizontal plane near a long straight conductor carrying a steady current I_1 at a distance d from the conductor as shown in figure. The loop will experience [AIPMT 2011 (Mains)]



- (1) a net attractive force towards the conductor
- (2) a net repulsive force away from the conductor
- (3) a net torque acting upward perpendicular to the horizontal plane
- (4) a net torque acting downward normal to horizontal plane

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Q.18 A short bar magnet of magnetic moment 0.4 J T^{-1} is placed in a uniform magnetic field of 0.16 T . The magnet is in stable equilibrium when the potential energy is

[AIPMT 2011 (Mains)]

- (1) 0.064 J
- (2) -0.064 J
- (3) zero
- (4) -0.082 J

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Q.19 The r.m.s. value of potential difference V shown in the figure is

[AIPMT 2011 (Mains)]



- (1) $\frac{V_0}{\sqrt{3}}$
- (2) V_0
- (3) $\frac{V_0}{\sqrt{2}}$
- (4) $\frac{V_0}{2}$

Scan or tap for the full solution



Q.20 A coil has resistance 30 ohm and inductive reactance 20 ohm at 50 Hz frequency. If an ac source, of 200 volt , 100 Hz , is connected across the coil, the current in the coil will be

[AIPMT 2011 (Mains)]

- (1) 2.0 A
- (2) 4.0 A
- (3) 8.0 A
- (4) $\frac{20}{\sqrt{13}} \text{ A}$

Scan or tap for the full solution



Q.21 A thin prism of angle 15° made of glass of refractive index $\mu_1 = 1.5$ is combined with another prism of glass of refractive index $\mu_2 = 1.75$. The combination of the prisms produces dispersion without deviation. The angle of the second prism should be

[AIPMT 2011 (Mains)]

- (1) 5°
- (2) 7°
- (3) 10°
- (4) 12°

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Q.22 A converging beam of rays is incident on a diverging lens. Having passed through the lens the rays intersect at a point 15 cm from the lens on the opposite side. If the lens is removed the point where the rays meet will move 5 cm closer to the lens. The focal length of the lens is

[AIPMT 2011 (Mains)]

- (1) 5 cm
- (2) -10 cm
- (3) 20 cm
- (4) -30 cm

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Q.23 The threshold frequency for a photosensitive metal is $3.3 \times 10^{14} \text{ Hz}$. If light of frequency $8.2 \times 10^{14} \text{ Hz}$ is incident on this metal, the cut-off voltage for the photoelectron emission is nearly

[AIPMT 2011 (Mains)]

- (1) 1 V
- (2) 2 V
- (3) 3 V
- (4) 5 V

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Q.24 An electron in the hydrogen atom jumps from excited state n to the ground state. The wavelength so emitted illuminates a photosensitive material having work function 2.75 eV . If the stopping potential of the photoelectron is 10 V , then the value of n is

[AIPMT 2011 (Mains)]

- (1) 2
- (2) 3
- (3) 4
- (4) 5

Scan or tap for the full solution



Q.25 Out of the following which one is not a possible energy for a photon to be emitted by hydrogen atom according to Bohr's atomic model?

[AIPMT 2011 (Mains)]

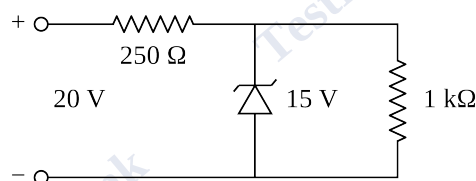
- (1) 0.65 eV
- (2) 1.9 eV
- (3) 11.1 eV
- (4) 13.6 eV

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Q.26 A Zener diode, having breakdown voltage equal to 15 V , is used in a voltage regulator circuit shown in figure. The current through the diode is

[AIPMT 2011 (Mains)]



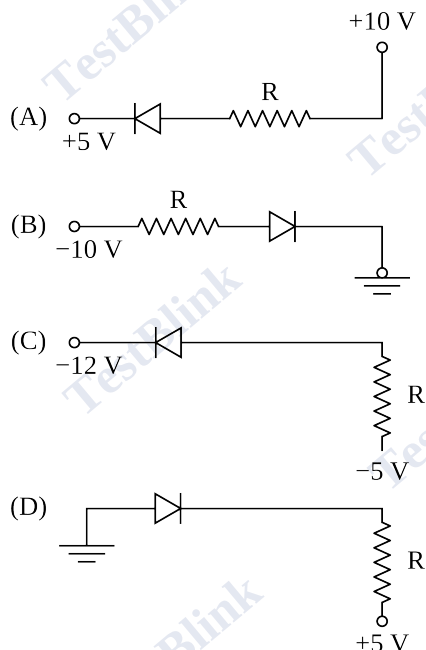
- (1) 5 mA
- (2) 10 mA
- (3) 15 mA
- (4) 20 mA

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Q.27 In the following figure, the diodes which are forward biased, are

[AIPMT 2011 (Mains)]



- (1) (A), (B) and (D) (2) (C) only
(3) (C) and (A) (4) (B) and (D)

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Q.28 Pure Si at 500 K has equal number of electron (n_e) and hole (n_h) concentrations of $1.5 \times 10^{16} \text{ m}^{-3}$. Doping by indium increases n_h to $4.5 \times 10^{22} \text{ m}^{-3}$. The doped semiconductor is of

[AIPMT 2011 (Mains)]

- (1) p-type having electron concentration $n_e = 5 \times 10^9 \text{ m}^{-3}$
(2) n-type with electron concentration $n_e = 5 \times 10^{22} \text{ m}^{-3}$
(3) p-type with electron concentration $n_e = 2.5 \times 10^{10} \text{ m}^{-3}$
(4) n-type with electron concentration $n_e = 2.5 \times 10^{23} \text{ m}^{-3}$

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Q.29 A thermocouple of negligible resistance produces an e.m.f. of $40 \mu\text{V}/^\circ\text{C}$ in the linear range of temperature. A galvanometer of resistance 10 ohm whose sensitivity is $1 \mu\text{A}/\text{division}$, is employed with the thermocouple. The smallest value of temperature difference that can be detected by the system will be

[AIPMT 2011 (Mains)]

- (1) 1°C (2) 0.5°C (3) 0.1°C (4) 0.25°C

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Q.30 Which has the maximum number of molecules among the following ?

[AIPMT 2011 (Mains)]

- (1) 44 g CO_2 (2) 48 g O_3
(3) 8 g H_2 (4) 64 g SO_2

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Q.31 Two radioactive nuclei P and Q, in a given sample decay into a stable nucleus R. At time $t = 0$, the number of P species is $4N_0$ and that of Q is N_0 . Half-life of P (for conversion to R) is 1 minute whereas that of Q is 2 minutes. Initially there are no nuclei of R present in the sample. When number of nuclei of P and Q are equal, the number of nuclei of R present in the sample would be

[AIPMT 2011 (Mains)]

- (1) $2N_0$ (2) $3N_0$ (3) $\frac{9N_0}{2}$ (4) $\frac{5N_0}{2}$

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Q.32 According to the Bohr theory, which of the following transitions in the hydrogen atom will give rise to the least energetic photon ?

[AIPMT 2011 (Mains)]

- (1) $n = 6$ to $n = 1$ (2) $n = 5$ to $n = 4$
(3) $n = 6$ to $n = 5$ (4) $n = 5$ to $n = 3$

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Q.33 What is the value of electron gain enthalpy of Na^+ if IE_1 of Na = 5.1 eV?

[AIPMT 2011 (Mains)]

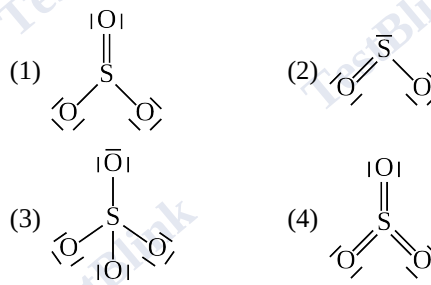
- (1) -5.1 eV (2) -10.2 eV
(3) +2.55 eV (4) +10.2 eV

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Q.34 Which of the following structures is the most preferred and hence of lowest energy for SO_3 ?

[AIPMT 2011 (Mains)]



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Q.35 Consider the following processes :

	ΔH (kJ/mol)
$\frac{1}{2}\text{A} \rightarrow \text{B}$	+150
$3\text{B} \rightarrow 2\text{C} + \text{D}$	-125
$\text{E} + \text{A} \rightarrow 2\text{D}$	+350

For $\text{B} + \text{D} \rightarrow \text{E} + 2\text{C}$, ΔH will be

[AIPMT 2011 (Mains)]

- (1) 525 kJ/mol (2) -175 kJ/mol
(3) -325 kJ/mol (4) 325 kJ/mol

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Q.36 In qualitative analysis, the metals of group I can be separated from other ions by precipitating them as chloride salts. A solution initially contains Ag^+ and Pb^{2+} at a concentration of 0.10 M. Aqueous HCl is added to this solution until the Cl^- concentration is 0.10 M. What will the concentrations of Ag^+ and Pb^{2+} be at equilibrium?

(K_{sp} for $\text{AgCl} = 1.8 \times 10^{-10}$, K_{sp} for

$\text{PbCl}_2 = 1.7 \times 10^{-5}$) [AIPMT 2011 (Mains)]

(1) $[\text{Ag}^+] = 1.8 \times 10^{-7} \text{ M}$, $[\text{Pb}^{2+}] = 1.7 \times 10^{-6} \text{ M}$

(2) $[\text{Ag}^+] = 1.8 \times 10^{-11} \text{ M}$, $[\text{Pb}^{2+}] = 8.5 \times 10^{-5} \text{ M}$

(3) $[\text{Ag}^+] = 1.8 \times 10^{-9} \text{ M}$, $[\text{Pb}^{2+}] = 1.7 \times 10^{-3} \text{ M}$

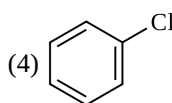
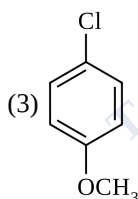
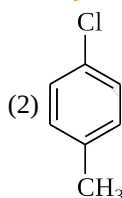
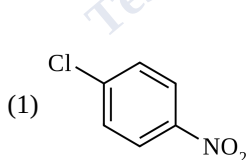
(4) $[\text{Ag}^+] = 1.8 \times 10^{-11} \text{ M}$, $[\text{Pb}^{2+}] = 1.7 \times 10^{-4} \text{ M}$

Scan or tap for the full solution



Q.37 Which of the following compounds undergoes nucleophilic substitution reaction most easily?

[AIPMT 2011 (Mains)]

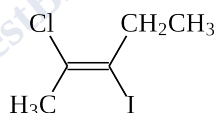


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Q.38 The IUPAC name of the following compound is

[AIPMT 2011 (Mains)]



(1) trans-2-chloro-3-iodo-2-pentene

(2) cis-3-iodo-4-chloro-3-pentene

(3) trans-3-iodo-4-chloro-3-pentene

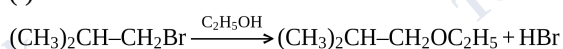
(4) cis-2-chloro-3-iodo-2-pentene

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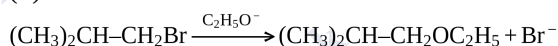


Q.39 Consider the reactions.

(i)



(ii)



The mechanisms of reactions (i) and (ii) are respectively

[AIPMT 2011 (Mains)]

(1) $\text{S}_{\text{N}}1$ and $\text{S}_{\text{N}}2$

(2) $\text{S}_{\text{N}}1$ and $\text{S}_{\text{N}}1$

(3) $\text{S}_{\text{N}}2$ and $\text{S}_{\text{N}}2$

(4) $\text{S}_{\text{N}}2$ and $\text{S}_{\text{N}}1$

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Q.40 Match the compounds given in List-I with List-II and select the suitable option using the code given below.

[AIPMT 2011 (Mains)]

List-I		List-II	
A.	Benzaldehyde	i.	Phenolphthalein
B.	Phthalic anhydride	ii.	Benzoin condensation
C.	Phenyl benzoate	iii.	Oil of wintergreen
D.	Methyl salicylate	iv.	Fries rearrangement

(1) (A)-(iv), (B)-(i), (C)-(iii), (D)-(ii)

(2) (A)-(iv), (B)-(ii), (C)-(iii), (D)-(i)

(3) (A)-(ii), (B)-(iii), (C)-(iv), (D)-(i)

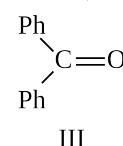
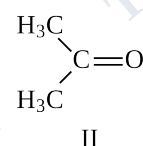
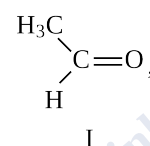
(4) (A)-(ii), (B)-(i), (C)-(iv), (D)-(iii)

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Q.41 The order of reactivity of phenyl magnesium bromide (PhMgBr) with the following compounds:

[AIPMT 2011 (Mains)]



(1) III > II > I

(2) II > I > III

(3) I > III > II

(4) I > II > III

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Q.42 An organic compound A on treatment with NH_3 gives B, which on heating gives C. C when treated with Br_2 in the presence of KOH produces ethyl amine. Compound A is

[AIPMT 2011 (Mains)]

(1) CH_3COOH

(2) $\text{CH}_3\text{CH}_2\text{CH}_2\text{COOH}$

(3) $\text{CH}_3-\text{CH}(\text{CH}_3)-\text{COOH}$

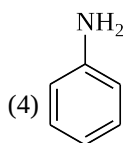
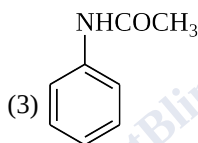
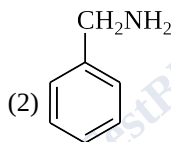
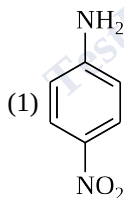
(4) $\text{CH}_3\text{CH}_2\text{COOH}$

Scan or tap for the full solution



Q.43 Which of the following compounds is most basic?

[AIPMT 2011 (Mains)]



Scan or tap for the full solution



Q.44 Which of the following is not a fat soluble vitamin?

[AIPMT 2011 (Mains)]

- (1) Vitamin B complex (2) Vitamin D
(3) Vitamin E (4) Vitamin A

Scan or tap for the full solution



Q.45 Which of the statements about "Denaturation" given below are correct?

- A. Denaturation of proteins causes loss of secondary and tertiary structures of the protein.
B. Denaturation leads to the conversion of double strand of DNA into single strand.
C. Denaturation affects primary structure which gets distorted.

[AIPMT 2011 (Mains)]

- (1) B and C (2) A and C
(3) A and B (4) A, B and C

Scan or tap for the full solution



Q.46 A 0.1 molal aqueous solution of a weak acid is 30% ionized. If K_f for water is 1.86°C/m , the freezing point of the solution will be

[AIPMT 2011 (Mains)]

- (1) -0.18°C (2) -0.54°C
(3) -0.36°C (4) -0.24°C

Scan or tap for the full solution



Q.47 200 mL of an aqueous solution of a protein contains its 1.26 g. The osmotic pressure of this solution at 300 K is found to be 2.57×10^{-3} bar. The molar mass of protein will be ($R = 0.083 \text{ L bar mol}^{-1} \text{ K}^{-1}$)

[AIPMT 2011 (Mains)]

- (1) 51022 g mol^{-1} (2) $122044 \text{ g mol}^{-1}$
(3) 31011 g mol^{-1} (4) 61038 g mol^{-1}

Scan or tap for the full solution



Q.48 A solution contains Fe^{2+} , Fe^{3+} and I^- ions. This solution was treated with iodine at 35°C . E° for $\text{Fe}^{3+}/\text{Fe}^{2+}$ is $+0.77 \text{ V}$ and E° for $\text{I}_2/2\text{I}^-$ is 0.536 V . The favourable redox reaction is

[AIPMT 2011 (Mains)]

- (1) I_2 will be reduced to I^-
(2) there will be no redox reaction
(3) I^- will be oxidised to I_2
(4) Fe^{2+} will be oxidised to Fe^{3+}

Scan or tap for the full solution



Q.49 The rate of the reaction: $2\text{N}_2\text{O}_5 \longrightarrow 4\text{NO}_2 + \text{O}_2$ can be written in three ways.

$$\frac{-d[\text{N}_2\text{O}_5]}{dt} = k[\text{N}_2\text{O}_5]$$

$$\frac{d[\text{NO}_2]}{dt} = k'[\text{N}_2\text{O}_5]; \quad \frac{d[\text{O}_2]}{dt} = k''[\text{N}_2\text{O}_5]$$

The relationship between k and k' and between k and k'' are

[AIPMT 2011 (Mains)]

- (1) $k' = 2k$; $k'' = k$ (2) $k' = 2k$; $k'' = k/2$
(3) $k' = 2k$; $k'' = 2k$ (4) $k' = k$; $k'' = k$

Scan or tap for the full solution



Q.50 The unit of rate constant for a zero order reaction is

[AIPMT 2011 (Mains)]

- (1) $\text{mol L}^{-1} \text{ s}^{-1}$ (2) $\text{L mol}^{-1} \text{ s}^{-1}$
(3) $\text{L}^2 \text{ mol}^{-2} \text{ s}^{-1}$ (4) s^{-1}

Scan or tap for the full solution



Q.51 The half-life of a substance in a certain enzyme-catalysed reaction is 138 s. The time required for the concentration of the substance to fall from 1.28 mg L^{-1} to 0.04 mg L^{-1} is

[AIPMT 2011 (Mains)]

- (1) 414 s (2) 552 s (3) 690 s (4) 276 s

Scan or tap for the full solution



Q.52 Which of the following statements is incorrect?

[AIPMT 2011 (Mains)]

- (1) Pure sodium metal dissolves in liquid ammonia to give blue solution.
(2) NaOH reacts with glass to give sodium silicate.
(3) Aluminium reacts with excess NaOH to give $\text{Al}(\text{OH})_3$.
(4) NaHCO_3 on heating gives Na_2CO_3 .

Scan or tap for the full solution



Q.53 Which of the following oxide is amphoteric?

[AIPMT 2011 (Mains)]

- (1) SnO_2 (2) CaO (3) SiO_2 (4) CO_2

Scan or tap for the full solution



Q.54 The pairs of species of oxygen and their magnetic behaviours are noted below. Which of the following presents the correct description?

[AIPMT 2011 (Mains)]

- (1) O_2^- , O_2^{2-} (2) O_2^+ , O_2
 – Both diamagnetic – Both paramagnetic
 (3) O , O_2^{2-} (4) O^+ , O_2^{2-}
 – Both paramagnetic – Both paramagnetic

Scan or tap for the full solution



Q.55 Which of the following carbonyls will have the strongest C–O bond? [AIPMT 2011 (Mains)]

- (1) $Cr(CO)_6$ (2) $Fe(CO)_5$
 (3) $[Mn(CO)_6]^+$ (4) $[V(CO)_6]^-$

Scan or tap for the full solution



Q.56 Which of the following complex compounds will exhibit highest paramagnetic behaviour? (At. No. Ti = 22, Cr = 24, Co = 27, Zn = 30)

[AIPMT 2011 (Mains)]

- (1) $[Cr(NH_3)_6]^{3+}$ (2) $[Co(NH_3)_6]^{3+}$
 (3) $[Zn(NH_3)_6]^{2+}$ (4) $[Ti(NH_3)_6]^{3+}$

Scan or tap for the full solution



Q.57 A bubble of air is underwater at temperature $15^\circ C$ and the pressure 1.5 bar. If the bubble rises to the surface where the temperature is $25^\circ C$ and the pressure is 1.0 bar, what will happen to the volume of the bubble? [AIPMT 2011 (Mains)]

- (1) Volume will become greater by a factor of 1.6.
 (2) Volume will become greater by a factor of 1.1.
 (3) Volume will become smaller by a factor of 0.70.
 (4) Volume will become greater by a factor of 2.5.

Scan or tap for the full solution



Q.58 Match List-I with List-II for the compositions of substances and select the correct answer using the codes given below. [AIPMT 2011 (Mains)]

List-I (Substances)		List-II (Composition)	
A.	Plaster of Paris	i.	$CaSO_4 \cdot 2H_2O$
B.	Epsomite	ii.	$CaSO_4 \cdot \frac{1}{2}H_2O$
C.	Kieserite	iii.	$MgSO_4 \cdot 7H_2O$
D.	Gypsum	iv.	$MgSO_4 \cdot H_2O$
		v.	$CaSO_4$

- (1) (A)-(iii), (B)-(iv), (C)-(i), (D)-(ii)
 (2) (A)-(ii), (B)-(iii), (C)-(iv), (D)-(i)
 (3) (A)-(i), (B)-(ii), (C)-(iii), (D)-(iv)
 (4) (A)-(iv), (B)-(iii), (C)-(ii), (D)-(i)

Scan or tap for the full solution



Q.59 A solid compound XY has NaCl structure. If the radius of the cation is 100 pm, the radius of the anion (Y^-) will be [AIPMT 2011 (Mains)]

- (1) 275.1 pm (2) 322.5 pm
 (3) 241.5 pm (4) 165.7 pm

Scan or tap for the full solution



Q.60 The following reactions take place in the blast furnace in the preparation of impure iron. Identify the reaction pertaining to the formation of the slag. [AIPMT 2011 (Mains)]

- (1) $Fe_2O_{3(s)} + 3CO_{(g)} \longrightarrow 2Fe_{(l)} + 3CO_{2(g)}$
 (2) $CaCO_{3(s)} \longrightarrow CaO_{(s)} + CO_{2(g)}$
 (3) $CaO_{(s)} + SiO_{2(s)} \longrightarrow CaSiO_{3(s)}$
 (4) $2C_{(s)} + O_{2(g)} \longrightarrow 2CO_{(g)}$

Scan or tap for the full solution



Q.61 Which one of the following aspects is an exclusive characteristic of living things? [AIPMT 2011 (Mains)]

- (1) Isolated metabolic reactions occur *in vitro*
 (2) Increase in mass from inside only
 (3) Perception of events happening in the environment and their memory.
 (4) Increase in mass by accumulation of material both on surface as well as internally.

Scan or tap for the full solution



Q.62 The pathogen *Microsporium* responsible for ringworm disease in humans belongs to the same kingdom of organisms as that of [AIPMT 2011 (Mains)]

- (1) *Taenia*, a tapeworm
 (2) *Wuchereria*, a filarial worm
 (3) *Rhizopus*, a mould
 (4) *Ascaris*, a round worm.

Scan or tap for the full solution



Q.63 *Selaginella* and *Salvinia* are considered to represent a significant step toward evolution of seed habit because [AIPMT 2011 (Mains)]

- (1) female gametophyte is free and gets dispersed like seeds.
 (2) female gametophyte lacks archegonia.
 (3) megaspores possess endosperm and embryo surrounded by seed coat.
 (4) embryo develops in female gametophyte which is retained on parent sporophyte.

Scan or tap for the full solution



Q.64 Consider the following four statements whether they are correct or wrong.

The two wrong statements together are

- A. The sporophyte in liverworts is more elaborate than that in mosses.
 B. *Salvinia* is heterosporous.
 C. The life-cycle in all seed-bearing plants is diplontic.
 D. In *Pinus* male and female cones are borne on different trees. [AIPMT 2011 (Mains)]

(1) A and C (2) A and D (3) B and C (4) A and B.

Scan or tap for the full solution



Q.65 Which one of the following pairs is wrongly matched while the remaining three are correct?

[AIPMT 2011 (Mains)]

- (1) *Penicillium* – conidia
 (2) Water hyacinth – runner
 (3) *Bryophyllum* – leaf buds
 (4) *Agave* – bulbils

Scan or tap for the full solution



Q.66 Whorled, simple leaves with reticulate venation are present in

[AIPMT 2011 (Mains)]

- (1) *Calotropis* (2) neem
 (3) China rose (4) *Alstonia*.

Scan or tap for the full solution



Q.67 Sweet potato is homologous to

[AIPMT 2011 (Mains)]

- (1) potato (2) *Colocasia*
 (3) ginger (4) turnip.

Scan or tap for the full solution



Q.68 At metaphase, chromosomes are attached to the spindle fibres by their

[AIPMT 2011 (Mains)]

- (1) satellites
 (2) secondary constrictions
 (3) kinetochores
 (4) centromeres.

Scan or tap for the full solution



Q.69 In Kranz anatomy, the bundle sheath cells have

[AIPMT 2011 (Mains)]

- (1) thin walls, many intercellular spaces and no chloroplasts
 (2) thick walls, no intercellular spaces and large number of chloroplasts
 (3) thin walls, no intercellular spaces and several chloroplasts
 (4) thick walls, many intercellular spaces and few chloroplasts.

Scan or tap for the full solution



Q.70 In mitochondria, protons accumulate in the

[AIPMT 2011 (Mains)]

- (1) outer membrane (2) inner membrane
 (3) intermembrane space (4) matrix

Scan or tap for the full solution



Q.71 In angiosperms, functional megaspore develops into

[AIPMT 2011 (Mains)]

- (1) embryo sac (2) ovule
 (3) endosperm (4) pollen sac.

Scan or tap for the full solution



Q.72 What is common between vegetative reproduction and apomixis?

[AIPMT 2011 (Mains)]

- (1) Both are applicable to only dicot plants
 (2) Both bypass the flowering phase
 (3) Both occur round the year
 (4) Both produce progeny identical to the parent.

Scan or tap for the full solution



Q.73 Which one of the following conditions of the zygotic cell would lead to the birth of a normal human female child?

[AIPMT 2011 (Mains)]

- (1) only one Y chromosome
 (2) only one X chromosome
 (3) one X and one Y chromosome
 (4) two X chromosomes

Scan or tap for the full solution



Q.74 Test cross in plants or in *Drosophila* involves crossing:

[AIPMT 2011 (Mains)]

- (1) the F_1 hybrid with a double recessive genotype
 (2) between two genotypes with dominant trait
 (3) between two F_1 hybrids
 (4) between two genotypes with recessive trait

Scan or tap for the full solution



Q.75 The unequivocal proof of DNA as the genetic material came from the studies on a:

[AIPMT 2011 (Mains)]

- (1) Viroid (2) Bacterium
(3) Fungus (4) Bacterial virus

Scan or tap for the full solution



Q.76 Read the following statement having two blanks (A and B):
“A drug used for _____ (A) _____ patients is obtained from a species of the organism _____ (B) _____.”

The one correct option for the two blanks is:

[AIPMT 2011 (Mains)]

- (1) A → Organ-transplant, B → *Trichoderma*
(2) A → AIDS, B → *Pseudomonas*
(3) A → Swine flu, B → *Monascus*
(4) A → Heart, B → *Penicillium*

Scan or tap for the full solution



Q.77 Consider the following statements (A-D) about organic farming. Which of these statements are correct?

- A. Utilizes genetically modified crops like Bt cotton
B. Uses only naturally produced inputs like compost
C. Does not use pesticides and urea
D. Produces vegetables rich in vitamins and minerals

[AIPMT 2011 (Mains)]

- (1) (B) and (C) only (2) (B), (C) and (D)
(3) (C) and (D) only (4) (A) and (B) only

Scan or tap for the full solution



Q.78 Which one of the following is a wrong matching of a microbe and its industrial product, while the remaining three are correct? [AIPMT 2011 (Mains)]

- (1) *Acetobacter aceti* – acetic acid
(2) *Clostridium butylicum* – lactic acid
(3) *Aspergillus niger* – citric acid
(4) Yeast – statins

Scan or tap for the full solution



Q.79 The logistic population growth is expressed by the equation: [AIPMT 2011 (Mains)]

- (1) $\frac{dN}{dt} = Nr \left(\frac{K-N}{K} \right)$ (2) $\frac{dN}{dt} = rN \left(\frac{K-N}{K} \right)$
(3) $\frac{dN}{dt} = rN \left(\frac{N-K}{N} \right)$ (4) $\frac{dN}{dt} = rN$

Scan or tap for the full solution



Q.80 Which one of the following animals may occupy more than one trophic level in the same ecosystem at the same time? [AIPMT 2011 (Mains)]

- (1) Lion (2) Frog (3) Goat (4) Sparrow

Scan or tap for the full solution



Q.81 Both, hydrarch and xerarch successions lead to:

[AIPMT 2011 (Mains)]

- (1) Xeric conditions
(2) Excessive wet conditions
(3) Highly dry conditions
(4) Medium water conditions

Scan or tap for the full solution



Q.82 The breakdown of detritus into smaller particles by earthworm is a process called [AIPMT 2011 (Mains)]

- (1) Fragmentation (2) Catabolism
(3) Mineralisation (4) Humification

Scan or tap for the full solution



Q.83 Consider the following statements (A)-(D) each with one or two blanks :

- (A) Bears go into _____ (1) _____ during winter to _____ (2) _____ cold weather.
(B) A conical age pyramid with a broad base represents _____ (3) _____ human population.
(C) A wasp pollinating a fig flower is an example of _____ (4) _____.
(D) An area with high levels of species richness is known as _____ (5) _____.

Which of the following options gives the correct fill ups for the respective blank numbers from (1) to (5) in the statements ? [AIPMT 2011 (Mains)]

- (1) (1) - aestivation, (2) - escape, (3) - stable, (4) - mutualism
(2) (3) - expanding, (4) - commensalism, (5) - biodiversity park
(3) (1) - hibernation, (2) - escape, (3) - expanding, (5) - hot spot
(4) (3) - stable, (4) - commensalism, (5) - marsh

Scan or tap for the full solution



Q.84 Biodiversity of a geographical region represents :

[AIPMT 2011 (Mains)]

- (1) The diversity in the organisms living in the region
(2) Species endemic to the region
(3) Genetic diversity present in the dominant species of the region
(4) Endangered species found in the region

Scan or tap for the full solution



Q.85 Some vascular bundles are described as open because these : [AIPMT 2011 (Mains)]

- (1) are capable of producing secondary xylem and phloem
- (2) are not surrounded by pericycle
- (3) possess conjunctive tissue between xylem and phloem
- (4) are surrounded by pericycle but no endodermis

Scan or tap for the full solution



Q.86 Function of companion cells is :

[AIPMT 2011 (Mains)]

- (1) Providing water to phloem
- (2) Loading of sucrose into sieve elements
- (3) Loading of sucrose into sieve elements by passive transport
- (4) Providing energy to sieve elements for active transport

Scan or tap for the full solution



Q.87 Which one of the following is not considered as a part of the endomembrane system ?

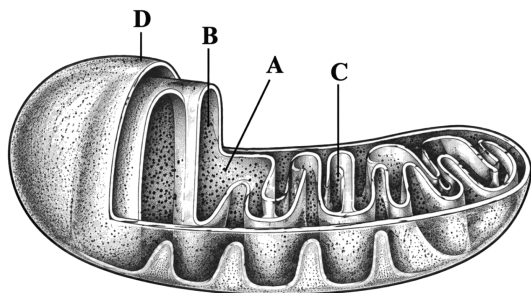
[AIPMT 2011 (Mains)]

- | | |
|-------------------|----------------|
| (1) Vacuole | (2) Lysosome |
| (3) Golgi complex | (4) Peroxisome |

Scan or tap for the full solution



Q.88 The figure below shows the structure of a mitochondrion with its four parts labelled (A), (B), (C) and (D). Select the part correctly matched with its function. [AIPMT 2011 (Mains)]

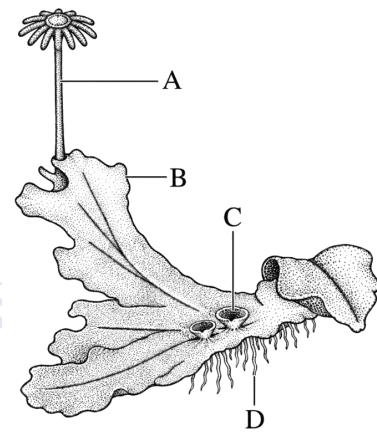


- (1) Part (B) : Inner membrane – forms infoldings called cristae
- (2) Part (C) : Cristae – possess single circular DNA molecule and ribosomes
- (3) Part (A) : Matrix – major site for respiratory chain enzymes
- (4) Part (D) : Outer membrane – gives rise to inner membrane by splitting

Scan or tap for the full solution



Q.89 Examine the figure given below and select the correct option giving all the four parts (A, B, C and D) rightly identified. [AIPMT 2011 (Mains)]

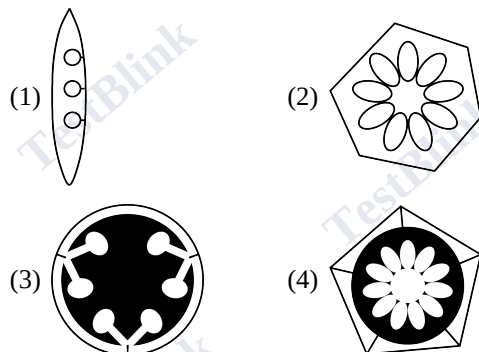


- (1) (A) Archegoniophore
(B) Female thallus
(C) Gemma cup
(D) Rhizoids
- (2) (A) Antheridiophore
(B) Male thallus
(C) Globule
(D) Roots
- (3) (A) Archegoniophore
(B) Female thallus
(C) Bud
(D) Foot
- (4) (A) Seta
(B) Sporophyte
(C) Protonema
(D) Rhizoids

Scan or tap for the full solution



Q.90 Which one of the following figures represents the placentation in *Dianthus*? [AIPMT 2011 (Mains)]



Scan or tap for the full solution



Q.91 Which one of the following is essential for photolysis of water? [AIPMT 2011 (Mains)]

- | | |
|------------|---------------|
| (1) Copper | (2) Manganese |
| (3) Boron | (4) Zinc |

Scan or tap for the full solution



- Q.92** Guttation is the result of [AIPMT 2011 (Mains)]
 (1) diffusion (2) transpiration
 (3) osmosis (4) root pressure

Scan or tap for the full solution



- Q.93** Which one of the following is not an essential mineral element for plants while the remaining three are? [AIPMT 2011 (Mains)]
 (1) Iron (2) Manganese
 (3) Cadmium (4) Phosphorus

Scan or tap for the full solution



- Q.94** "Good ozone" is found in the [AIPMT 2011 (Mains)]
 (1) Troposphere (2) Ionosphere
 (3) Stratosphere (4) Mesosphere

Scan or tap for the full solution



- Q.95** Which one of the following statements is totally wrong about the occurrence of notochord, while the other three are correct? [AIPMT 2011 (Mains)]
 (1) It is present only in larval tail in ascidian.
 (2) It is replaced by a vertebral column in adult frog.
 (3) It is absent throughout life in humans from the very beginning.
 (4) It is present throughout life in *Amphioxus*.

Scan or tap for the full solution



- Q.96** Consider the following four statements (A–D) related to the common frog *Rana tigrina*, and select the correct option stating which ones are true (T) and which ones are false (F). Statements:
 A. On dry land it would die due to lack of O_2 if its mouth is forcibly kept closed for a few days.
 B. It has four-chambered heart.
 C. On dry land it turns uricotelic from ureotelic.
 D. Its life-history is carried out in pond water.

[AIPMT 2011 (Mains)]

- (1) A-T, B-F, C-F, D-T (2) A-T, B-T, C-F, D-F
 (3) A-F, B-F, C-T, D-T (4) A-F, B-T, C-T, D-F

Scan or tap for the full solution



- Q.97** Ureters act as urinogenital ducts in [AIPMT 2011 (Mains)]
 (1) human males
 (2) human females
 (3) both male and female frogs
 (4) male frogs

Scan or tap for the full solution



- Q.98** Which one of the following is a possibility for most of us in regard to breathing, by making a conscious effort? [AIPMT 2011 (Mains)]

- (1) One can breathe out air totally without oxygen.
 (2) One can breathe out air through Eustachian tube by closing both nose and mouth.
 (3) One can consciously breathe in and breathe out by moving the diaphragm alone, without moving the ribs at all.
 (4) The lungs can be made fully empty by forcefully breathing out all air from them.

Scan or tap for the full solution



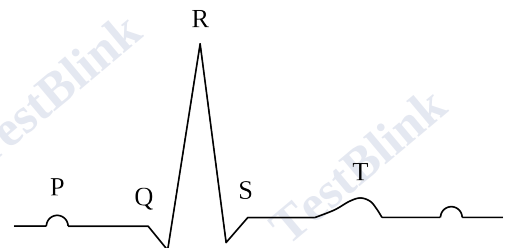
- Q.99** Bulk of carbon dioxide (CO_2) released from body tissues into the blood is present as [AIPMT 2011 (Mains)]

- (1) bicarbonate in blood plasma and RBCs
 (2) free CO_2 in blood plasma
 (3) 70% carbamino-haemoglobin and 30% as bicarbonate
 (4) carbamino-haemoglobin in RBCs.

Scan or tap for the full solution



- Q.100** Given below is the ECG of a normal human. Which one of its components is correctly interpreted below? [AIPMT 2011 (Mains)]



- (1) Complex QRS - one complete pulse
 (2) Peak T - initiation of total cardiac contraction
 (3) Peak P and peak R together - systolic and diastolic blood pressures
 (4) Peak P - initiation of left atrial contraction only

Scan or tap for the full solution



- Q.101** Uricotelic mode of excreting nitrogenous wastes is found in [AIPMT 2011 (Mains)]

- (1) reptiles and birds
 (2) birds and annelids
 (3) amphibians and reptiles
 (4) insects and amphibians.

Scan or tap for the full solution



- Q.102** The type of muscles present in our [AIPMT 2011 (Mains)]

- (1) heart is involuntary and unstriated smooth muscles
- (2) intestine is striated and involuntary
- (3) thigh is striated and voluntary
- (4) upper arm is smooth muscle and fusiform in shape.

Scan or tap for the full solution



Q.103 The 24 hour (diurnal) rhythm of our body such as the sleep-wake cycle is regulated by the hormone

[AIPMT 2011 (Mains)]

- (1) calcitonin
- (2) prolactin
- (3) adrenaline
- (4) melatonin

Scan or tap for the full solution



Q.104 What happens during fertilization in humans after many sperms reach close to the ovum?

[AIPMT 2011 (Mains)]

- (1) Only two sperms nearest the ovum penetrate zona pellucida
- (2) Secretions of acrosome help one sperm enter cytoplasm of ovum through zona pellucida
- (3) All sperms except the one nearest to the ovum lose their tails
- (4) Cells of corona radiata trap all the sperms except one.

Scan or tap for the full solution



Q.105 About which day in a normal human menstrual cycle does rapid secretion of LH (popularly called LH-surge) normally occur?

[AIPMT 2011 (Mains)]

- (1) 11th day
- (2) 14th day
- (3) 20th day
- (4) 5th day

Scan or tap for the full solution



Q.106 The technique called gamete intrafallopian transfer (GIFT) is recommended for those females:

[AIPMT 2011 (Mains)]

- (1) who cannot produce an ovum
- (2) who cannot retain the foetus inside uterus
- (3) who cannot provide suitable environment for fertilisation
- (4) whose cervical canal is too narrow to allow passage for the sperms

Scan or tap for the full solution



Q.107 Which one of the following options gives the correct matching of a disease with its causative organism and mode of infection?

[AIPMT 2011 (Mains)]

- (1) Disease → Pneumonia, Causative Organism → *Streptococcus pneumoniae*, Mode of Infection → Droplet infection
- (2) Disease → Malaria, Causative Organism → *Plasmodium vivax*, Mode of Infection → Bite of male *Anopheles* mosquito
- (3) Disease → Elephantiasis, Causative Organism → *Wuchereria bancrofti*, Mode of Infection → With infected water and food
- (4) Disease → Typhoid, Causative Organism → *Salmonella typhi*, Mode of Infection → With inspired air

Scan or tap for the full solution



Q.108 Common cold is not cured by antibiotics because it is:

[AIPMT 2011 (Mains)]

- (1) caused by a Gram-positive bacterium
- (2) caused by a Gram-negative bacterium
- (3) not an infectious disease
- (4) caused by a virus

Scan or tap for the full solution



Q.109 Which one of the following techniques made it possible to genetically engineer living organisms?

[AIPMT 2011 (Mains)]

- (1) Recombinant DNA techniques
- (2) X-ray diffraction
- (3) Heavier isotope labeling
- (4) Hybridization

Scan or tap for the full solution



Q.110 *Bacillus thuringiensis* forms protein crystals which contain insecticidal protein. This protein:

[AIPMT 2011 (Mains)]

- (1) is activated by acid pH of the foregut of the insect pest.
- (2) binds with epithelial cells of midgut of the insect pest ultimately killing it
- (3) is coded by several genes including the gene cry
- (4) does not kill the carrier bacterium which is itself resistant to this toxin

Scan or tap for the full solution



Q.111 Silencing of mRNA has been used in producing transgenic plants resistant to:

[AIPMT 2011 (Mains)]

- (1) White rusts
- (2) Nematodes
- (3) Bacterial blights
- (4) Bollworms

Scan or tap for the full solution



Q.112 Read the following four statements (A-D) with certain mistakes in two of them. Which are the two statements having mistakes?

- A. The first transgenic buffalo, Rosie produced milk which was human alpha-lactalbumin enriched.
- B. Restriction enzymes are used in isolation of DNA from other macro-molecules
- C. Downstream processing is one of the steps of R-DNA technology
- D. Disarmed pathogen vectors are also used in transfer of R-DNA into the host

[AIPMT 2011 (Mains)]

- (1) Statements (B) and (C)
- (2) Statements (A) and (C)
- (3) Statements (A) and (B)
- (4) Statements (C) and (D)

Scan or tap for the full solution



Q.113 Frogs differ from humans in possessing :

[AIPMT 2011 (Mains)]

- (1) hepatic portal system
- (2) paired cerebral hemispheres
- (3) nucleated red blood cells
- (4) thyroid as well as parathyroid

Scan or tap for the full solution



Q.114 The cells lining the blood vessels belong to the category of :

[AIPMT 2011 (Mains)]

- (1) Squamous epithelium
- (2) Columnar epithelium
- (3) Connective tissue
- (4) Smooth muscle tissue

Scan or tap for the full solution



Q.115 Which one of the following structures in *Pheretima* is correctly matched with its function ?

[AIPMT 2011 (Mains)]

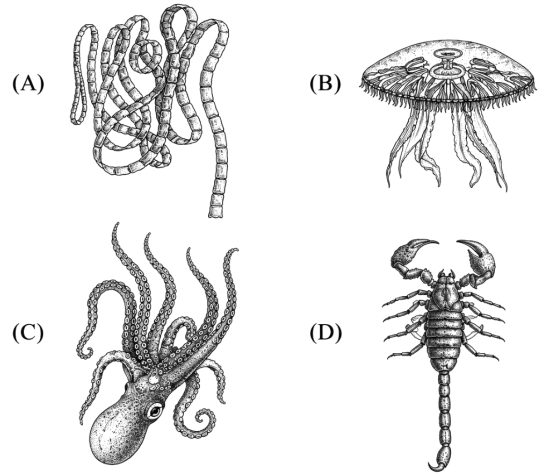
- (1) Gizzard - absorbs digested food
- (2) Setae - defence against predators
- (3) Typhlosole - storage of extra nutrients
- (4) Clitellum - secretes cocoon

Scan or tap for the full solution



Q.116 The figures (A – D) show four animals. Select the correct option with respect to a common characteristic of two of these animals.

[AIPMT 2011 (Mains)]



- (1) (A) and (B) have cnidoblasts for self-defence
- (2) (A) and (D) respire mainly through body wall
- (3) (C) and (D) have a true coelom
- (4) (B) and (C) show radial symmetry

Scan or tap for the full solution



Q.117 One of the constituents of the pancreatic juice which is poured into the duodenum in humans is

[AIPMT 2011 (Mains)]

- (1) trypsinogen
- (2) chymotrypsin
- (3) trypsin
- (4) enterokinase

Scan or tap for the full solution



Q.118 Which one of the following correctly represents the normal adult human dental formula?

[AIPMT 2011 (Mains)]

- (1) $\frac{3}{3}, \frac{1}{1}, \frac{3}{2}, \frac{1}{1}$
- (2) $\frac{2}{2}, \frac{1}{1}, \frac{3}{2}, \frac{3}{3}$
- (3) $\frac{2}{2}, \frac{1}{1}, \frac{2}{2}, \frac{3}{3}$
- (4) $\frac{3}{3}, \frac{1}{1}, \frac{3}{3}, \frac{3}{3}$

Scan or tap for the full solution



ANSWER KEY

Ques.	1	2	3	4	5	6	7
Ans.	3	3	3	1	2	4	2
Ques.	8	9	10	11	12	13	14
Ans.	3	4	3	2	4	1	1
Ques.	15	16	17	18	19	20	21
Ans.	4	2	1	2	3	2	3
Ques.	22	23	24	25	26	27	28
Ans.	4	2	3	3	1	3	1
Ques.	29	30	31	32	33	34	35
Ans.	4	3	3	3	1	4	2
Ques.	36	37	38	39	40	41	42
Ans.	3	1	1	1	4	4	4
Ques.	43	44	45	46	47	48	49
Ans.	2	1	3	4	4	3	2
Ques.	50	51	52	53	54	55	56
Ans.	1	3	3	1	2	3	1

Ques.	57	58	59	60	61	62	63
Ans.	1	2	3	3	3	3	4
Ques.	64	65	66	67	68	69	70
Ans.	2	2	4	4	3	2	3
Ques.	71	72	73	74	75	76	77
Ans.	1	4	4	1	4	1	2
Ques.	78	79	80	81	82	83	84
Ans.	2	2	4	4	1	3	1
Ques.	85	86	87	88	89	90	91
Ans.	1	2	4	1	1	4	2
Ques.	92	93	94	95	96	97	98
Ans.	4	3	3	3	1	4	3
Ques.	99	100	101	102	103	104	105
Ans.	1	1	1	3	4	2	2
Ques.	106	107	108	109	110	111	112
Ans.	1	1	4	1	2	2	3
Ques.	113	114	115	116	117	118	
Ans.	3	1	4	3	1	3	