प्रा. मोटेगावकर सरांचे

RCC™

NEET : 2022 | **PCB Test : 3** | **Time : 03 Hours**

Question Booklet Version	Roll Number	Question Booklet Sr. No.
11 (Write this number on your Answer Sheet)	0	

This is to certify that, the entries of RCC-2022 Roll No. and Answer Sheet No. have been correctly written and verified.

Candidate's Signature

Invigilator's Signature

NTA UPDATED QUESTION PAPER PATTERN

Sr. No.	Subject(s)	Section(s)	No. Of Question(s)	Mark(s)* *(Each Question Carries 04 (Four Marks))	Type Of Question(s)
1.	PHYSICS	SECTION A	35	140	MCQ (Multiple Choice Questions)
		SECTION B	15	40	
2.	CHEMISTRY	SECTION A	35	140	
		SECTION B	15	40	
3.	BOTONY	SECTION A	35	140	
		SECTION B	15	40	
4.	ZOOLOGY	SECTION A	35	140	
		SECTION B	15	40	
		TOTAL MARKS		720	

Note: ■ Correct option marked will be given (4) Marks and incorrect option marked will be minus one (-1) mark. Unattempted/Unonswered Questions will be given no marks.

■ Section B will have 15 questions, out of these 15 Questions, candidates can choose to attempt any10 Questions.

• *Test Syllabus* •

Physics : (11^{th} + 12^{th}) Complete Syllabus

Chemistry : (11^{th} + 12^{th}) Complete Syllabus

Biology : (11^{th} + 12^{th}) Complete Syllabus

Section 'A' : Physics

Section 'A'

1. The pressure P exerted by a liquid is given by $P = ax + \frac{b}{c+t^2}$, where x is distance, t is time ; a, b, c are arbitrary constants. The dimensions of a, b, c are respectively

1) $ML^{-2}T^{-2}$; ML^{-1} ; T^2
2) $ML^{-1}T^{-2}$; T^2 ; L^2
3) ML^{-2-2} ; MT^{-2} ; ML^{-1}
4) MT^{-2} ; L^2 ; T^2

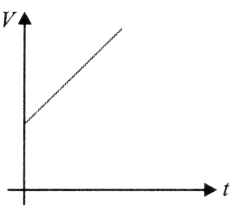
Sol. (1) : $ax = P,\ a = \frac{P}{x} = \frac{ML^{-1}T^{-2}}{L} = \mathbf{ML^{-2}\,T^{-2}}$

$$c = t^2 = \mathbf{T^2}\ ;\ \frac{b}{T^2} = P$$

or $b = PT^2 = ML^{-1}\,T^{-2} \times T^2 = \mathbf{ML^{-1}}$

2. A body moves with uniform acceleration, then which of the following graphs is correct?

1)



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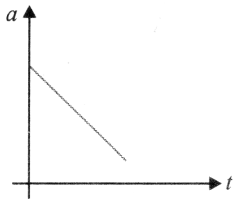

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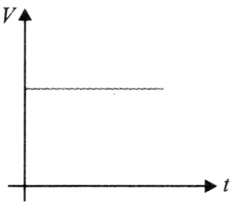
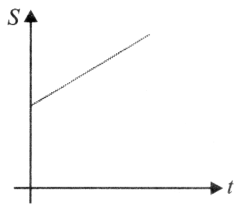


4)



Sol. (1) : For a uniformly accelerated motion, the relation between velocity and time t is

$v = u + at$, i.e. $v \propto t$

3. A rocket of initial mass 6000 kg ejects gases at a constant rate of 16 kg/s with constant relative speed of 11 km/s. What is acceleration of rocket one minute after the blast?

1) 25 m/s^2 2) 50 m/s^2
3) 10 m/s^2 4) 35 m/s^2

Sol. (4) : Acceleration, $a = \frac{F}{m} = \frac{u\,(dm/dt)}{\left(M - \frac{dm}{dt} \times t\right)}$

Here, $M = 6000$ kg ; $\frac{dm}{dt} = 16\,\text{kg/s}$

$u = 11$ km/s $= 11 \times 10^3$ m/s ; $t = 60$ s ;

Calculate $a = \mathbf{35\ m/s^2}$

4. The maximum velocity (in ms^{-1}) with which a car driver must traverse a flat curve of radius 150 m and coefficient of friction 0.6 to avoid skidding is

1) 60 2) 25
3) 15 4) 30

Sol. (4) : $r = 150$ m, $\mu = 0{\cdot}6$, $v = ?$

As force of friction provides the necessary centripetal force,

therefore, $F = \mu R = \mu mg = \frac{mv^2}{r}$

$$v = \sqrt{\mu r g} = \sqrt{0{\cdot}6 \times 150 \times 9{\cdot}8} = \mathbf{29{\cdot}7\ m/s}$$

5. A block of mass 2 kg is pulled by a force $F = 40$ N upwards through a height of 2 m. Find the work done on the block by the applied force F and by its weight mg. Take g = 10 m/s^2.

1) 80 J, –40 J 2) Zero, 0.25 J
3) 40 J, 35 J 4) 80 J , –45 J

Sol. (1) : Here, $m = 2$ kg $F = 40$ N, $h = 2$m

work done by applied force $= F \times h \cos 0°$

$= 40 \times 2 \times 1 = 80$ J

Work done by the weight $= mg \times h \cos 180°$

$= 2 \times 10 \times 2(-1) = -40$ J

6. A particle is moving along a circular path. The angular velocity $\vec{\omega}$, linear velocity $\vec{v}$ angular acceleration $\vec{\alpha}$ and centripetal acceleration $\vec{a}_c$ at any instant are related as follows. Which of the following relations is not correct?

1) $\vec{\omega} \perp \vec{v}$ 2) $\vec{\omega} \perp \vec{\alpha}$
3) $\vec{\omega} \perp \vec{a}_c$ 4) $\vec{v} \perp \vec{a}_c$

Sol. (2) : Angular velocity $\vec{\omega}$ is not perpendicular to angular acceleration $\vec{\alpha}$

7. The mass of an electron is 9×10^{-31} kg. It revolves around the nucleus of an atom in a circular orbit of 4.0 Å, with a speed of 6×10^6 m/s. The angular momentum of electron is

1) 2.16×10^{-33} kg m^2 / s
2) 2×10^{-35} kg m^2 / s
3) 3×10^{-33} kg m^2 / s
4) 3×10^{-35} kg m^2 / s

Sol. (1) : Here, $m = 9 \times 10^{-31}$ kg , $r = 4{\cdot}0$ Å $= 4 \times 10^{-10}$ m,

$v = 6 \times 10^6$ m/s, $L = ?$

$L = m\,v\,r = 9 \times 10^{-31} \times 6 \times 10^6 \times 4 \times 10^{-10}$

$= \mathbf{2{\cdot}16 \times 10^{-33}\ kg\ m^2\ s^{-1}}$

8. A stationary bomb explodes into three pieces. One piece of 2 kg mass moves with a velocity of 8 m/s at right angles to the other piece of mass 1 kg moving with a velocity of 12 ms^{-1}. If mass of third piece is 0.5 kg, then its velocity is

1) 10 m/s 2) 20 m/s
3) 30 m/s 4) 40 m/s

Sol. (4) : Here,

$m_1 = 2$ kg, $v_1 = 8$ m/s ; $m_2 = 1$ kg, $v_2 = 12$ m/s
$m_3 = 0{\cdot}5$ kg, $v_3 = ?$
$p_1 = m_1 v_1 = 2 \times 8 = 16$ kg m/s
$p_2 = m_2 v_2 = 1 \times 12 = 12$ kg m/s.

As the two pieces fly off at right angles, their resultant momentum

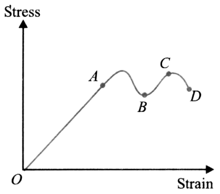
$$p = \sqrt{p_1^2 + p_2^2} = \sqrt{16^2 + 12^2} = 20 \text{ kg m/s.}$$

As no external force is involved in explosion, therefore,

$$p = p_3 = m_3 v_3$$

$$v_3 = \frac{p}{m_3} = \frac{20}{0{\cdot}5} = \mathbf{40\ m/s}$$

9. The variation of stress and strain for a metal is shown in Figure. In which part of the curve Hooke's law is obeyed ?



1) OA 2) AB
3) BC 4) CD

Sol. (1) : Hooke's law essentially defines elastic limit as it states that within elastic limit extension $\propto$ stretching force or strain $\propto$ stress

10. *n* drops of a liquid , each with surface energy *E*, join to form a single drop

1) Some energy will be absorbed in the process
2) Some energy will be released in the process
3) The energy absorbed or released will be $n\,E\,[2^{2/3}–1]$
4) The energy absorbed or released will be $E\,(\,n - n^{2/3}]$

Sol. (4): Surface tension, S = surface energy per unit area.
Let r = radius of each small drop and R = radius of a big single drop. Then $n \times \frac{4}{3}\pi r^3 = \frac{4}{3}\pi R^3$ or $R = n^{\frac{1}{3}} r$

Initial surface energy, $E_1 = n \times 4\pi r^2 \times S = n\,E$

Final surface energy, $E_2 = 4\pi R^2 \times S$
$= 4\pi r^2 n^{2/3} \times S = n^{2/3} E$

$\therefore$ Energy released $= E_1 - E_2 = \mathbf{E\ (n - n^{2/3})}$

11. Boyle's Law is applicable for an

1) adiabatic process 2) isothermal process
3) isobaric process 4) isochoric process

Sol. (2) : Boyle's Law, i.e., PV = constant, only when temperature is constant, i.e. when the changes follow isothermal process

12. For a gas of molecular weight *M*, specific heat capacity at constant pressure is ($\gamma = C_p / C_v$)

1) $\dfrac{R}{\gamma - 1}$ 2) $\dfrac{\gamma R}{\gamma - 1}$
3) $\dfrac{\gamma R}{M(\gamma - 1)}$ 4) $\dfrac{\gamma RM}{(\gamma - 1)}$

Sol. (3) : As $C_p - C_v = R$; $1 - \frac{C_v}{C_p} = \frac{R}{C_p}$ or $1 - \frac{1}{\gamma} = \frac{R}{C_p}$

or $\frac{\gamma - 1}{\gamma} = \frac{R}{C_p}$. $C_p = \frac{\gamma R}{\gamma - 1}$

specific heat capacity $= \frac{C_p}{M} = \frac{\gamma \mathbf{R}}{\mathbf{M}\ (\gamma - 1)}$

13. A transverse wave is described by the equation $y = y_0 \sin 2\pi \left(ft - \frac{x}{\lambda}\right)$. The maximum particle velocity is four times the wave velocity if

1) $\lambda = \dfrac{\pi y_0}{4}$ 2) $\lambda = \dfrac{\pi y_0}{2}$
3) $\lambda = \pi y_0$ 4) $\lambda = 2\pi y_0$

Sol. (2) : Here, $y = y_0 \sin 2\pi \left(f\,t - \frac{x}{\lambda}\right)$

Compare with the standard form of equation :
$y = r \sin (\omega t - kx)$

$r = y_0$, $\omega = 2\pi f$, $k = \frac{2\pi}{\lambda}$

$(v_{max})_{particle} = r\,\omega = y_0\,(2\pi f)$

and $(v_{max})_{wave} = \frac{\omega}{k} = \frac{2\pi f}{2\pi/\lambda} = f\lambda$

As $(v_{max})_{particle} = 4\,(v_{max})_{wave}$ $\lambda = \frac{\pi \mathbf{y_0}}{\mathbf{2}}$

$\therefore$ $y_0\,(2\pi f) = 4 f \lambda$

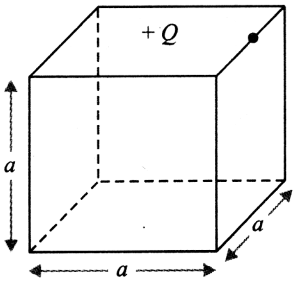
14. Two positive ions, each carrying a charge *q*, are separated by a distance *d*. If *F* is the force of repulsion between the ions, the number of electrons missing from each ion will be (*e* being the charge on an electron)

1) $\dfrac{4\pi\varepsilon_0 F d^2}{q^2}$ 2) $\dfrac{4\pi\varepsilon_0 F d^2}{e^2}$
3) $\sqrt{\dfrac{4\pi\varepsilon_0 F e^2}{d^2}}$ 4) $\sqrt{\dfrac{4\pi\varepsilon_0 F d^2}{e^2}}$

Sol. (4): $F = \frac{1}{4\pi\epsilon_0}\frac{q\times q}{d^2} = \frac{(ne)(ne)}{4\pi\epsilon_0 d^2}$

$$n = \sqrt{\frac{4\pi\epsilon_0 F d^2}{e^2}}$$

15. In Figure + Q charge is located at one of the edges of the cube, then electric flux through cube due to + Q charge is



1) $\frac{+Q}{\epsilon_0}$

2) $\frac{+Q}{2\epsilon_0}$

3) $\frac{+Q}{4\epsilon_0}$

4) $\frac{+Q}{8\epsilon_0}$

Sol. (3) : The electric lines of force starting from + Q charge on one of the edges of cube are being shared by four cubes, if we imagine the continuity of structure shown.

Therefore, electric flux $= \frac{1}{4}(Q/\epsilon_0)$

16. Electric charges q, q, $-2\,q$ are placed at the corners of an equilateral triangle ABC of side l. The magnitude of electric dipole moment of the system is

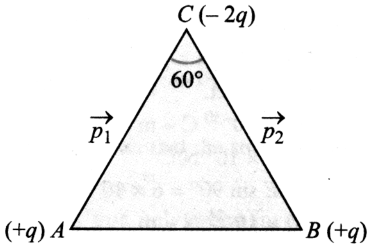
1) $q\,l$

2) $2\,q\,l$

3) $\sqrt{3}\;ql$

4) $4\,q\,l$

Sol. (3) : As is clear from



The two dipole moments are $\vec{p_1} = \vec{p_2} = ql$

Angle between them is $\theta = 60°$.

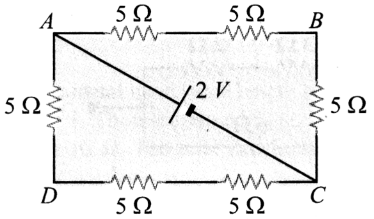
∴ Dipole moment of the system

$$|\vec{p}| = \sqrt{p_1^2 + p_2^2 + 2p_1 p_2 \cos 60°}$$

$$= \sqrt{(ql)^2 + (ql)^2 + 2(ql)(ql)\frac{1}{2}}$$

$$|\vec{p}| = \boldsymbol{ql\sqrt{3}}$$

17. The potential difference between points A and B of Figure is



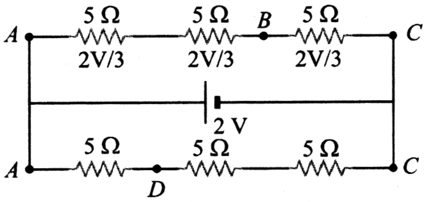
1) $\frac{2}{3}V$

2) $\frac{8}{9}V$

3) $\frac{4}{3}V$

4) $2\,V$

Sol. (3) : The equivalent circuit is shown in Fig.
Potential difference across A and C is $V_{AC} = 2$ V.



Since all the resistance are equal, hence potential difference across each resistor $= \frac{2\text{ V}}{3}$ therefore, potential difference between A and B $= \frac{2\text{ V}}{3} + \frac{2\text{ V}}{3} = \frac{\mathbf{4V}}{\mathbf{3}}$

18. Two wires of resistance R_1 and R_2 have temperature coefficient of resistance α_1 and α_2 respectively. They are joined in series. The effective temperature coefficient of resistance is

1) $\frac{\alpha_1 - \alpha_2}{2}$

2) $\sqrt{\alpha_1\alpha_2}$

3) $\frac{\alpha_1 R_1 + \alpha_2 R_2}{R_1 + R_2}$

4) $\frac{\sqrt{R_1 R_2 \alpha_1 \alpha_2}}{\sqrt{R_1^2 + R_2^2}}$

Sol. (3) : $R_{1t} = R_1(1 + \alpha_1 t)$; $R_{2\,t} = R_2(1 + \alpha_2 t)$

$R_{st} = R_{1t} + R_{2t} = R_1[1 + \alpha_1 t] + R_2[1 + \alpha_2 t]$

$= (R_1 + R_2) + (R_1\alpha_1 + R_2\alpha_2)\,t$

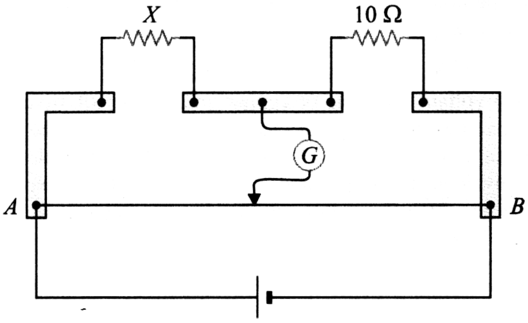
$$= (R_1 + R_2)\left[1 + \left(\frac{R_1\alpha_1 + R_2\alpha_2}{R_1 + R_2}t\right)\right]$$

$$= R_s\left[1 + \left(\frac{R_1\alpha_1 + R_2\alpha_2}{R_1 + R_2}\right)t\right]$$

Comparing it with $R_{st} = R_s\,[1 + \alpha_s\,t]$

we have, $\alpha_s = \boldsymbol{\frac{R_1\alpha_1 + R_2\alpha_2}{R_1 + R_2}}$

19. **A meter bridge is set up as shown in Figure, to determine an unknown resistance X using a standard 10 Ω resistor. The galvanometer shows null point when tapping key is at 52 cm mark. The end correctrons are 1 cm and 2 cm respectively for the ends A and B. The determined value of X is**



1) 10.2 Ω
2) 10.6 Ω
3) 10.8 Ω
4) 11.1 Ω

Sol. (2) : Here, $P = X$, $Q = 10\ \Omega$

$l_1 = 52 + 1 = 53$ cm ; $l_2 = (100 - 52) + 2 = 50$ cm

$$\frac{P}{Q} = \frac{l_1}{l_2} \quad \text{or} \quad \frac{X}{10} = \frac{53}{50}$$

$$\text{or} \quad X = \frac{53}{50} \times 10 = \mathbf{10{\cdot}6\,\Omega}$$

20. **The time period of a thin bar magnet in earth's magnetic field is T. If the magnet is cut into four equal parts perpendicular to its length, the time period of each part in the same field will be**

1) $T/2$
2) $T/4$
3) $\sqrt{2}T$
4) $2T$

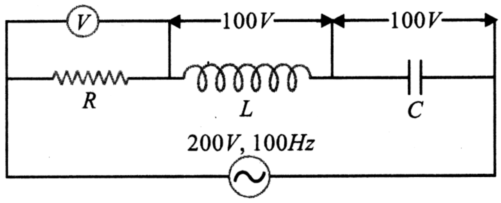
Sol. (2) : Mass becomes 1/4 and length becomes 1/4.

$\therefore$ Moment of inertia I becomes $\frac{1}{4}\left(\frac{1}{4}\right)^2 = \frac{1}{64}$

Magnetic moment M becomes 1/4th.

As $T = 2\pi\sqrt{\frac{I}{MH}}$, $\therefore$ T becomes **1/4th = $T/4$**

21. **In the circuit shown in figure, what will be the reading of the voltmeter?**



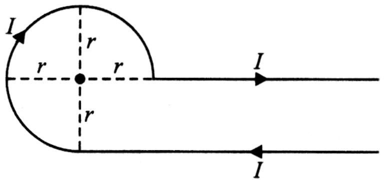
1) 300 V
2) 900 V
3) 200 V
4) 400 V

Sol. (3) : Here, $V_R = ?$ $V_L = V_C = 100$ V, $V = 200$ V

$$\text{As} \quad V = \sqrt{V_R^2 + (V_L - V_C)^2}$$

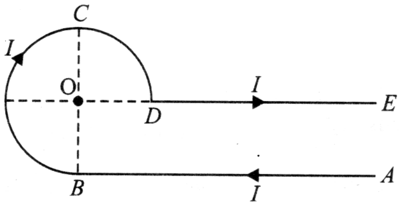
$$\therefore \quad 200 = \sqrt{V_R^2 + (100-100)^2} = V_R \text{ , i.e., } \quad V_R = \mathbf{200\ V}$$

22. **Current I is flowing in a conductor shaped as shown in the Figure. The radius of the curved part is r and the length of straight portion is very large. The value of the magnetic field at the centre O will be**



1) $\frac{\mu_0 I}{4\pi r}\left(\frac{\pi}{2}+1\right)$
2) $\frac{\mu_0 I}{4\pi r}\left(\frac{\pi}{2}-1\right)$
3) $\frac{\mu_0 I}{4\pi r}\left(\frac{3\pi}{2}+1\right)$
4) $\frac{\mu_0 I}{4\pi r}\left(\frac{3\pi}{2}-1\right)$

Sol. (3) : For the circular part BCD, the angle subtended at the centre O is 3 π/2.



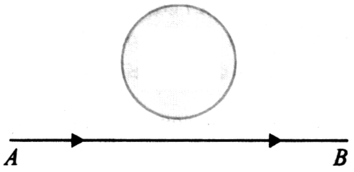
Total magnetic field induction at O is

$$= B_{AB} + B_{BCD} + B_{DE}$$

$$= \frac{\mu_0}{4\pi}\frac{I}{r}[\sin 90^\circ + \sin 0^\circ] + \frac{\mu_0}{4\pi}\frac{I}{r} \times \frac{3\pi}{2} + 0$$

$$= \frac{\mu_0}{4\pi}\frac{I}{r} + \frac{\mu_0}{4\pi}\frac{I}{r}\frac{3\pi}{2} = \frac{\mu_0}{4\pi}\frac{I}{r}\left(\frac{3\pi}{2}+1\right)$$

23. **An electron moves along the line AB, which lies in the same plane as a circular loop of conducting wire as shown in Figure.**
What will be the direction of current induced if any, in the loop?



1) no current will be induced
2) the current will be clockwise
3) the current will be anticlockwise
4) the current will change direction as the electron passes by

Sol. (4) : As the electron moves along the wire AB, current will be induced in the loop. And the current induced in the loop will be reversed as soon as the electron crosses the loop.

24. An electromagnetic wave going through vacuum is described by $E = E_0 \cos(kx - \omega t)$; $B = B_0 \cos(kx - \omega t)$ which of the following equations is true?

1) $E_0 \omega = B_0 K$
2) $E_0 k = B_0 \omega$
3) $E_0 B_0 = \omega k$
4) $E_0 = \omega k E_0$

Sol. (2) : $\frac{E_0}{B_0} = c = \frac{\omega}{k}$ or $E_0 k = B_0 \omega$

25. Light travels through a glass plate of thickness t and having refractive index n. If c is the velocity of light in vacuum, the time taken by the light travel this thickness of glass is

1) $\frac{t}{nc}$
2) tnc
3) $\frac{nt}{c}$
4) $\frac{tc}{n}$

Sol. (3) : As $n = \frac{c}{v}$ $\therefore$ $v = c/n$

Time taken, $t' = \frac{\text{thickness}}{\text{velocity}} = \frac{t}{v} = \frac{t}{c/n} = \boldsymbol{\frac{nt}{c}}$

26. If critical angle for TIR from a medium to vacuum is 30°, the velocity of light in the medium is

1) 3×10^8 m/s
2) 1.5×10^8 m/s
3) 6×10^8 m/s
4) $\sqrt{3} \times 10^8$ m/s

Sol. (2) : Here, $C = 30°, v = ?$

$$\mu = \frac{1}{\sin C} = \frac{1}{\sin 30°} = 2$$

$$v = \frac{c}{\mu} = \frac{3 \times 10^8 \text{ m/s}}{2} = \mathbf{1{\cdot}5 \times 10^8 \text{ m/s}}$$

27. A ray of light is incident normally on one of the faces of a prism of apex angle 30° and refractive index $\sqrt{2}$. The angle of deviation of the ray is

1) 0°
2) 12.5°
3) 15°
4) 22.5°

Sol. (3) : For normal incidence, $i_1 = 0, r_1 = 0$

As $r_1 + r_2 = A$ $\therefore$ $r_2 = A - r_1 = 30°$

As $\mu = \frac{\sin i_2}{\sin r_2}$

$\therefore$ $\sin i_2 = \mu \sin r_2 = \sqrt{2} \sin 30° = \frac{1}{\sqrt{2}}$

$i_2 = 45°$

$\delta = i_1 + i_2 - A = 0 + 45° - 30° = \mathbf{15°}$

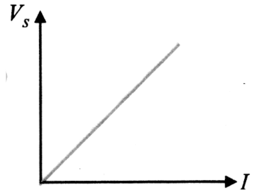
28. In Young's double slit experiment, when two light waves form third minimum, they have

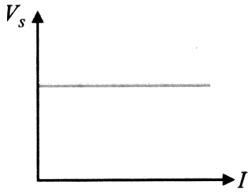
1) phase difference of 3π
2) phase difference of $\frac{5\pi}{2}$
3) path difference of 3π
4) path difference of $\frac{5\lambda}{2}$

Sol. (4) : Condition for minima is path diff. $= (2n-1)\frac{\lambda}{2}$.

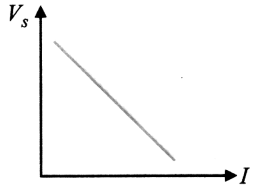
For $n = 3$, path diff. $= (2 \times 3 - 1)\frac{\lambda}{2} = \boldsymbol{\frac{5\lambda}{2}}$

29. The correct curve between the stopping potential (V_s) and intensity of incident light (I) is

1) 

2) 

3) 

4) 

Sol. (2) : Stopping potential is independent of the intensity of the incident light. Hence path between V_s and I is a st. line parallel to I-axis

30. The de-Broglie wavelength of a body of mass m and kinetic energy E is given by

1) $\lambda = \frac{h}{2mE}$
2) $\lambda = \frac{h}{\sqrt{2mE}}$
3) $\lambda = \sqrt{\frac{2mE}{h}}$
4) $\lambda = \frac{h}{mE}$

Sol. (2) : Here, $E = \frac{1}{2}mv^2$ or $mv^2 = 2E$

$m^2v^2 = 2mE$ or $mv = \sqrt{2mE}$

$$\lambda = \frac{h}{mv} = \frac{h}{\sqrt{2mE}}$$

31. The fraction of a radioactive substance decayed in a time equal to the average life

1) $\frac{e-1}{e}$
2) $\frac{1-e}{e}$
3) $\frac{e}{1-e}$
4) $\frac{1}{e}$

Sol. (1) : By definition, in a time $t=\frac{1}{\lambda}=\tau$, no. of atoms left undecayed is $N=\frac{1}{e}N_0$ or $\frac{N}{N_0}=\frac{1}{e}$

$\therefore$ Fraction of atoms decayed $=1-\frac{1}{e}=\frac{e-1}{e}$

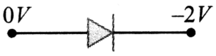
32. An *n*-type and *p*-type silicon can be obtained by doping pure silicon with

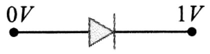
1) Arsenic and Phosphorous
2) Indium and Aluminium
3) Phosphorous and Indium
4) Aluminium and Boron

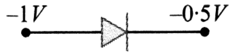
Sol. (3) : Phosphorous is pentavalent impurity and Indium is Trivalent impurity.

33. Which one of the following represents forward bias diode?

1) 

2) 

3) 

4) 

Sol. (2) : The *p*-*n* junction will be forward biased if *p*-side is at higher potential and *n*-side is at lower potential.

34. The correct relationship between the two current gains α and β in a transistor is

1) $\beta=\frac{\alpha}{1+\alpha}$
2) $\alpha=\frac{\beta}{1-\beta}$
3) $\alpha=\frac{\beta}{1+\beta}$
4) $\alpha=\frac{1+\beta}{\beta}$

Sol. (3) : $\alpha=\frac{\Delta I_c}{\Delta I_e}=\frac{\Delta I_c}{\Delta I_b+\Delta I_c}=\frac{\Delta I_c/\Delta I_b}{1+\Delta I_c/\Delta I_b}=\frac{\beta}{1+\beta}$

35. The following truth table corresponds to the logic gate

A	**B**	**X**
0	**0**	**0**
0	**1**	**1**
1	**0**	**1**
1	**1**	**1**

1) NAND
2) AND
3) XOR
4) OR

Sol. (4) : Since output is 1 when either or both of the input is 1, so logic gate is OR gate.

Section 'B'

36. A force of $3x^2-2x+5$ acts on a body of mass 5 kg and displaces it from $x=0$ to $x=4$ m . What is the work done by the force?

1) 42 J
2) 55 J
3) 68 J
4) 84 J

Sol. (3) : $W=\int F dx=\int_0^4 (3x^2-2x+5)\,dx$

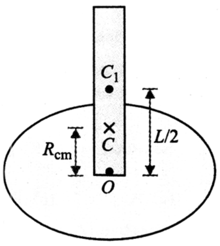
$$=\left[3\cdot\frac{x^3}{3}-2\times\frac{x^2}{2}+5x\right]_0^4$$

$=4^3-4^2+5\times 4=68$ J

37. One end of a thin uniform rod of length *L* and mass M_1 is riveted to the centre of a uniform circular disc of radius *r* and mass M_2 so that they are coplanar. The centre of mass of the combination from the centre of the disc is (assume that point of attachment is at the origin)

1) $\frac{L(M_1+M_2)}{2M_1}$
2) $\frac{LM_1}{2(M_1+M_2)}$
3) $\frac{2(M_1+M_2)}{LM_1}$
4) $\frac{2LM_1}{(M_1+M_2)}$

Sol. (2) : In Fig. *O* is centre of disc and it is centre of mass of disc. C_1 is centre of mass of rod, where $OC_1=L/2=r_1$. Distance of *c.m.* of disc from origin, $r_0=0$. If R_{cm} is distance of centre of mass *C* of the combination from *O*, then



$$R_{cm}=\frac{M_1\times L/2+M_2\times 0}{M_1+M_2}\Rightarrow R_{cm}=\frac{M_1L}{2(M_1+M_2)}$$

38. A particle is made to move in circular path in decreasing speed. Which of the following correct?

1) Angular momentum is constant
2) Only the direction of $\vec{L}$ is constant
3) Acceleration is always directed towards centre
4) Particle move in spiral path

Sol. (2) : When particle is made to move in a circular path with decreasing speed, the magnitude of angular momentum ($L=mvr$) will change, but its direction remains the same being perpendicular to the plane of motion.

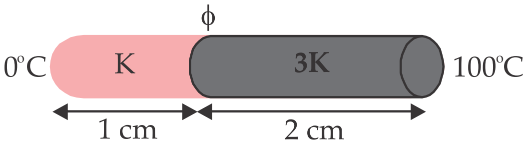
39. If the radius of the Earth's orbit around the Sun is *r* & the time period of revolution of the Earth around the Sun is *T*, the mass of Sun is

1) $\frac{4\pi^2r^2}{GT^2}$
2) $\frac{4\pi^2r^3}{GT^2}$
3) $\left[\frac{4\pi^2r^3}{GT^2}\right]^{1/2}$
4) $\left[\frac{4\pi^2r^3}{GT^2}\right]^{1/3}$

Sol. (2) : Let m, M be the mass of earth and sun respectively. Then

$$\frac{GMm}{r^2}=\frac{mv^2}{r}=mr\omega^2=mr\frac{4\pi^2}{T^2}\quad\text{or}\quad M=\frac{4\pi^2r^3}{GT^2}$$

40. Two bars of thermal conductivities K and 3 K and lengths 1 cm and 2 cm respectively have equal cross-sectional area, they are joined length wise as shown in Figure. If the temperatures at the ends of this composite bar is 0°C and 100°C respectively, Figure, then the temperature ϕ of the interface is



1) 50°C
2) $\frac{100}{3}$°C
3) 60°C
4) $\frac{200}{3}$°C

Sol. (3) : In the steady state, rate of flow of heat through each part of rod is same.

$$\left(\frac{\Delta Q}{\Delta t}\right)_1=\left(\frac{\Delta Q}{\Delta t}\right)_2$$

$$K_1A_1\left(\frac{\Delta T_1}{\Delta x_1}\right)=K_2A_2\left(\frac{\Delta T_2}{\Delta x_2}\right)$$

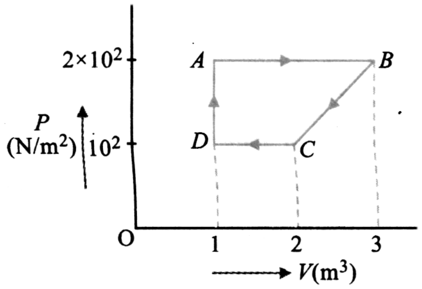
$$KA\left(\frac{\phi-0}{1\text{ cm}}\right)=3KA\left(\frac{100-\phi}{2\text{ cm}}\right)$$

$$\phi=\frac{3(100-\phi)}{2}$$

$$-3\phi+300=2\phi$$

$$\phi=\frac{300}{5}=\mathbf{60^\circ C}$$

41. A cyclic process is shown in Figure. Work done during isobaric expansion is



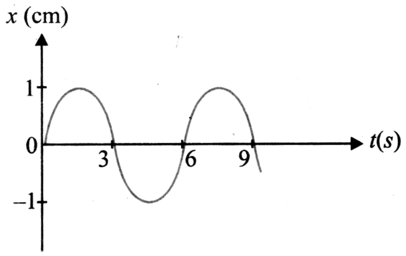
1) 1600 J
2) 100 J
3) 400 J
4) 600 J

Sol. (3) : Isobaric expansion is represented by curve AB

Work done = area under AB

$= 2\times10^2\times(3-1)=4\times10^2=400$ J

42. The $x-t$ graph of a particle executing SHM is shown in figure. The acceleration of the particle at time $t=\frac{3}{4}$ s is



1) $-\frac{\pi^2}{18}$
2) $-\frac{\sqrt{2}\pi^2}{18}$
3) $-\frac{\sqrt{3}\pi^2}{36}$
4) $-\frac{\sqrt{3}\pi^2}{24}$

Sol. (2) : From graph, $r=1$ cm ; $T=6$ s

$$\omega=\frac{2\pi}{T}=\frac{2\pi}{6}=\frac{\pi}{3}\text{ rad/s.}$$

Displacement in SHM at time t is ; $x=r\sin\omega t$

At $t=\frac{3}{4}$ s, $x=1\sin\frac{\pi}{3}\times\frac{3}{4}=\sin\frac{\pi}{4}=\frac{1}{\sqrt{2}}$ cm

Acceleration, $A=-\omega^2x=-\left(\frac{\pi}{3}\right)^2\times\frac{1}{\sqrt{2}}=-\frac{\sqrt{2}\pi^2}{18}$ cm/s^2

43. Tuning fork F_1 has a frequency of 256 Hz and it is observed to produce 6 beats/second with another tuning fork F_2. When F_2 is loaded with wax, it still produces 6 beats/second with F_1. The frequency of F_2 before loading was

1) 253 Hz
2) 262 Hz
3) 250 Hz
4) 259 Hz

Sol. (2) : Here, $n_1=256$, $m=6$ beats/sec, $n_2=?$

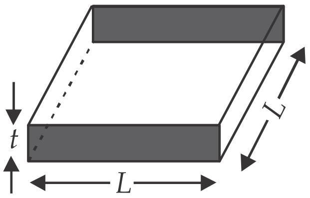
$n_2=n_1\pm m=256\pm6=\mathbf{262}$ or 250.

when F_2 is loaded, its frequency decreases.

$\therefore\quad n_2=256\pm6=262$ or 250.

Hence original frequency of F_2 must be **262 Hz** on loading frequency of F_2 becomes 250. Number of beats/sec remains the same.

44. Consider a thin square sheet of side L and thickness t, made of a material of resistivity ρ. The resistance between two opposite faces, shown by the shaded areas in the Figure is

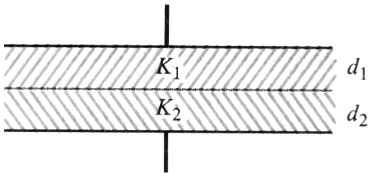


1) directly proportional to L
2) directly proportional to t
3) independent of L
4) independent of t

Sol. (3) : Here, $A = L \times t$, $l = L$ $\therefore$ $R = \frac{\rho l}{A} = \frac{\rho L}{L \times t} = \frac{\rho}{t}$

Thus, R is independent of L.

45. What will be capacitance of a system of two parallel plates, each of area A separated by distances d_1 and d_2 and packed with dielectrics of constants K_1 and K_2. figure?



1) $\frac{K_1K_2 \in_0 A}{K_1d_2 - K_1d_1}$ 2) $\frac{K_1K_2 \in_0 A}{K_1d_1 - K_2d_2}$

3) $\frac{K_1K_2 \in_0 A}{K_1d_2 + K_2d_1}$ 4) $\frac{K_1K_2 \in_0 A}{K_1d_1 + K_2d_2}$

Sol. (3) : $C_1 = \frac{K_1 \in_0 A}{d_1}$; $C_2 = \frac{K_2 \in_0 A}{d_2}$

$$\frac{1}{C_s} = \frac{1}{C_1} - \frac{1}{C_2} = \frac{d_1}{K_1 \in_0 A} + \frac{d_2}{K_2 \in_0 A} = \frac{1}{\in_0 A}\left[\frac{d_1}{K_1} + \frac{d_2}{K_2}\right]$$

$$\frac{1}{C_s} = \frac{d_1 K_2 + d_2 K_1}{\in_0 A K_1 K_2}, \quad C_s = \frac{\in_0 \mathbf{A K_1 K_2}}{\mathbf{d_1 K_2 + d_2 K_1}}$$

46. A proton of mass m and charge q is moving in a plane with kinetic energy E. If there exists a uniform magnetic field B, perpendicular to the plane of the motion, the proton will move in a circular path of radius

1) $\frac{2Em}{qB}$ 2) $\frac{\sqrt{2Em}}{qB}$

3) $\frac{\sqrt{Em}}{2qB}$ 4) $\frac{\sqrt{2Eq}}{mB}$

Sol. (2) : $F = qvB = \frac{mv^2}{r}$ or $r = \frac{mv}{qB}$

$E = \frac{1}{2}mv^2$ or $mv = \sqrt{2Em}$

Hence $r = \frac{\sqrt{2Em}}{qB}$

47. The magnetic flux through a circuit of resistance R changes by an amount $\Delta\phi$ in a time Δt. Then the total quantity of electric charge Q that passes any point in the circuit during the time Δt is represent by

1) $Q = \frac{\Delta\phi}{\Delta t}$ 2) $Q = R\frac{\Delta\phi}{\Delta t}$

3) $Q = \frac{1}{R}\frac{\Delta\phi}{\Delta t}$ 4) $Q = \frac{\Delta\phi}{R}$

Sol. (4): $i = \frac{e}{R} = \frac{\Delta\phi}{\Delta t(R)} \Rightarrow Q = i \cdot \Delta t = \frac{\Delta\phi}{R}$

48. A ray of light is incident on the surface of separation of a medium with the velocity of light at an angle 45° and is refracted in the medium at an angle 30°. What will be the velocity of light in the medium?

1) 1.96×10^8 m/s 2) 2.12×10^8 m/s

3) 3.18×10^8 m/s 4) 3.33×10^8 m/s

Sol. (2) : $\mu = \frac{c}{v} = \frac{\sin i}{\sin r}$

$$v = \frac{c \sin r}{\sin i} = \frac{3 \times 10^8 \times \sin 30°}{\sin 45°} = 3 \times 10^8 \times \frac{\sqrt{2}}{2}$$

$= \mathbf{2{\cdot}12 \times 10^8}$ **m/s**

49. When the angle of incidence on a material is 60°, the reflected light is completely polarized. The velocity of the refracted ray inside the material is (in ms^{-1})

1) 3×10^8 2) $\left(\frac{3}{\sqrt{2}}\right) \times 10^8$

3) $\sqrt{3} \times 10^8$ 4) 0.5×10^8

Sol. (3) : As reflected light is completely polarized, therefore, $i_p = 60°$.

$\mu = \tan i_p = \tan 60° = \sqrt{3}$

As $\mu = \frac{c}{v} = \sqrt{3}$ $\therefore$ $v = \frac{c}{\sqrt{3}} = \frac{3 \times 10^8}{\sqrt{3}} = \mathbf{\sqrt{3} \times 10^8 =}$ **m/s**

50. A radioactive sample decays by two different processes. Half life for the first process is t_1 and for the second process is t_2. The effective half life is

1) $t_1 + t_2$ 2) $t_1 - t_2$

3) $(t_1 + t_2)^2$ 4) $\frac{t_1t_2}{t_1 + t_2}$

Sol. (4) : As $\lambda = \lambda_1 + \lambda_2$

$$\Rightarrow \frac{0{\cdot}693}{t} = \frac{0{\cdot}693}{t_1} + \frac{0{\cdot}693}{t_2} \text{ or } t = \frac{t_1 t_2}{t_1 + t_2}$$

Section 'B' : Chemistry

Section 'A'

51. Which of the following options does not represent ground state electronic configuration of an atom ? *[XIth Part-I N.B. 66]*

1) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^8\ 4s^2$
2) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^9\ 4s^2$
3) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^{10}\ 4s^1$
4) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^5\ 4s^1$

Sol. (2) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^9 4s^2$
should be,
$1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^1$

52. Consider the isoelectronic species, Na^+, Mg^{2+}, F^- and O^{2-}. The correct order of increasing length of their radii is _____ *[XIth Part-I N.B. 86]*

1) $F^- < O^{2-} < Mg^{2+} < Na^+$
2) $Mg^{2+} < Na^+ < F^- < O^{2-}$
3) $O^{2-} < F^- < Na^+ < Mg^{2+}$
4) $O^{2-} < F^- < Mg^{2+} < Na^+$

Sol. (2) size of isoelectronic species $\propto 1/Z$

$$\begin{array}{lcccc} & Mg^{2+} & < Na^+ & < F^- & < O^{2-} \\ Z = & 12 & 11 & 9 & 8 \end{array}$$

53. The first ionisation enthalpies of Na, Mg, Al and Si are in the order : *[XIth Part-I N.B. 86]*

1) Na < Mg > Al < Si
2) Na > Mg > Al > Si
3) Na < Mg < Al < Si
4) Na > Mg > Al < Si

Sol. (1) Na < Mg > Al < Si

54. Isostructural species are those which have the same shape and hybridisation. Among the given species identify the isostructural pairs.

1) [NF_3 and BF_3]
2) [BF_4^- and NH_4^+]
3) [BCl_3 and $BrCl_3$]
4) [NH_3 and NO_3^-]

Sol. (2) $BF_4^- \Rightarrow sp^3$, 4bp, 0 lp
$NH_4^+ \Rightarrow sp^3$, 4bp, 0 lp
Both are tetrahedral

55. In which of the following molecule/ion all the bonds are not equal ? *[XIth Part-I N.B. 125]*

1) XeF_4
2) BF_4^-
3) PCl_5
4) SiF_4

Sol. (3) In PCl_5 axial bonds are weaker than equatorial bonds.

56. Dipole-dipole forces act between the molecules possessing permanent dipole. Ends of dipoles possess 'partial charges'. The partial charge is *[XIth Part-I N.B. 138]*

1) more than unit electronic charge
2) equal to unit electronic charge
3) less than unit electronic charge
4) double the unit electronic charge

Sol. (3) partial charge ($\delta +$ or $\delta -$) is less than unit electronic charge (e)

57. The volume of gas is reduced to half from its original volume. The specific heat will be ____. *[XIth Part-I N.B. 168]*

1) reduce to half
2) be doubled
3) remain constant
4) increase four times

Sol. (3) specific heat is intensive property.

58. For the reaction $H_{2(g)} + I_{2(g)} \rightleftharpoons 2HI_{(g)}$, the standard free energy is $\Delta G° > 0$. The equilibrium constant (K) would be _______. *[XIth Part-I N.B. 186]*

1) K = 0
2) K > 1
3) K = 1
4) K < 1

Sol. (4) $\Delta G° = -RT \ln K$
when $\Delta G° > 0 \Rightarrow K < 1$

59. Acidity of BF_3 can be explained on the basis of which of the following concepts ? *[XIth Part-I N.B. 213]*

1) Arrhenius concept
2) Bronsteed Lowry concept
3) Lewis concept
4) Bronsted Lowry as well as Lewis concept

Sol. (3) BF_3 is lone pair acceptor due to incomplete octet of B.

60. Which of the following arrangements represent increasing oxidation number of the central atom? ***[XIth Part-II N.B. 269]***

1) CrO_2^-, ClO_3^-, CrO_4^{2-}, MnO_4^-
2) ClO_3^-, CrO_4^{2-}, MnO_4^-, CrO_2^-
3) CrO_2^-, ClO_3^-, MnO_4^-, CrO_4^{2-}
4) CrO_4^{2-}, MnO_4^-, CrO_2^-, ClO_3^-

Sol. (1) $CrO_2^- = +3$
$ClO_3^- = +5$
$CrO_4^{2-} = +6$
$MnO_4^- = +7$

61. The reducing power of a metal depends on various factors. Suggest the factor which makes Li, the strongest reducing agent in aqueous solution. ***[XIth Part-II N.B. 302]***

1) Sublimation enthalpy
2) Ionisation enthalpy
3) Hydration enthalpy
4) Electron-gain enthalpy

Sol. (3) Due to high hydration enthalpy of Li^+, E° of Li is Lowest among all elements so it is strongest reducing agent in aq. med

62. Quartz is extensively used as a piezoelectric material, it contains ___. ***[XIth Part-II N.B. 322]***

1) Pb
2) Si
3) Ti
4) Sn

Sol. (2) It is a fact.

63. The principle involved in paper chromatography is ***[XIth Part-II N.B. 362]***

1) Adsorption
2) Partition
3) Solubility
4) Volatility

Sol. (2) Paper chromatography based on partition principle.

64. What is the correct order of decreasing stability of the following cations. ***[XIth Part-II N.B. 355]***

I. $CH_3-\overset{\oplus}{C}H-CH_3$ **II.** $CH_3-\overset{\oplus}{C}H-OCH_3$

III. $CH_3-\overset{\oplus}{C}H-CH_2-OCH_3$

1) II > I > III
2) II > III > I
3) III > I > II
4) I > II > III

Sol. (1) I] $CH_3-\overset{\oplus}{C}H-CH_3$ $\alpha_H = 06.$ II] $CH_3-\overset{\oplus}{C}H-\overset{+M}{OCH_3}$ $\alpha_H = 03$

III] $CH_3-\overset{\oplus}{C}H-CH_2-\overset{-I}{OCH_3}$ $\alpha_H = 03.$

$\therefore$ II > I > III.

65. Biochemical Oxygen Demand, (BOD) is a measure of organic material present in water. BOD value less than 5 ppm indicates a water sample to be ________. ***[XIth Part-II N.B. 415]***

1) rich in dissolved oxygen
2) poor in dissolved oxygen
3) highly polluted
4) not suitable for aquatic life

Sol. (1) BOD value is less than 5 ppm indicate clean water, which is rich in dissolved oxygen.

66. Cations are presents in the interstitial sites in ___________. ***[XIIth Part-I N.B. 24]***

1) Frenkel defect
2) Schottky defect
3) Vacancy defect
4) Metal deficiency defect

Sol. (1) It is a fact

67. The value of Henry's constant K_H is __________. ***[XIIth Part-I]***

1) greater for gases with higher solubility
2) greater for gases with lower solubility
3) constant for all gases
4) not related to the solubility of gases

Sol. (2) $K_H \propto \frac{1}{\text{Solubility}}$

68. An electrochemical cell can behave like an electrolytic cell when ___. ***[XIIth Part-I N.B. 66]***

1) $E_{cell} = 0$
2) $E_{cell} > E_{ext}$
3) $E_{ext} > E_{cell}$
4) $E_{cell} = E_{ext}$

Sol. (3) When external potential is greater than cell potential, electrochemical cell behaves like electrolytic cell.

69. The value of rate constant of a pseudo first order reaction __________. *[XIIth Part-I N.B. 112]*

1) depends on the concentration of reactants present in small amount
2) depends on the concentration of reactants present in excess
3) is independent of the concentration of reactants
4) depends only on temperature

Sol. (2) The reactant present in the excess makes the reaction of pseudo first order.

70. Which of the following ores are concentrated by froth flotation ? *[XIIth Part-I N.B. 154]*

1) Haematite
2) Galena
3) Borax
4) Magnetite

Sol. (2) Froth floatation is used for sulphide ores (Galena is PbS)

71. Which of the following elements can be involved in pπ-dπ bonding ? *[XIIth Part-I N.B. 172]*

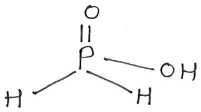
1) Carbon
2) Nitrogen
3) Phosphorus
4) Boron

Sol. (3) Due to presence of vacant d-orbital P form pπ-dπ bond.

72. Strong reducing behaviour of H_3PO_2 is due to *[XIIth Part-I N.B. 184]*

1) Low oxidation state of phosphorus
2) Presence of two –OH groups and one P-H bond
3) Presence of one –OH group and two P–H bonds
4) High electron gain enthalpy of phosphorus

Sol. (3)



73. Hot conc. H_2SO_4 acts as moderately strong oxidising agent. It oxidises both metals and nonmetals. Which of the following element is oxidised by conc. H_2SO_4 into two gaseous products? *[XIIth Part-I N.B. 196]*

1) Cu
2) S
3) C
4) Zn

Sol. (3) $C + H_2SO_4 \longrightarrow CO_2 + SO_2 + H_2O$

74. Electronic configuration of a transition element X in +3 oxidation state is $[Ar]3d^5$. What is its atomic number ? *[XIIth Part-I N.B. 220]*

1) 25
2) 26
3) 27
4) 24

Sol. (2) $X^{3+} = [Ar]3d^5$

$X = [Ar]3d^6 4s^2$

Atomic number of X

$= 18 + 6 + 2 = 26.$

75. Which of the following complexes formed by Cu^{2+} ions is most stable ? *[XIIth Part-I N.B. 262]*

1) $Cu^{2+} + 4NH_3 \rightleftharpoons [Cu(NH_3)_4]^{2+}$, log K = 11.6
2) $Cu^{2+} + 4CN^- \rightleftharpoons [Cu(CN)_4]^{2-}$, log K = 27.3
3) $Cu^{2+} + 2en \rightleftharpoons [Cu(en)_2]^{2+}$, log K = 15.4
4) $Cu^{2+} + 4H_2O \rightleftharpoons [Cu(H_2O)_4]^{2+}$, log K = 8.9

Sol. (2) Stability of complex $\propto$ log K

76. Indicate the complex ion which shows geometrical isomerism. *[XIIth Part-I N.B. 251]*

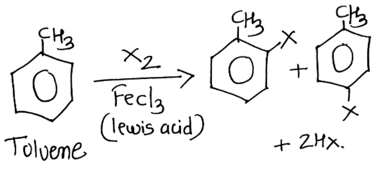
1) $[Cr(H_2O)_4Cl_2]^+$
2) $[Pt(NH_3)_3Cl]$
3) $[Co(NH_3)_6]^{3+}$
4) $[Co(CN)_5(NC)]^{3-}$

Sol. (1) $[Cr(H_2O)_4Cl_2]^+$ is Ma_4b_2 complex shows geometrical I.

77. Toluene reacts with a halogen in the presence of iron (III) chloride giving ortho and para halo compounds. The reaction is *[XIth Part-II N.B. 400]*

1) Electrophilic elimination reaction
2) Electrophilic substitution reaction
3) Free radical addition reaction
4) Nucleophilic substitution reaction

Sol. (2)

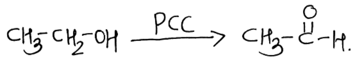


Above halogenation reaction is Electrophilic Substitution reaction.

78. CH_3CH_2OH can be converted into CH_3CHO by ______ *[XIIth Part-II N.B. 340]*

1) catalytic hydrogenation
2) treatment with $LiAlH_4$
3) treatment with pyridinium chlorochromate
4) treatment with $KMnO_4$

Sol. (3)



$CH_3-CH_2-OH \xrightarrow{PCC} CH_3-\overset{O}{\overset{\|}{C}}-H.$

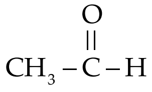
mild oxidising agent.

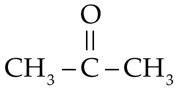
79. Which of the following compounds will react with sodium hydroxide solution in water? *[XIIth Part-II N.B. 336]*

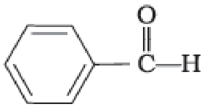
1) C_6H_5OH
2) $C_6H_5CH_2OH$
3) $(CH_3)_3COH$
4) C_2H_5OH

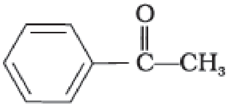
Sol. (1) Strong acid can react with Strong base. like NaOH.
As phenol is stronger acid.
Acidic strength :- phenol > Alcohol.

80. Which of the following compounds is most reactive towards nucleophilic addition reactions? *[XIIth Part-II N.B. 366]*

1) 
$CH_3-\overset{O}{\overset{\|}{C}}-H$

2) 
$CH_3-\overset{O}{\overset{\|}{C}}-CH_3$

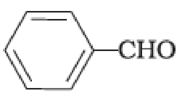
3) 

4) 

Sol. (1) Aliphatic aldehyde are more reactive towards NAR as compare to aromatic aldehyde. As in case of aromatic aldehyde carbonyl carbon is less electrophilic.

81. Cannizaro's reaction is not given by ______ *[XIIth Part-II N.B. 372]*

1) 

2) 

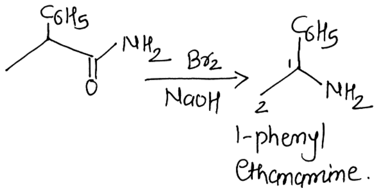
3) HCHO
4) CH_3CHO

Sol. (4) Cannizaro's reaction given by those compound which donot contain α_H.
As $\overset{\alpha}{CH_3}-CHO$ contain α_H.

82. The best reagent for converting, 2-phenylpropanamide into 1-phenylethanamine is ______. *[XIIth Part-II N.B. 394]*

1) excess H_2/Pt
2) $NaOH/Br_2$
3) $NaBH_4$/methanol
4) $LiAlH_4$/ether

Sol. (2)



83. Which of the following polymer is stored in the liver of animals ? *[XIIth Part-II N.B. 419]*

1) Amylose
2) Cellulose
3) Amylopectin
4) Glycogen

Sol. (4) Glycogen is animal starch, polymer obtained from glucose.

84. Dinucleotide is obtained by joining two nucleotides together by phosphodiester linkage. Between which carbon atoms of pentose sugars of nucleotides are these linkages present ? *[XIth Part-II N.B. 428]*

1) 5' and 3'
2) 1' and 5'
3) 5' and 5'
4) 3' and 3'

Sol. (1) Nucleotides are joined together by phosphodiester linkage betn $\boxed{5'}$ & $\boxed{3'}$ carbon atoms of pentose sugar.

85. Which of the following is/are not addition polymers ? *[XIIth Part-II N.B. 437]*

1) Nylon
2) Melamine formaldehyde resin
3) Orlon
4) Both (1) and (2)

Sol. (4) Nylon and melamine formaldehyde both are condensation polymer.

Section 'B'

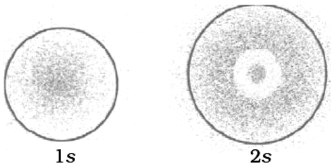
86. Which of the following statements is correct about the reaction given below :

$4Fe(s) + 3O_2(g) \rightarrow 2Fe_2O_3(g)$ ***[XIth Part-I N.B. 14]***

1) Total mass of iron and oxygen in reactants = total mass of iron and oxygen in product therefore it follows law of conservation of mass.
2) Total mass of reactants = total mass of product; therefore, law of multiple proporrtions is followed
3) Amount of Fe_2O_3 can be increased by taking any one of the reactants (iron or oxygen) in excess
4) Amount of Fe_2O_3 produced will decrease if the amount of any one of the reactants (iron or oxygen) is taken in excess

Sol. (1) Mass of reactant = mass of product
This is law of conservation of mass.

87. The probability density plots of 1s and 2s orbitals are given in figure.



The density of dots in a region repersents of probability density of finding electrons in the region.

On the basis of above diagram which of the following statements is incorrect ?

[XIth Part-I N.B. 58]

1) 1s and 2s orbitals are spherical in shape
2) The probability of finding the electron is maximum near the nucleus
3) The probability of finding the electrons at a given distance is equal in all directions
4) The probability density of electrons for 2s orbital decreases uniformly as distance from the nucleus increases.

Sol. (4) The probability density of electrons in 2s orbital first increases then decreases and after that it begins to increases again as distance increases from nucleus.

88. Hydrogen bonds are formed in many compounds e.g., H_2O, HF, NH_3. The boiling point of such compounds depends to a large extent on the strength of hydrogen bond and the number of hydrogen bonds. The correct decreasing order of the boiling points of above compounds is : ***[XIIth Part-I N.B. 201]***

1) $HF > H_2O > NH_3$
2) $H_2O > HF > NH_3$
3) $NH_3 > HF > H_2O$
4) $NH_3 > H_2O > HF$

Sol. (2) Boiling point order is
$H_2O > HF > NH_3$

89. The formation of the oxide ion, $O^{2-}(g)$, from oxygen atom requires first an exothermic and then an endothermic step as shown in below:

$O(g) + e^- \rightarrow O^-(g)\ ;\ \Delta H^0 = -141\ kJ\ mol^{-1}$

$O^-(g) + e^- \rightarrow O^{2-}(g)\ ;\ \Delta H^0 = +780\ kJ\ mol^{-1}$

Thus process of formation of O^{2-} in gas phase is unfavourable even though O^{2-} is isoelectronic with neon. It is due to the fact that

[XIth Part-I N.B. 90]

1) Oxygen is more electronegative
2) Addition of electron in oxygen results in larger size of the ion
3) Electron repulsion outweighs the stability gained by achieving noble gas configuration
4) O^- ion has comparatively smaller size than oxygen atom

Sol. (3) Electron repulsion outweighs the stability gained by achieving noble gas cong^n.

90. On the basis of thermochemical equations (a), (b) and (c), find out which of the algebric relationships given in options (i) to (iv) is correct.

a) $C_{(graphite)} + O_2(g) \rightarrow CO_2(g)\ ;\ \Delta_rH = x\ kJ\ mol^{-1}$

b) $C_{(graphite)} + \frac{1}{2}O_2(g) \rightarrow CO(g)\ ;\ \Delta_rH = y\ kJ\ mol^{-1}$

c) $CO(g) + \frac{1}{2}O_2(g) \rightarrow CO_2(g)\ ;\ \Delta_rH = z\ kJ\ mol^{-1}$

[XIth Part-I N.B. 175]

1) $z = x + y$
2) $x = y - z$
3) $x = y + z$
4) $y = 2z - x$

Sol. (3) eqn c = eqn a − eqn b

$\therefore z = x - y \quad \therefore x = y + z$

91. When hydrochloric acid is added to cobalt nitrate solution at room temperature, the following reaction takes place and the reaction mixture becomes blue. On cooling the mixture it becomes pink. On the basis of this information mark the correct answer. *[XIth Part-I N.B. 211]*

$$\underset{\text{(Pink)}}{[Co(H_2O)_6]^{3+}(aq)} + 4Cl^-(aq) \rightleftharpoons \underset{\text{(Blue)}}{[CoCl_4]^{2-}(aq)} + 6H_2O(l)$$

1) $\Delta H > 0$ for the reaction
2) $\Delta H < 0$ for the reaction
3) $\Delta H = 0$ for the reaction
4) The sign of ΔH cannot be predicted on the basis of this information

Sol. (1) Since the reaction shifts to backwardd direction on cooling, this means that the backward reaction is exothermic reaection.

Therefore, the forward reaction is endothermic reaction and hence $\Delta H > 0$.

92. Arrange the following carbanions in order of their decreasing stability.

(A) $H_3C - C \equiv C^-$ **(B) $H-C \equiv C^-$**

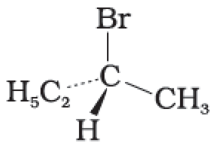
(C) $H_3C-CH_2^-$ *[XIth Part-II N.B. 350]*

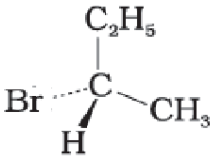
1) A > B > C 2) B > A > C

3) C > B > A 4) C > A > B

Sol. (2) $\underset{\text{Ⓑ} \quad \downarrow \, sp}{H-C\equiv C^{\ominus}} > \underset{\text{Ⓐ} \quad \downarrow \, sp}{CH_3-C\equiv C^{\ominus}} > \underset{\downarrow \, sp^3}{CH_3-CH_2^{\ominus}}$

93. The addition of HBr to 1-butene gives a mixture of products A, B and C

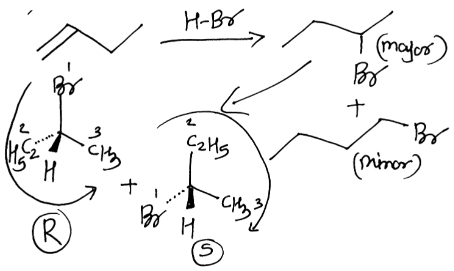
(A) 

(B) 

(C) $CH_3-CH_2-CH_2-CH_2-Br$

The mixture consists of *[XIth Part-II N.B. 389]*

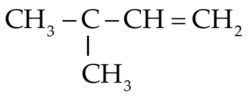
1) A and B as major and C as minor products
2) B as major, A and C as minor products
3) B as minor, A and C as major products
4) A and B as minor and C as major products

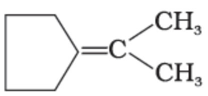
Sol. (1) 

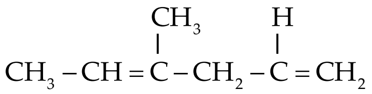
94. Which of the following alkenes on ozonolysis give a mixture of ketones only ?

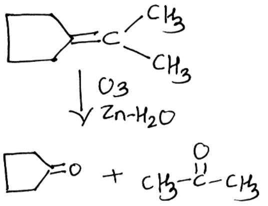
[XIth Part-II N.B. 391]

1) $CH_3-CH=CH-CH_3$

2) 
$CH_3-\underset{\large CH_3}{\underset{|}{C}}-CH=CH_2$

3) 

4) 
$CH_3-CH=\overset{\large CH_3}{\overset{|}{C}}-CH_2-\overset{\large H}{\overset{|}{C}}=CH_2$

Sol. (3) 

95. Which of the following statements is false ?

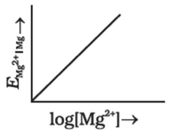
[XIIth Part-I N.B. 52]

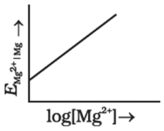
1) Two different solutions of sucrose of same molality prepared in different solvents will have the same depression in freezing point
2) The osmotic pressure of a solution is given by the equation $\pi = CRT$ (where C is the molarity of the solution)
3) Decreasing order of osmotic pressure for 0.01M aqueous solutions of barium chloride, potassium chloride, acetic acid and sucrose is $BaCl_2 > KCl > CH_3COOH >$ sucrose
4) According to Raoult's law, the vapour pressure exerted by a volatile component of a solution is directly proportional to its mole fraction in the solution

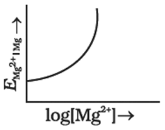
Sol. (1) When solvent is changed, Kf changes so ΔT_f cannot be same.

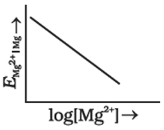
96. **Electrode potential for Mg electrode varies according to the equation**

$E_{Mg^{2+}|Mg} = E^0_{Mg^{2+}|Mg} - \frac{0.059}{2}\log\frac{1}{[Mg^{2+}]}$. **The graph of** $E_{Mg^{2+}|Mg}$ **vs log** $[Mg^{2+}]$ **is** ***[XIIth Part-I N.B. 73]***

1)


2)


3)


4)


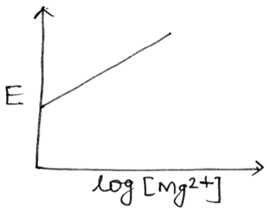
Sol. (2) $E = E^0 - \frac{0.059}{2}\log\frac{1}{[Mg^{2+}]}$

$E = E^0 + \frac{0.059}{2}\log[Mg^{2+}]$

$y = c + mx$

$\therefore$ Intercept $= E^0$

Slope $= m =$ +ve.



97. **Consider the Arrhenius equation given below and mark the correct option.**

$k = Ae^{-Ea/RT}$ ***[XIIth Part-I N.B. 114]***

1) Rate constant increases exponentially with increasing activation energy and decreasing temperature
2) Rate constant decreases exponentially with increasing activation energy and decreasing temperature
3) Rate constant increases exponentially with decreasing activation energy and decreasing temperature
4) Rate constant increases exponentially with deceasing activation energy and increasing temperature

Sol. (4) $K = Ae^{-Ea/RT}$

$K \propto T$

98. **When 1 mol $CrCl_3.6H_2O$ is treated with excess of $AgNO_3$, 3 mol of AgCl are obtained. The formula of the complex is :**

[XIIth Part-I N.B. 245]

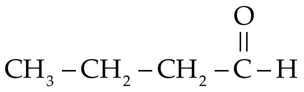
1) $[CrCl_3(H_2O)_3].3H_2O$
2) $[CrCl_2(H_2O)_4].2H_2O$
3) $[CrCl(H_2O)_5]Cl_2.H_2O$
4) $[Cr(H_2O)_6]Cl_3$

Sol. (4) As 3 moles AgCl formed

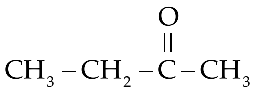
$\therefore$ so 3Cl outside sphere

$[Cr(H_2O)_6]Cl_3$.

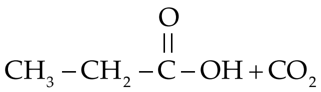
99. **Addition of water of alkynes occurs in acidic medium and in the presence of Hg^{2+} ions as a catalyst. Which of the following products will be formed on addition of water to but-1-yne under these conditions** ***[XIth Part-II N.B. 395]***

1)


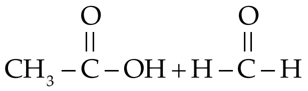
$CH_3-CH_2-CH_2-\overset{\overset{\Large O}{||}}{C}-H$

2)


$CH_3-CH_2-\overset{\overset{\Large O}{||}}{C}-CH_3$

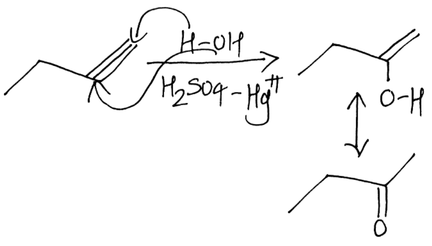
3)


$CH_3-CH_2-\overset{\overset{\Large O}{||}}{C}-OH+CO_2$

4)


$CH_3-\overset{\overset{\Large O}{||}}{C}-OH+H-\overset{\overset{\Large O}{||}}{C}-H$

Sol. (2)



100. **The most useful classification of drugs for medicinal chemists is __.** ***[XIIth Part-II N.B. 448]***

1) on the basis of chemical structure
2) on the basis of drug action
3) on the basis of molecular targets
4) on the basis of pharmacological effect

Sol. (3)

Section 'C' : Botany

Section-A

101. Which one of the following is odd one with respect to taxonomic rank? **[NCERT 11th Page 7]**

1) Mangifera
2) Carnivora
3) Diptera
4) Primata

Ans.(1)

102. Plant growth hormones extracted from a fungus and a fish are respectively

[NCERT 11th Page 249]

1) Gibberellins and Auxin
2) Ethylene and cytokinin
3) Auxin and 2,4-D
4) Gibberllin and kinetin

Ans.(4)

103. IBA is a **[NCERT 11th Page 248]**

1) Auxin
2) Gibberellin
3) Kinetin
4) None of these

Ans.(1)

104. Which of following statements are true?

[NCERT11th page.no. 205, Exe.]

1) Boron deficiency lead to stout axis
2) Every mineral element that is present in a cell is needed by the cell
3) Nitrogen as a nutrient element is highly immobile in the plants
4) It is very easy to establish the essentiality of micro-nutrients because they are required only in trace quantities.

Ans.(1)

105. Nitrogen fixation requires __A__ and energy in the form of __B__.

[NCERT11th page.no. 205, Summary reducing]

1) A - Oxidising agent, B - ADP
2) A - strong reducing agent, B - ATP
3) A - strong reducing agent, B - AMP
4) A - salts, B - $NADPH_2$

Ans.(2)

106. The control points, where a plant adjust the quantity and types of solutes that reach the xylem. **[NCERT11th page.no. 189, Exe.]**

1) Transport protein of epidermis cells
2) Transport protein of cortex cells
3) Transport protein of endodermal cells
4) Transport protein of pericycle cells

Ans.(3)

107. Rhizome, Agave and Bryophullum are produced by **[NCERT12th page.no. 07]**

1) Reduction cell division
2) equational cell division
3) Parthenocarpy
4) Parthenogenesis

Ans.(2)

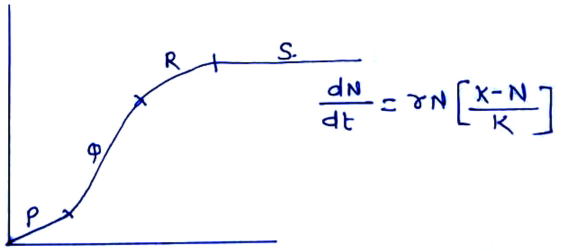
108. All of the following are major biomes in India except

[NCERT 12th, page 221, fig. 13.2, most IMP for NEET 2021]

1) Coniferous forest
2) Sea coast
3) Deciduous forest
4) Desert

Ans.(1)

109. The given diagram of logistic growth curve having asymptot, phase of deceleration, phase of acceleration, and lag phase, these are respectively **[NCERT 12th, Page-230, page-13.6]**



1) P, Q, R, S
2) S, Q, R, P
3) P, R, Q, S
4) S, R, Q, P

Ans.(4)

110. Humus serves as a reservoir because

[NCERT 12th, page 244, line 3, 4]

1) It is dark in colour
2) It is colloidal in nature
3) It is amorphous in nature
4) It is highly resistant to microbial activity

Ans.(2)

111. "Price tags on natural life support services" was the concept given by

[NCERT 12th, Page-255, 2nd last para]

1) Robert constanza
2) Conell
3) Charls darwin
4) Ramdev Mishra

Ans.(1)

112. The active chemical present in the plant "Rauwalfia vomitoria" is

[NCERT 12th, page-259, line-5,6]

1) Cardiac glycoside   2) Reserpine

3) Caffine   4) Cyclosporin A

Ans.(2)

113. In all the following places, sacred grooves are found, except **[NCERT 12th, Page-267, 2nd Para]**

1) Keolado National Park

2) Aravali Hills in Rajasthan

3) Khasi and Jaintia

4) Western Ghat of Maharashtra

Ans.(1)

114. Match the correct pairs of the acts and the year of their passing by Govt. of India

[NCERT 12th, Page-270,272]

Column-A	**Column-B**
a) Environmental act	**i) 1987**
b) Air act	**ii) 1981**
c) Noise is added into air pollution	**iii) 1986**

1) a-i, b-ii, c-iii   2) a-iii, b-ii, c-i

3) a-iii, b-i, c-ii   4) a-ii, b-iii, c-i

Ans.(2)

115. "Algal blooms" in polluted was is due to

[Que is designed by using 2 topics i.e. Environmental issue, page-275, Last para-2,3 line and Biological classification page-19- Eubacteria line 9,10]

1) Paramoecium   2) Blue-gree

3) Azolla   4) Oscillatoria

Ans.(2)

116. Which of the following is the organisms group is completely heterotrophic **[NCERT Pg. No.21]**

1) Monera   2) Protista

3) Protozoans   4) Chrysophytes

Ans.(3)

117. TMV is infectious to plants and it is

[NCERT Pg. No.26 figure]

1) Rod shape RNA virus

2) Spherical RNA virus

3) Rod shape DNA virus

4) Spherical shape DNA virus

Ans.(1)

118. Deepest dwelling algae is **[NCERT Pg. No.33]**

1) Red algae   2) Brown algae

3) Green algae   4) BGA

Ans.(1)

119. Elaborate dispersion mechanism of spores in mosses is by **[NCERT Pg. No.36 Based concept]**

1) Elaters   2) Peristomial teeth

3) Sorus   4) cones

Ans.(2)

120. *Colocasia* is modified to **[NCERT Pg. No.68]**

1) Storage of food

2) Storage of water

3) Photosynthetic petioles

4) Stem Support

Ans.(1)

121. A lateral branch with short internodes and each node bearing a rosette of leaves in

[NCERT Pg.No.69]

1) Mint and Jasmine

2) Ecornia and Pistia

3) Chrysanthemum and Banana

4) *Coccus nucifera*

Ans.(2)

122. Fascicular vascular cambium, interfascicular cambium and cork-cambium are examples of

[NCERT Pg.No.85]

1) Apical Meristem   2) Lateral meristem

3) Intercalary meristem4) All of these

Ans.(2)

123. Highly thicken with narrow lumen cavity is in **[NCERT Pg. No.86]**

1) Fibers   2) Sclereids

3) Sclerenchyma   4) Bast Fibers

Ans.(2)

124. Polymer of fructose is **[NCERT Pg.No.148]**

1) Inulin   2) Insulin

3) Starch   4) Callose

Ans.(1)

125. NADP reductase is located on

[NCERT Pg. no.214]

1) Lumen Side   2) Grana side

3) Stroma side   4) Matrix side

Ans.(3)

126. Both PSI and PSII are present in **[NCERT Pg.no.213 1st Para.]**

1) Grana lamellae
2) Stroma lamellae
3) Stroma
4) Matrix cristae

Ans.(1)

127. Incomplete oxidation of glucose is observed in **[NCERT Pg.no.228]**

1) Glycolysis – Cytoplasm
2) Glycolysis – Matrix
3) Krebs cycle – Matrix
4) Lactic acid fermentation - Stroma

Ans.(1)

128. In *Vllisneria* the female flower is **[NCERT Pg.no.29]**

1) Surface of water
2) Submerge in water
3) Aerial in some forms
4) Underground if terrestrial

Ans.(1)

129. To prevent autogamy in some plants the length of the filament and style shows variation such condition is called as **[NCERT Pg.no.31]**

1) Herkogamy
2) Heterostyle
3) Dichogamy
4) Monochliny

Ans.(2)

130. The variation in the Mendel study of inheritance for one gene is observe in following ration **[NCERT Pg.no.74]**

1) ¾ tall:(1/4 tall + ½ tall):¼dwarf
2) ¾ dwarf:(1/4 tall + ½ tall):¼tall
3) ¾ tall:(1/4 tall + ½ dwarf):¼dwarf
4) ¾ tall:(1/4 dwarf + ½ tall):¼dwarf

Ans.(1)

131. Walter Sutton with Boveri conclude that

1) Chromosomes and genes has different movement
2) Gene and chromosomes has separate inheritance
3) Chromosomes are larger than the genes
4) Chromosomes and genes shows parallel movement

Ans.(4)

132. In male Grasshopper, the number of X chromosomes in female is **[NCERT Pg.no.86]**

1) Only one
2) Only two
3) Only three
4) Absent

Ans.(2)

133. What is not True for DNA in prokaryotes **[NCERT Pg. no.99]**

1) Present in the form of a compact structure called nucleoid
2) The coils are maintained by non-histone basic proteins
3) Found in cytoplasm in a supercoiled condition
4) Packaged as nucleosomes along with histones

Ans.(4)

134. Read the statements given below and identifies the incorrect statement. **[NCERT Pg.no.120]**

1) The human genome contains 3164.7 million nucleotide bases.
2) The average gene consists of 30,000 bp and large portion is made up of repeated sequence.
3) The total number of genes is estimated at 30,000.
4) Chromosome Y has 231 genes and less than 2% of the genome codes for proteins.

Ans.(1)

135. The loss of which enzyme affects the synthesis of hnRNA in eukaryotes

1) RNA polymerase II
2) RNA primase
3) RNA polymerase III
4) RNA polymerase I

Ans.(1)

Section-B

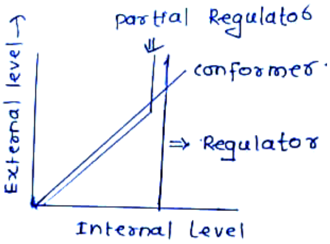
136. The movement of chloroplast due to streaming of cytoplasm is easily visible in **[NCERT 11th page.no. 185]**

1) Hydra
2) Hydrilla
3) Hypae
4) Higher plants

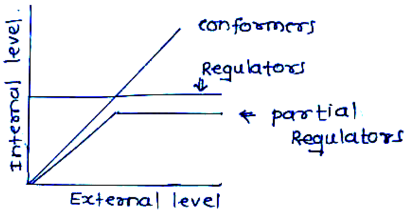
Ans.(2)

137. **Which of the following graph represent correct representation of 'different types of responses'** **[NCERT 12th, page-223, fig. 13.3]**

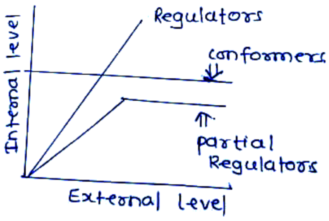
1)



2)



3)



4) More than one are correct

Ans.(4)

138. **What is the percentage of photosynthetically active radiation [PAR] in the incident solar radiation**

[Most IMP for NEET 2021, NCERT 12th Page-257, Exercise Q-5 and page 245- line 5,6]

1) 100% 2) 50%

3) 1-5% 4) 2 to 10%

Ans.(4)

139. **Which of the following is the correct formula for "Species area relationship" on log scale**

[NCERT 12th, Page-262]

1) Log S = log C + A log Z

2) Log S = log C + Z log A

3) Log C = Log S + Z log A

4) Log C = Log S + A log Z

Ans.(2)

140. **Which of the following is true for "Terror of Bengal"** **[Most IMP for NEET 2021]**

a) It's botanical name is Echhornia crasspies

b) It's worlds most problematic weed

c) It is pollinated by wind or insects.

[Question is designed by using two topics i.e. 1) Environmetnal issue, page-275, last two lines 276- 1st line and ii) SRFP; Page-29, 2nd para, line-15,16]

1) a, b 2) b,c

3) a, c 4) a, b, c

Ans.(4)

141. **Basidium is product of** **[NCERT Pg. No.24]**

1) Dikaryotic hyphae 2) Asexual reproduction

3) Fragmentation 4) Haploid hyphae

Ans.(1)

142. **Wings like pollen grain is present in**

[NCERT Pg. No.39 Based Concept]

1) Pinus 2) Cedrus

3) Ephedra 4) Ginkgo

Ans.(1)

143. ***Cassia* and *Gulmohar* has** **[NCERT Pg.No.74]**

1) Valvate aestivation 2) Imbricate aestivation

3) Vaxillary aestivation 4) Quincasial aestivation

Ans.(2)

144. **The cells of epiblema is protrude to form**

1) Cortex cells 2) Trichomes

3) Hairs 4) Glandular cells

Ans.(3)

145. **Binding of Substrate to enzymes alter in its shape to** **[NCERT Pg. No.157]**

1) Fit more tightly around the substrate

2) Fit loosely around the substrate

3) Increase the efficiency of substrates

4) Decrease the efficiency of enzymes

Ans.(1)

146. **How many carboxylation reaction occurs in HSK pathway** **[NCERT Pg.no.219 Figure]**

1) 1 2) 3

3) 2 4) 0

Ans.(3)

147. Non – iron containing proteins is

[NCERT Pg.no.233Figure]

1) NADH Dehydrogenase

2) Cytochrome bc complex

3) Succinate dehydrogenase

4) ATP synthase

Ans.(4)

148. Most common type of endosperm development is **[NCERT Pg.no.35]**

1) Cellular endosperm

2) free nuclear endosperm

3) Non-cellular endosperm

4) Persistent endosperm

Ans.(2)

149. Down's syndrome is a

1) Genetic disorder having one less copy of X chromosomes

2) Genetic disorder of one less copy of Y chromosomes

3) Genetic disorder having one more copy of 21 chromosomes

4) Genetic disorder having total of 47 chromosomes with extra X chromosomes

Ans.(3)

150. Which mRNA will be translated to a polypeptide chain containing 8 amino acids?

1) AUGUUAAUAGACGAGUAGCGACGAUGU

2)AUGAGACGGACUGCAUUCCCAACCUGA

3)AUGCCCAACCGUUAUUCAUGCUAGGAG

4)AUGUCGACAGUCUAAAACAGCGGGCCC

Ans.(2)

Section 'D' : Zoology

Section-A

151. Match the column [NCERT 11th Page 5]

Column-I	Column-II
A) Operculum	i) Ctenophora
B) Parapodia	ii) Mollusca
C) Scales	iii) Reptilia
D) Comb plates	iv) Osteichthyes
E) Radula	v) Annelida

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

Ans.(2)

152. Mark the correct match of the animal and its common name [NCERT 11th Page 56]

1) Trygon - dog fish
2) Ascidia - Lancelet
3) Pterophyllum - flying fish
4) Myxine - Hag fish

Ans.(4)

153. Pure-line breed refers to
[NCERT 12th Page 167]

1) Heterozygosity and self assortment
2) Homozygosity only
3) Linkage and cross over
4) None of these

Ans.(2)

154. The molecular glves and molecular knives are
[NCERT 12th Page 195]

1) Restriction enzymes, ligases
2) Ligases, restriction enzymes
3) alkaline phosphatases
4) Polymerases

Ans.(2)

155. Discovery of PCR and r-DNA technology is by [NCERT 12th Page 194]

1) Cohen and Boyer
2) Karry mullis, stanley cohen and Herbert Boyer
3) Paul Berg, Darwin
4) Aristotle, Cohen, Boyer

Ans.(2)

156. A transgenic 'food crop' which may help in overcoming vit A deficiency?
[NCERT 11th Page 199]

1) Maize	2) Golden rice
3) Bt-cotton	4) Flavr savr tomato

Ans.(2)

157. The physico-chemical approach to study and understand living organism is called as
[NCERT11th page.no. 123, unit introduction]

1) Zoology	2) Reductionst biology
3) Biology	4) Rebooster Biology

Ans.(2)

158. Sedimentation coefficient measures
[NCERT11th page.no. 136]

1) Phagocytosic nature	2) Cyclosis
3) Density and size	4) Coloruing ability

Ans.(3)

159. The plane of alignemnt of the chromosomes at [NCERT11th page.no. 165]

1) Anaphase	2) Telophase
3) Prophase	4) Metaphase

Ans.(4)

160. If the cell had diploid or 2n number of chromosomes at G_1, then the no. of chromosomes after S phase
[NCERT11th page.no. 163]

1) Becomes half i.e.; n
2) Becomes double i.e.; 4n
3) Remains same i.e.; 2n
4) Remains same i.e.; n

Ans.(3)

161. Which of the following statements is/are not true

a) Two or more "similar" organs forms an organ system
b) Tissue includes groups of 'similar' cells
c) Structure of the cell varies with it's function

[NCERT 11th, page-100, 2nd para line 4,5 & 3rd para 1st line]

1) a, b	2) b, c
3) a, c	4) a only

Ans.(4)

162. Assertion : All complex animals consists of only four types tissue, which forms many types of organs.

Reason : Tissues are organised in specific proportion and pattern to form organs.

1) If both Assertion and Reason are true and the Reason is the correct explanation of the Assertion

2) If both Assertion and Reason are true but the Reason is not the correct explanation of the Assertion

3) If Assertion is true statement and Reason is false

4) If both Assertion and Reason are false - statements

Ans.(1)

163. Which of the following is not the example of "Flagella used for locomotion".

[NCERT 11th, page 303, muscles line 3,4]

1) In spermatozoa 2) In sponges

3) In euglena 4) None of these

Ans.(2)

164. 'Wild contractions' are present in

[NCERT 11th, page 312, last para]

1) Myasthenia gravis 2) Muscular dystrophy

3) Tetany 4) Gout

Ans.(3)

165. Which of the following cells are known as 'stem cells' in human embryo

[NCERT 12th, page -54, line-4,5]

1) Inner cell mass 2) Trophoblast

3) Syncytotrophoblast 4) Cells of Rauber

Ans.(1)

166. After the completion of second meiotic division, the oocyte formed is

[NCERT 12th, page-52, line-3]

1) Ootid 2) Ovum

3) Secondary oocyte 4) Primary oocyte

Ans.(1)

167. Which of the following is/are the example of 'infertile couple' if they are not able to conceive

a) unprotected sexual cohabitation for 6 months

b) Sexual cohabitation with natural method of contraception since two year

c) Protected sexual cohabitation for last two years

[NCERT 12th, page-65, summary-last para]

1) a only 2) a, b, c

3) c only 4) none of these

Ans.(4)

168. Which of the following is/are true statements

a) In Cu7, this '7' stands for shape of copper-T

b) In multiload 375, this 375 stands for area of copper wire in mm^2.

c) In LNG-20, this 20 stands for the rate of release of drug [Hormone] i.e. 20 μg/24 hours

[Mast Imp, NCERT 12th, page-60, last para, NCERT based question]

1) a, b 2) b, c

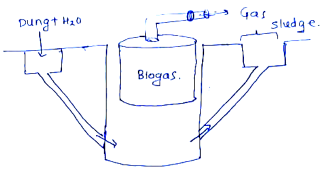
3) a, c 4) a, b, c

Ans.(4)

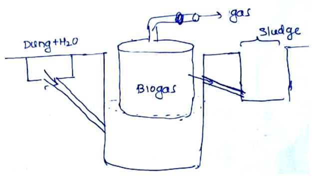
169. Which of the following is the correct diagram for a typical biogas plant

[NCERT 12th, Page-186, fig. 10.8]

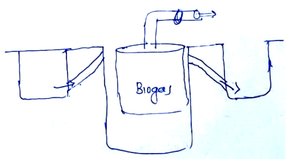
1)



2)



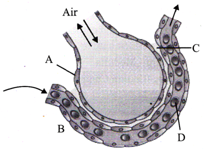
3)



4) More than one are correct

Ans.(2)

170. **In the given diagram, which of the following is not correctly labeled?** **[NCERT-XI, Page-273, Para-1]**



1) A-Alveolar wall
2) D-RBC
3) B-Artery
4) C-Basement substance

Ans.(3)

171. **Enzyme trypsinogen is changed to trypsin by-** **[NCERT-XI, Page-262, Para-4]**

1) Gastrin
2) Enterogastrone
3) Enterokinase
4) Secretin

Ans.(3)

172. **Milk protein is digested by-** **[NCERT-XI, Page-262, Para-3]**

1) Maltose
2) Rennin
3) Trypsin
4) Lactose

Ans.(2)

173. **The depolarisation of the ventricles is represented by-** **[NCERT-XI, Page-286, Para-4]**

1) P-wave
2) Q-wave
3) T-wave
4) QRS complex

Ans.(4)

174. **SAN (Sino-atrial node) is made up of :** **[NCERT-XI, Page-284, Para-2,]**

1) Modified nervous tissue
2) Modified muscle tissue
3) Modified epithelial tissue
4) Modified connective tissue

Ans.(2)

175. **Bony fishes are** **[NCERT-XI, Page-290, Para-2]**

1) Ureotelic
2) Uricotelic
3) Aminotelic
4) Ammonotelic

Ans.(4)

176. **Counter current mechanism observed in the renal medulla helps in the formation of -** **[NCERT-XI, Page-296, Para-1]**

1) Concentrated urine
2) Dilute urine
3) Reabsorption of nutrients
4) Reabsorption of creatinine

Ans.(1)

177. **Diabetes insipidus is under control of** **[NCERT-XI, Page-334, Para-2]**

1) ACTH
2) TSH
3) ADH
4) aldosterone

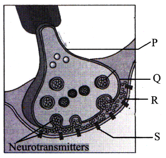
Ans.(3)

178. **Cretinism is due to less secretion of** **[NCERT-XI, Page-335, Para-1]**

1) Thyroid
2) Pituitary
3) Parathyroid
4) Adrenal

Ans.(1)

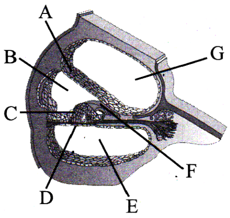
179. **Which of the following is incorrect w.r.t. synapse?** **[NCERT-XI, Page-319, Fig- 21.3]**



1) Q-Pre-synaptic membrane
2) S-Receptors
3) P-Axon terminal
4) R-Synaptic Knob

Ans.(4)

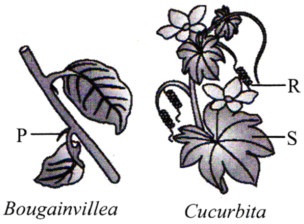
180. **Select the wirte option as shown in the diagram :** **[NCERT-XI, Page-326, Fig 21.8]**



	Scala vestibuli	Basilar membrane	Organ of Corti
1)	B	D	F
2)	E	A	C
3)	G	A	F
4)	G	D	C

Ans.(1)

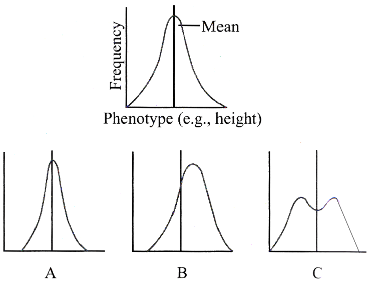
181. **Which of the following structures represent homology in the given diagrams?** **[NCERT-XII, Page-131, Fig- 7.3 (a)]**



1) P and S
2) P and R
3) Q and S
4) Q and R

Ans.(2)

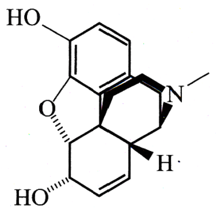
182. **Following is the diagrammatic representation of the operation of natural selection on different traits. Which of the following options correctly identifies all the three graphs A, B and C.** **[NCERT-XII, Page-136, Fig- 7.8]**



	A	B	C
1)	Directional	Stabilizing	Disruptive
2)	Stabilizing	Directional	disruptive
3)	Disruptive	stabilizing	Directional
4)	Directional	Disruptive	Stabilizing

Ans.(2)

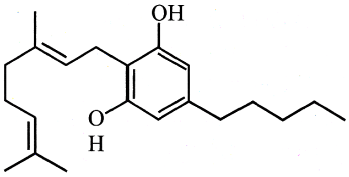
183. **The chemical compound whose chemical structure is given below is obtained form which plant?** **[NCERT-XII, Page-158,159, Para 8]**



1) Papaver somniferum
2) Erythroxylum coca
3) Atropa beladona
4) cannabis sativa

Ans.(1)

184. **Which of these is a member of the group of chemicals whose chemical structure is given below?** **{NCERT-XII, Page-159, Para-8]**



1) Marijuna
2) Hashish
3) Ganja
4) All of these

Ans.(4)

185. **The function of thyrocalcitonin is -** **[NCERT-XI, Page-335, Para-5]**

1) Lowers Ca^{2+} level in blood
2) Elevates K^{+} level in blood
3) Elevates Ca^{2+} level in blood
4) None of the above

Ans.(1)

Section-B

186. **Skin is dry without oil glands except the oil glands except the oil gland at the base of the tail is a character of?** **[NCERT 11th Page 58]**

1) Amphibia
2) Aves
3) Reptiles
4) fish

Ans.(2)

187. **Which of the following insects is useful for us?** **[NCERT 11th Page 53]**

1) Musca
2) Bombyx
3) Pheretima
4) Periplaneta

Ans.(2)

188. **The Humulin production was done by American based company ____ in year _____**

1) Texas, 1981
2) IRRI, 1980
3) Eli Lilly, 1981
4) Eli Lilly, 1983

Ans.(4)

189. **Cortwheel organisation found in**

[NCERT 11th page.no. 137]

1) Ribosomes
2) Mitochondria
3) Plastids
4) Centrioles

Ans.(4)

190. **The department which initiated the Ganga action plant and Yamuna action plant is/are** **[NCERT 12th, page-185, 3rd para, line 1,2]**

1) Department of natural resource conservation
2) KVIC and IRAI
3) Ministry of environment and forest
4) Ministry of social welfare

Ans.(3)

191. **"Cisternae" are present in**

[Que. is designed by using two topics is 1) cell 2) Locomotion]

1) Sarcoplasmic reticulum
2) Golgi compleex
3) Endoplasmic reticulum
4) All of these

Ans.(4)

192. **A woman with 'last menstrual period' an 21/01/2020, what would be the expected date of delivery in the same case**

[NCERT 12th, page 54, line 6,7, NCERT based question]

1) 21/10/2020
2) 21/10/2021
3) 21/09/2021
4) 21/09/2020

Ans.(1)

193. **Three water samples, namely river water, untreated sewage water and secondary effluent, discharged from, a sewage treatment plant, were subjected to BOD test. The sample were lebelled A, B, C but the laboratory attendent did not note, which was which. The BOD values of three samples A, B, C were recorded as 20 mg/L, 8mg/L, 400 mg/L respectively. Can you tell the correct lebelling for A, B and C respectively**

[Most IMP que for NEET 2021]

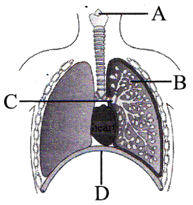
[NCERT 12th, Page-189, exercise que-2]

1) Secondary effluent discharged from STP, river water, untreated water
2) River water, untreated water, secondary effluent discharged from STP
3) Secondary effluent discharged from STP, untreated water, river water
4) None of these

Ans.(1)

194. **The given figure shows the diagrammatic view of human respiratory system. Identify A, B, C and D.**

[NCERT-XI, Page-269, Fig - 17.1]



	A	B	C	D
1)	Epiglottis	Alveoli	Bronchus	Diaphragm
2)	Epiglottis	Alveoli	Bronchioles	Diaphragm
3)	Soundbox	Alveoli	Bronchus	diaphragm
4)	Soundbox	alveoli	Bronchioles	diaphragm

Ans.(1)

195. **Pancreatic lipase acts upon**

[NCERT-XI, Page-263, Para-3]

1) Glycogen
2) Starch
3) Fat
4) Polypertides

Ans.(3)

196. **The 'Lub' and "Dub" heart sound are due to**

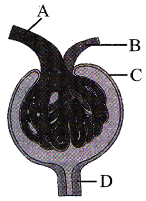
[NCERT-XI, Page-285, Para-3]

1) Opening of heart valves
2) Action of papillary muscles
3) Closing of heart valves
4) Activity of pacemaker

Ans.(3)

197. **The given figure perpesents the Malpighian body. Identify the labeled parts A to D and select the correct option-**

[NCERT-XI, Page-292, Fig- 19.3]



	A	B	C	D
1)	Efferent arteriole	afferent arteriole	Bowman's capsule	Proximal convoluted tubule
2)	Afferent arteriole	Efferent arteriole	Renal corpuscle	Proximal convoluted tubule
3)	Afferent arteriole	Efferent arteriole	Bowman's capsule	Proximal convoluted tubule
4)	Afferent arteriole	Efferent arteriole	Bowman's capsule	Distal convoluted tubule

Ans.(3)

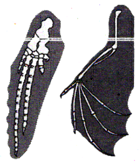
198. **Layers of rods, cones and ganglion cells are present in-** **[NCERT-XI, Page-324, Para-2]**

1) Retina
2) sclerotic layer
3) Choroid layer
4) Schlemm's canal

Ans.(1)

199. **The following diagrams represents :**

[NCERT-XII, Page-131, Fig- 7.3 (b)]



1) Homologous organ
2) Vestigial organ
3) Analogous organ
4) Convergent evolution

Ans.(1)

200. **Short-lived immunity acquired from mother to foetus across placenta or through mother's milk to the infant is categorized as**

[NCERT-XII, Page-152, Para-8]

1) Active immunity
2) Passive immunity
3) Cellular immunity
4) Innate non-specific immunity

Ans.(2)