FINAL NEET(UG)–2021 EXAMINATION

(Held On Sunday 12th SEPTEMBER, 2021)

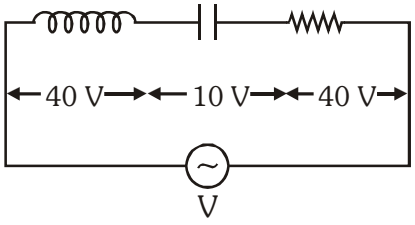
PHYSICS

TEST PAPER WITH ANSWER & SOLUTION

SECTION - A (PHYSICS)

1. An inductor of inductance L, a capacitor of capacitance C and a resistor of resistance 'R' are connected in series to an ac source of potential difference 'V' volts as shown in figure.

Potential difference across L, C and R is 40 V, 10 V and 40 V, respectively. The amplitude of current flowing through LCR series circuit is $10\sqrt{2}$ A. The impedance of the circuit is :-



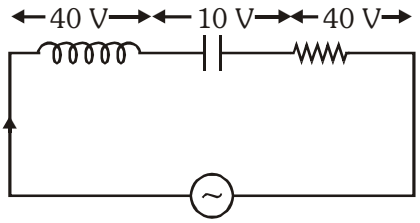
(1) $4\sqrt{2}\,\Omega$ (2) $5/\sqrt{2}\,\Omega$

(3) 4 Ω (4) 5 Ω

Ans. (4)

Sol. $I_0 = 10\sqrt{2}$ A

$$I_{RMS} = \frac{I_0}{\sqrt{2}} = 10A$$



$$V_{RMS} = \sqrt{V_R^2 + (V_L - V_C)^2}$$

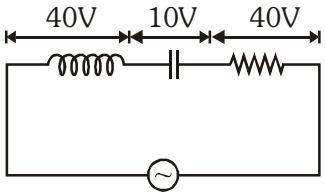
$$= \sqrt{(40)^2 + (40-10)^2}$$

$$= 50 \text{ V}$$

$$Z = \frac{V_{RMS}}{I_{RMS}} = \frac{50\text{ V}}{10\text{ V}} = 5\Omega$$

For Hindi :-

$I_{rms} = 10\sqrt{2}$A



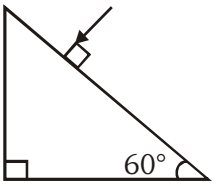
$$V_{rms} = \sqrt{V_R^2 + (V_L - V_C)^2}$$

$$= \sqrt{40^2 + (40-10)^2}$$

$$= 50 \text{ V}$$

$$Z = \frac{V_{rms}}{I_{rms}} = \frac{50V}{10\sqrt{2}A} = \frac{5}{\sqrt{2}}\Omega$$

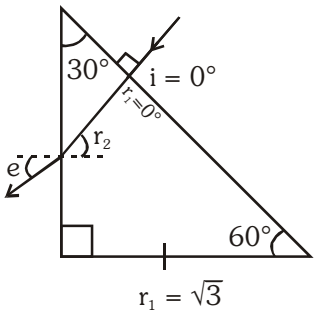
2. Find the value of the angle of emergence from the prism. Refractive index of the glass is $\sqrt{3}$.



(1) 60° (2) 30° (3) 45° (4) 90°

Ans. (1)

Sol.



$r_1 = \sqrt{3}$

$r_1 + r_2 = A = 30°$

$r_2 = 30°$ ($r_1 = 0°$)

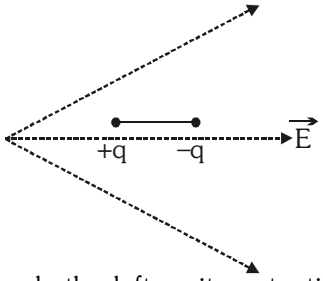
from Snell's law

$\sqrt{3}\sin r_2 = 1 \times \sin e$

$\sqrt{3}\sin 30° = \sin e$

$e = 60°$

3. A dipole is placed in an electric field as shown. In which direction will it move ?

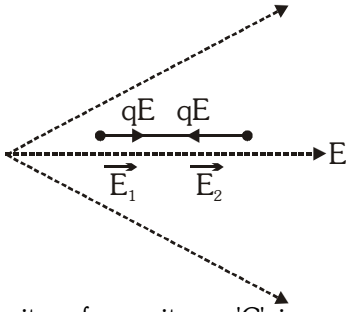


(1) towards the left as its potential energy will increase.
(2) towards the right as its potential energy will decrease.
(3) towards the left as its potential energy will decrease.
(4) towards the right as its potential energy will increase.

Ans. (2)

Sol. $|\vec{E}_1| > |\vec{E}_2|$

as field lines are closer at charge +q,
so net force on the dipole acts towards right side.
A system always moves to decrease it's potential energy.



4. A capacitor of capacitance 'C', is connected across an ac source of voltage V, given by
$V = V_0 \sin\omega t$
The displacement current between the plates of the capacitor, would then be given by :

(1) $I_d = V_0 \omega C \cos\omega t$ (2) $I_d = \frac{V_0}{\omega C}\cos\omega t$

(3) $I_d = \frac{V_0}{\omega C}\sin\omega t$ (4) $I_d = V_0 \omega C \sin\omega t$

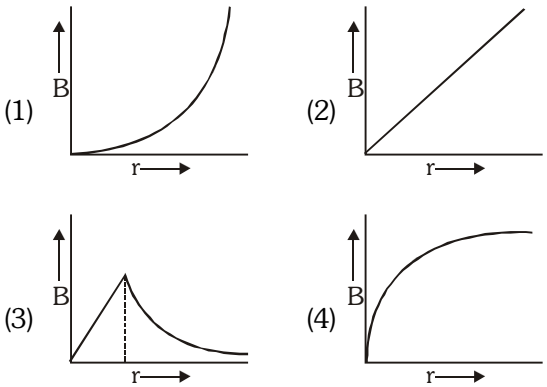
Ans. (1)

Sol. $q = CV$

$$\frac{dq}{dt} = \frac{CdV}{dt}$$

$I_d = C(V_0\ \omega \cos\omega t)$
$= V_0\omega C \cos\omega t$

5. A thick current carrying cable of radius 'R' carries current 'I' uniformly distributed across its cross-section. The variation of magnetic field B(r) due to the cable with the distance 'r' from the axis of the cable is represented by :



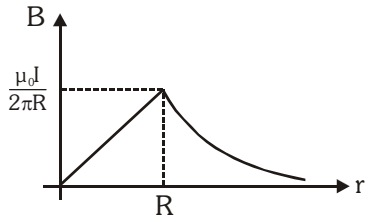
Ans. (3)

Sol. Inside a current carrying cylindrical conductor,

$$B = \frac{\mu_0 I}{2\pi R^2} r \quad \therefore B \propto r$$

Outside the conductor,

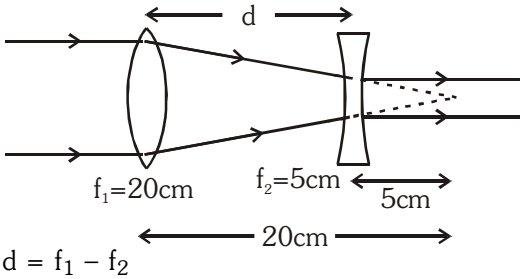
$$B = \frac{\mu_0 I}{2\pi r} \therefore B \propto \frac{1}{r}$$



6. A convex lens 'A' of focal length 20 cm and a concave lens 'B' of focal length 5 cm are kept along the same axis with a distance 'd' between them. If a parallel beam of light falling on 'A' leaves 'B' as a parallel beam, then the distance 'd' in cm will be :-
(1) 25 (2) 15 (3) 50 (4) 30

Ans. (2)

Sol.



$d = f_1 - f_2$
$= 20 - 5$
$= 15$ cm

7. An electromagnetic wave of wavelength 'λ' is incident on a photosensitive surface of negligible work function. If 'm' mass is of photoelectron emitted from the surface has de-Broglie wavelength λ_d, then :

(1) $\lambda = \left(\frac{2m}{hc}\right)\lambda_d^2$ (2) $\lambda_d = \left(\frac{2mc}{h}\right)\lambda^2$

(3) $\lambda = \left(\frac{2mc}{h}\right)\lambda_d^2$ (4) $\lambda = \left(\frac{2h}{mc}\right)\lambda_d^2$

Ans. (3)

Sol. $\frac{hc}{\lambda} = K_{max} + \phi$ [given ϕ is neglibible]

so, $\frac{hc}{\lambda} = K_{max}$

$\lambda_d = \frac{h}{\sqrt{2m\,K_{max}}} \Rightarrow K_{max} = \frac{h^2}{2m\lambda_d^2}$

$\left(\frac{hc}{\lambda}\right) = \frac{h^2}{2m\lambda_d^2} \Rightarrow \lambda = \left(\frac{2mc}{h}\right)\lambda_d^2$

8. **Column-I** gives certain physical terms associated with flow of current through a metallic conductor. **Column-II** gives some mathematical relations involving electrical quantities. Match **Column-I** and **Column-II** with appropriate relations.

Column-I		Column-II	
(A)	Drift Velocity	(P)	$\frac{m}{ne^2\rho}$
(B)	Electrical Resistivity	(Q)	nev_d
(C)	Relaxation Period	(R)	$\frac{eE}{m}\tau$
(D)	Current Density	(S)	$\frac{E}{J}$

(1) (A)-(R), (B)-(S), (C)-(P), (D)-(Q)
(2) (A)-(R), (B)-(S), (C)-(Q), (D)-(P)
(3) (A)-(R), (B)-(P), (C)-(S), (D)-(Q)
(4) (A)-(R), (B)-(Q), (C)-(S), (D)-(P)

Ans. (1)

Sol. (A) $\upsilon_d = \left(\frac{eE}{m}\right)\tau$

(B) $J = \sigma E = E/\rho$
$\Rightarrow \rho = E/J$

(C) $\rho = \frac{E}{ne\upsilon_d}$

$\upsilon_d = \frac{E}{ne\rho}$

$\frac{eE}{m}\tau = \frac{E}{ne\rho}$

$\tau = \frac{m}{ne^2\rho}$

(D) $i = neA\upsilon_d$

$\frac{i}{A} = ne\upsilon_d$

$J = ne\upsilon_d$

9. A radioactive nucleus ${}^A_Z X$ undergoes spontaneous decay in the sequence

${}^A_Z X \to {}_{Z-1}B \to {}_{Z-3}C \to {}_{Z-2}D$, where Z is the atomic number of element X. The possible decay particles in the sequence are :

(1) α, β^-, β^+ (2) α, β^+, β^-
(3) β^+, α, β^- (4) β^-, α, β^+

Ans. (3)

Sol. ${}^A_Z X \xrightarrow{B^+} {}_{Z-1}B \xrightarrow{\alpha} {}_{Z-3}C \xrightarrow{\beta^-} {}_{Z-2}D$

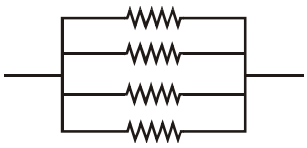
β^+ decreases atomic number by 1
α decreases atomic number by 2
β^- increases atomic number by 1

10. The effective resistance of a parallel connection that consists of four wires of equal length, equal area of cross-section and same material is 0.25 Ω. What will be the effective resistance if they are connected in series ?

(1) 0.25 Ω (2) 0.5 Ω
(3) 1 Ω (4) 4Ω

Ans. (4)

Sol. $R_{||} = \frac{R}{4} = 0.25\ \Omega$



$R = 1\ \Omega$

$R_{series} = 4R$
$= 4(1)$
$= 4\Omega$

11. A particle is released from height S from the surface of the Earth. At a certain height its kinetic energy is three times its potential energy. The height from the surface of earth and the speed of the particle at that instant are respectively :

(1) $\frac{S}{4}, \frac{3gS}{2}$ (2) $\frac{S}{4}, \frac{\sqrt{3gS}}{2}$

(3) $\frac{S}{2}, \frac{\sqrt{3gS}}{2}$ (4) $\frac{S}{4}, \sqrt{\frac{3gS}{2}}$

Ans. (4)

Sol. U + KE = E

4U = E = mgS

4mgh = mgS

$h = \frac{S}{4}$

$V = \sqrt{2g\left(\frac{3S}{4}\right)} = \sqrt{\frac{3gS}{2}}$

12. The half-life of a radioactive nuclide is 100 hours. The fraction of original activity that will remain after 150 hours would be :

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

Ans. (2)

Sol. $\frac{A}{A_0} = \left(\frac{1}{2}\right)^{t/T_H} = \left(\frac{1}{2}\right)^{150/100} = \frac{1}{2\sqrt{2}}$

13. A cup of coffee cools from 90°C to 80°C in t minutes, when the room temperature is 20°C. The time taken by a similar cup of coffee to cool from 80°C to 60°C at a room temperature same at 20°C is :

(1) $\frac{13}{10}t$ (2) $\frac{13}{5}t$ (3) $\frac{10}{13}t$ (4) $\frac{5}{13}t$

Ans. (2)

Sol. According to Newton's law of cooling

$$\frac{T_1 - T_2}{t} = K\left[\frac{T_1 + T_2}{2} - T_0\right]$$

For 1st cup of coffee,

$$\Rightarrow \quad \frac{90-80}{t} = K\left[\frac{90+80}{2} - 20\right] \quad ...(1)$$

For 2nd cup of coffee,

$$\Rightarrow \quad \frac{80-60}{t'} = K\left[\frac{80+60}{2} - 20\right] \quad ...(2)$$

Divide (1) by (2)

$$\frac{t'}{2t} = \frac{65}{50} \Rightarrow t' = \frac{13}{5}t$$

14. The number of photons per second on an average emitted by the source of monochromatic light of wavelength 600 nm, when it delivers the power of 3.3×10^{-3} watt will be : ($h = 6.6 \times 10^{-34}$ Js)

(1) 10^{18} (2) 10^{17}

(3) 10^{16} (4) 10^{15}

Ans. (3)

Sol. $p = \frac{nhc}{\lambda} \Rightarrow n = \frac{p\lambda}{hc}$

$$n = \frac{3.3\times10^{-3}\times600\times10^{-9}}{6.6\times10^{-34}\times3\times10^{8}} \simeq 10^{16}$$

15. A body is executing simple harmonic motion with frequency 'n', the frequency of its potential energy is :-

(1) n (2) 2n

(3) 3n (4) 4n

Ans. (2)

Sol. Displacement equation of SHM of frequency 'n'

$x = A\sin(\omega t) = A\sin(2\pi nt)$

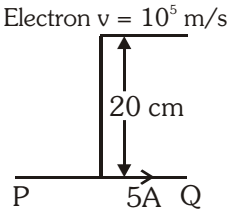
Now,

Potential energy $U = \frac{1}{2}kx^2 = \frac{1}{2}KA^2\sin^2(2\pi nt)$

$$= \frac{1}{2}kA^2\left[\frac{1-\cos(2\pi(2n)t)}{2}\right]$$

So frequency of potential energy = 2n

16. An infinitely long straight conductor carries a current of 5 A as shown. An electron is moving with a speed of 10^5 m/s parallel to the conductor. The perpendicular distance between the electron and the conductor is 20 cm at an instant. Calculate the magnitude of the force experienced by the electron at that instant.

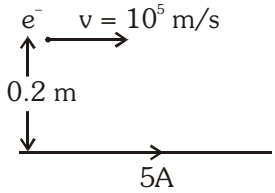


(1) 4×10^{-20} N (2) $8\pi \times 10^{-20}$ N

(3) $4\pi \times 10^{-20}$ N (4) 8×10^{-20} N

Ans. (4)

Sol.



$$f = ev\left(\frac{\mu_0 i}{2\pi r}\right)$$

$$f = \frac{1.6\times10^{-19}\times10^5\times2\times10^{-7}\times5}{0.2}$$

$f = 8 \times 10^{-20}$ Newton

17. If force [F], acceleration [A] and time [T] are chosen as the fundamental physical quantities. Find the dimensions of energy.

(1) [F] [A] [T] (2) [F] [A] [T^2]

(3) [F] [A] [T^{-1}] (4) [F] [A^{-1}] [T]

Ans. (2)

Sol. $E \propto F^a A^b T^c$

$[M^1L^2T^{-2}] \propto [M^1L^1T^{-2}]^a [LT^{-2}]^b [T]^c$

$a = 1$

$a + b = 2 \Rightarrow b = 1$

$-2a - 2b + c = -2$

$\Rightarrow c = 2$

$a = 1 \quad b = 1 \quad c = 2$

$E \propto [F] [A] [T^2]$

18. Match **Column-I** and **Column-II** and choose the **correct** match from the given choices.

Column-I		Column-II	
(A)	Root mean square speed of gas molecules	(P)	$\frac{1}{3}nm\bar{v}^2$
(B)	Pressure exerted by ideal gas	(Q)	$\sqrt{\frac{3RT}{M}}$
(C)	Average kinetic energy of a molecule	(R)	$\frac{5}{2}RT$
(D)	Total internal energy of 1 mole of a diatomic gas	(S)	$\frac{3}{2}k_BT$

(1) (A) - (R), (B) - (P), (C) - (S), (D) - (Q)

(2) (A) - (Q), (B) - (R), (C) - (S), (D) - (P)

(3) (A) - (Q), (B) - (P), (C) - (S), (D) - (R)

(4) (A) - (R), (B) - (Q), (C) - (P), (D) - (S)

Ans. (3)

Sol. Root mean sqaure speed of gas molecules

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

Pressure exerted by ideal Gas

$$P = \frac{1}{3}\rho\upsilon_{rms}^2$$

$$P = \frac{1}{3}mn\upsilon^2$$

$\rho = mn, \ \upsilon_{rms}^2 = \bar{\upsilon}^2$

Average kinetic energy of a molecular

$$KE = \frac{3}{2}KT$$

Total internal energy of 1 mole of a diatomic gas

$$U = \frac{f}{2}\mu RT$$

$$U = \frac{5}{2}RT \text{ (For 1 mole diatomic gas)}$$

19. A small block slides down on a smooth inclined plane, starting from rest at time t = 0. Let S_n be the distance travelled by the block in the interval t = n − 1 to t = n. Then, the ratio $\frac{S_n}{S_{n+1}}$ is :

(1) $\frac{2n-1}{2n}$ (2) $\frac{2n-1}{2n+1}$

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

Ans. (2)

Sol. S_n = Distance in n^{th} sec. i.e. t = n − 1 to t = n

S_{n+1} = Distance in $(n+1)^{th}$ sec.

i.e. t = n to t = n + 1

So as we know

$$S_n = \frac{a}{2}(2n-1) \quad a = \text{acceleration}$$

$$\frac{S_n}{S_{n+1}} = \frac{\frac{a}{2}(2n-1)}{\frac{a}{2}(2(n+1)-1)} = \frac{2n-1}{2n+1}$$

$$\frac{S_n}{S_{n+1}} = \frac{2n-1}{2n+1}$$

20. A nucleus with mass number 240 breaks into two fragments each of mass number 120, the binding energy per nucleon of unfragmented nuclei is 7.6 MeV while that of fragments is 8.5 MeV. The total gain in the Binding Energy in the process is :

(1) 0.9 MeV (2) 9.4 MeV

(3) 804 MeV (4) 216 MeV

Ans. (4)

Sol. $X^{240} \rightarrow Y^{120} + Z^{120}$

given binding energy per nucleon of X, Y & Z are 7.6 MeV, 8.5 MeV & 8.5 MeV respectively.

Gain in binding energy is :-

Q = Binding Energy of products – Binding energy of reactants

= (120 × 8.5 × 2) – (240 × 7.6) MeV

= 216 MeV

21. A screw gauge gives the following readings when used to measure the diameter of a wire

Main scale reading : 0 mm

Circular scale reading : 52 divisions

Given that 1 mm on main scale corresponds to 100 divisions on the circular scale. The diameter of the wire from the above data is :

(1) 0.52 cm (2) 0.026 cm

(3) 0.26 cm (4) 0.052 cm

Ans. (4)

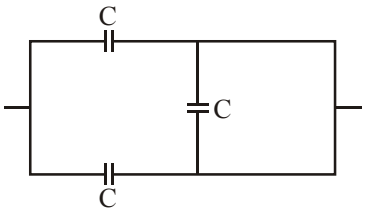
Sol. Least count = $\frac{1mm}{100} = 0.01mm$

Diameter = main scale reading + circular scale reading

Diameter = 0 + 52 × 0.01 mm

= 0.52 mm = 0.052 cm

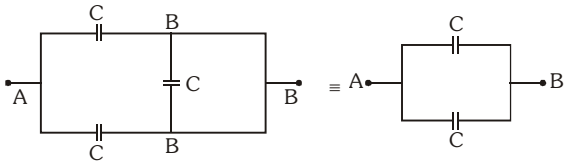
22. The equivalent capacitance of the combination shown in the figure is :



(1) 3C (2) 2C (3) C/2 (4) 3C/2

Ans. (2)

Sol.



(one capacitor gets short)

$\Rightarrow C_{eq} = C_1 + C_2$

= C + C

= 2C

23. A lens of large focal length and large aperture is best suited as an objective of an astronomical telescope since :

(1) a large aperture contributes to the quality and visibility of the images.

(2) a large area of the objective ensures better light gathering power.

(3) a large aperture provides a better resolution.

(4) all of the above.

Ans. (4)

Sol. $MP = \frac{f_0}{f_e}$

$R.P. = \frac{a}{1.22\lambda}$

large aperture(a) of the objective lens provides better resolution $\therefore$ good quality of image is formed and also it gathers more light.

24. Two charged spherical conductors of radius R_1 and R_2 are connected by a wire. Then the ratio of surface charge densities of the spheres (σ_1/σ_2) is:

(1) $\frac{R_1}{R_2}$ (2) $\frac{R_2}{R_1}$

(3) $\sqrt{\left(\frac{R_1}{R_2}\right)}$ (4) $\frac{R_1^2}{R_2^2}$

Ans. (2)

Sol. For a conducting sphere

$E = \frac{\sigma}{\epsilon_0}$

$V = \frac{\sigma R}{\epsilon_0}$

as both spheres have same potential after connecting with wire,

$V_1 = V_2$

$\sigma_1 R_1 = \sigma_2 R_2$

$\Rightarrow \frac{\sigma_1}{\sigma_2} = \frac{R_2}{R_1}$

25. A spring is stretched by 5 cm by a force 10 N. The time period of the oscillations when a mass of 2 kg is suspended by it is :

(1) 0.0628 s (2) 6.28 s

(3) 3.14 s (4) 0.628 s

Ans. (4)

Sol. $F = kx$

$10 = k(5 \times 10^{-2})$

$k = \frac{10}{5\times10^{-2}} = 2 \times 10^2 = 200$ N/m

Now $T = 2\pi\sqrt{\frac{m}{k}} = 2\pi\sqrt{\frac{2}{200}} = \frac{2\pi}{10} = 0.628$ sec.

26. For a plane electromagnetic wave propagating in x-direction, which one of the following combination gives the correct possible directions for electric field (E) and magnetic field (B) respectively?

(1) $\hat{j}+\hat{k}, \hat{j}+\hat{k}$ (2) $-\hat{j}+\hat{k}, -\hat{j}-\hat{k}$

(3) $\hat{j}+\hat{k}, -\hat{j}-\hat{k}$ (4) $-\hat{j}+\hat{k}, -\hat{j}+\hat{k}$

Ans. (2)

Sol. $\vec{v} \parallel \vec{E}\times\vec{B}, \hat{v} = \hat{i}$

Option (1) $\vec{E}\times\vec{B} = \vec{0}$ $(\vec{E} \parallel \vec{B})$

Option (2) $\vec{E}\times\vec{B} = 2\hat{i}$ (parallel to $\vec{v}$)

Option (2) $\vec{E}\times\vec{B} = \vec{0}$ $(\vec{E} \nparallel \vec{B})$

Option (2) $\vec{E}\times\vec{B} = \vec{0}$ $(\vec{E} \parallel \vec{B})$

27. The escape velocity from the Earth's surface is υ. The escape velocity from the surface of another planet having a radius, four times that of Earth and same mass density is:

(1) υ (2) 2υ

(3) 3υ (4) 4υ

Ans. (4)

Sol. $v_e = \sqrt{\frac{2GM}{R}} = \sqrt{\frac{2G}{R}\times\frac{4}{3}\pi R^3\rho}$

$= \sqrt{\frac{8\pi G\rho}{3}R^2}$

$\Rightarrow v_e \propto R$

$\Rightarrow \frac{v_e}{\upsilon} = \frac{4R}{R} \Rightarrow v_e = 4v$

28. In a potentiometer circuit a cell of EMF 1.5 V gives balance point at 36 cm length of wire. If another cell of EMF 2.5 V replaces the first cell, then at what length of the wire, the balance point occurs?

(1) 60 cm (2) 21.6 cm

(3) 64 cm (4) 62 cm

Ans. (1)

Sol. $\frac{E_1}{E_2} = \frac{\phi\ell_1}{\phi\ell_2}$

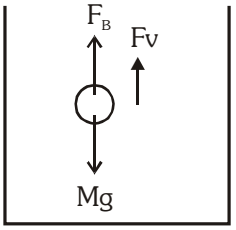
$\frac{1.5}{2.5} = \frac{36}{\ell_2} \Rightarrow \ell_2 = 36\times\frac{5}{3} = 60$ cm

29. The velocity of a small ball of mass M and density d, when dropped in a container filled with glycerine becomes constant after some time. If the density of glycerine is $\frac{d}{2}$, then the viscous force acting on the ball will be :

(1) $\frac{Mg}{2}$ (2) Mg (3) $\frac{3}{2}$Mg (4) 2Mg

Ans. (1)

Sol. Mass = M



Density of ball = d

Density of glycerine = $\frac{d}{2}$

$F_B = V_s \rho_\ell g = V\frac{d}{2}g$

$F_g = Mg = vdg$

for constant velocity, $F_{net} = 0$

$\therefore \quad F_B + F_v = M_g$

$$F_v = M_g - F_B = Vdg - \frac{Vdg}{2} = \frac{Vdg}{2} = \frac{Mg}{2}$$

30. A parallel plate capacitor has a uniform electric field '$\vec{E}$' in the space between the plates. If the distance between the plates is 'd' and the area of each plate is 'A', the energy stored in the capacitor is : (ε_0 = permittivity of free space)

(1) $\frac{1}{2}\varepsilon_0 E^2$ (2) $\varepsilon_0 EAd$

(3) $\frac{1}{2}\varepsilon_0 E^2 Ad$ (4) $\frac{E^2 Ad}{\varepsilon_0}$

Ans. (3)

Sol. $E = \frac{1}{2}CV^2$

$$= \frac{1}{2}\left(\frac{\varepsilon_0 A}{d}\right)(Ed)^2$$

$$= \frac{1}{2}\varepsilon_0 E^2 Ad$$

31. The electron concentration in an n-type semiconductor is the same as hole concentration in a p-type semiconductor. An external field (electric) is applied across each of them. Compare the currents in them.

(1) current in n-type = current in p-type

(2) current in p-type > current in n-type

(3) current in n-type > current in p-type

(4) No current will flow in p-type, current will only flow in n-type

Ans. (3)

Sol. In N type semiconductor majority charge carriers are e^- and P type semiconductor majority charge carriers are holes.

$I = neAV_d = neA(\mu E)$

$\mu_e > \mu_h \Rightarrow I_e > I_h$

32. Consider the following **statements (A)** and **(B)** and identify the **correct** answer.

(A) A zener diode is connected in reverse bias, when used as a voltage regulator.

(B) The potential barrier of p-n junction lies between 0.1 V to 0.3 V.

(1) **(A)** and **(B)** both are correct.

(2) **(A)** and **(B)** both are incorrect.

(3) **(A)** is correct and **(B)** is incorrect.

(4) **(A)** is incorrect but **(B)** is correct.

Ans. (3)

Sol. Reverse bias Zener diode use as a voltage regulator

for Ge Potential barrier V_0 = 0.3 V

Si Potential barrier V_0 = 0.7 V

33. Polar molecules are the molecules :

(1) having zero dipole moment.

(2) acquire a dipole moment only in the presence of electric field due to displacement of charges.

(3) acquire a dipole moment only when magnetic field is absent.

(4) having a permanent electric dipole moment.

Ans. (4)

Sol. Polar molecules have centres of postive and negative charges separated by some distance, so they have permanent dipole moment.

34. If E and G respectively denote energy and gravitational constant, then $\frac{E}{G}$ has the dimensions of :

(1) $[M^2]\,[L^{-1}]\,[T^0]$

(2) $[M]\,[L^{-1}]\,[T^{-1}]$

(3) $[M]\,[L^0]\,[T^0]$

(4) $[M^2]\,[L^{-2}]\,[T^{-1}]$

Ans. (1)

Sol. E = energy = $[ML^2T^{-2}]$

G = Gravitational constant = $[M^{-1}L^3T^{-2}]$

$$\text{So } \frac{E}{G} = \frac{[E]}{[G]} = \frac{ML^2T^{-2}}{M^{-1}L^3T^{-2}} = [M^2L^{-1}T^0]$$

35. Water falls from a height of 60 m at the rate of 15 kg/s to operate a turbine. The losses due to frictional force are 10% of the input energy. How much power is generated by the turbine?

($g = 10\ m/s^2$)

(1) 10.2 kW (2) 8.1 kW

(3) 12.3 kW (4) 7.0 kW

Ans. (2)

Sol. $$P_{in} = \frac{mgh}{t} = \frac{15\times10\times60}{1}$$

$$= 9000\ w$$

P_{out} = 90% of P_{in}

$\Rightarrow$ 8.1 kw

SECTION-B

36. A car starts from rest and accelerates at 5 m/s^2. At t = 4 s, a ball is dropped out of a window by a person sitting in the car. What is the velocity and acceleration of the ball at t = 6 s ?

(Take g = 10 m/s^2)

(1) 20 m/s, 5 m/s^2 (2) 20 m/s, 0

(3) $20\sqrt{2}$ m/s, 0 (4) $20\sqrt{2}$ m/s, 10 m/s^2

Ans. (4)

Sol. velocity of car at t = 4 sec is

$$v = u + at$$
$$v = 0 + 5(4)$$
$$= 20\ m/s$$

At t = 6 sec

acceleration is due to gravity $\therefore$ a = g = 10 m/s

v_x = 20 m/s (due to car)

$v_y = u + at$

= 0 + g(2) (downward)

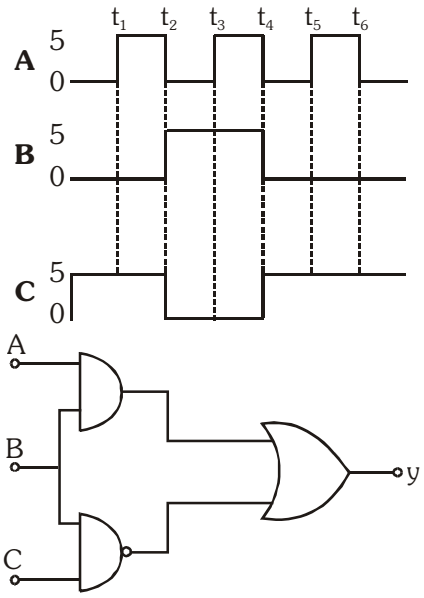
= 20 m/s (downward)

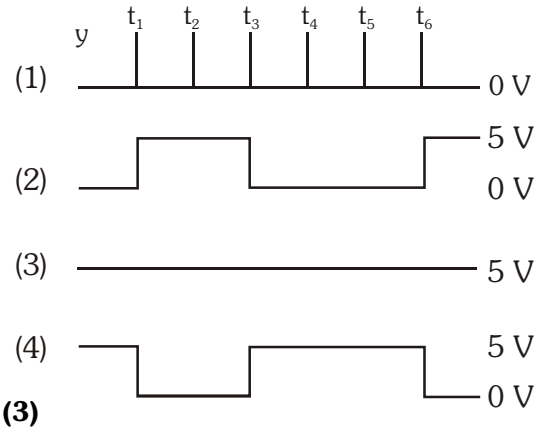
$$v = \sqrt{v_x^2 + v_y^2}$$

$$= \sqrt{20^2 + 20^2}$$

$$= 20\sqrt{2}\ m/s$$

37. For the given circuit, the input digital signals are applied at the terminals A, B and C. What would be the output at the terminal y ?





Ans. (3)

Sol. $Y = A\cdot B + \overline{B\cdot C}$

(i) 0 to t_1 A = 0, B = 0, C = 1

$$Y = 0\cdot 0 + \overline{0\cdot 1} = 0 + 1 = 1$$

(ii) t_1 to t_2 A = 1, B = 0, C = 1

$Y = 1 \cdot 0 + \overline{0 \cdot 1} = 0 + 1 = 1$

(iii) t_2 to t_3 A = 0, B = 1, C = 0

$Y = 0 \cdot 1 + \overline{1 \cdot 0} = 0 + 1 = 1$

38. A ball of mass 0.15 kg is dropped from a height 10 m, strikes the ground and rebounds to the same height. The magnitude of impulse imparted to the ball is ($g = 10\ m/s^2$) nearly :

(1) 0 kg m/s

(2) 4.2 kg m/s

(3) 2.1 kg m/s

(4) 1.4 kg m/s

Ans. (2)

Sol. Velocity just before striking the ground

$v_1 = \sqrt{2gh}$

$v_1 = \sqrt{2(10)(10)} = 10\sqrt{2}$ m/s

$v_1 = -10\sqrt{2}\,\hat{j}$

If it reaches the same height, speed remains same after collision only the direction changes.

$v_2 = 10\sqrt{2}$ m/s

$\vec{v_2} = 10\sqrt{2}\,\hat{j}$

$|\text{Impulse}| = m\,|\Delta\vec{v}|$

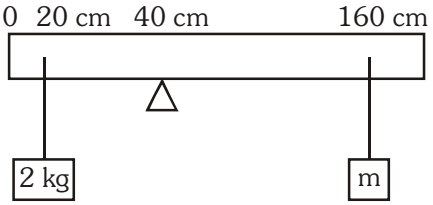
$= m\,|10\sqrt{2}\,j - (-10\sqrt{2}\,j)|$

$= 0.15\left[2(10\sqrt{2})\right]$

$= 3\sqrt{2}$ kg m/s

$= 4.2$ kg m/s

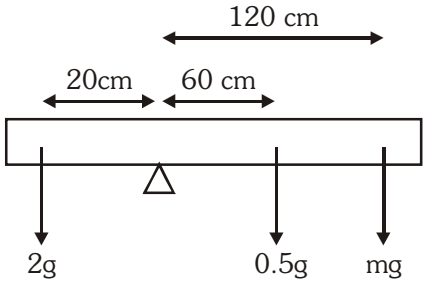
39. A uniform rod of length 200 cm and mass 500 g is balanced on a wedge placed at 40 cm mark. A mass of 2 kg is suspended from the rod at 20 cm and another unknown mass 'm' is suspended from the rod at 160 cm mark as shown in the figure. Find the value of 'm' such that the rod is in equilibrium. ($g = 10\ m/s^2$)



(1) $\frac{1}{2}$kg (2) $\frac{1}{3}$kg (3) $\frac{1}{6}$kg (4) $\frac{1}{12}$kg

Ans. (4)

Sol.

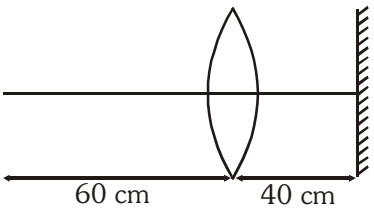


By balancing torque

$2g \times 20 = 0.5\ g \times 60 + mg \times 120$

$m = \frac{0.5}{6}\text{kg} = \frac{1}{12}\text{kg}$

40. A point object is placed at a distance of 60 cm from a convex lens of focal length 30 cm. If a plane mirror were put perpendicular to the principal axis of the lens and at a distance of 40 cm from it, the final image would be formed at a distance of :



(1) 20 cm from the lens, it would be a real image.

(2) 30 cm from the lens, it would be a real image.

(3) 30 cm from the plane mirror, it would be a virtual image.

(4) 20 cm from the plane mirror, it would be a virtual image.

Ans. (4)

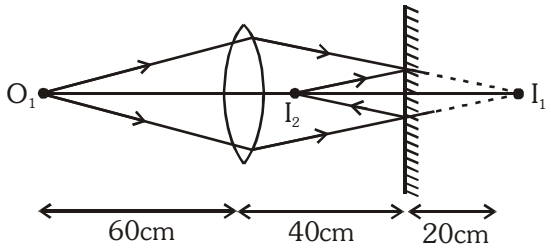
Sol. first, for image formation from lens

u = – 60 cm

f = + 30 cm

$$\Rightarrow v = \frac{uf}{u+f} = \frac{-60\times 30}{-60+30} = 60\text{cm}$$

this real image formed by lens acts as virtual object for mirror



Real image from plane mirror is formed 20 cm in front of mirror, hence at 20 cm distance from lens.

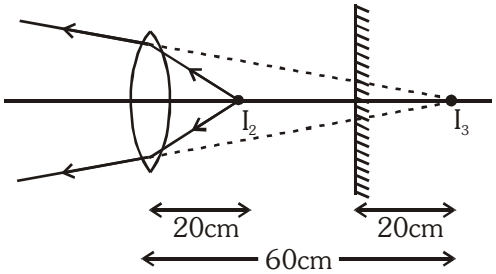
Now, for second refraction from lens,

u = – 20 cm

f = +30 cm

$$v = \frac{uf}{u+f} = \frac{-20\times 30}{-20+30} = -60\text{cm}$$

So, final virtual image is 60 cm from lens, or 20 cm behind mirror



41. A step down transformer connected to an ac mains supply of 220 V is made to operate at 11V, 44 W lamp. Ignoring power losses in the transformer, what is the current in the primary circuit ?

(1) 0.2 A (2) 0.4 A

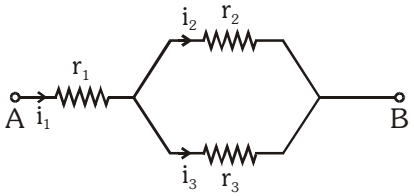
(3) 2A (4) 4A

Ans. (1)

Sol. $220 \times i_p = 44$

$$\Rightarrow i_p = \frac{44}{220} = \frac{1}{5} = 0.2\text{A}$$

42. Three resistors having resistances r_1, r_2 and r_3 are connected as shown in the given circuit. The ratio $\frac{i_3}{i_1}$ of currents in terms of resistances used in the circuit is :



(1) $\frac{r_1}{r_2+r_3}$ (2) $\frac{r_2}{r_2+r_3}$

(3) $\frac{r_1}{r_1+r_2}$ (4) $\frac{r_2}{r_1+r_3}$

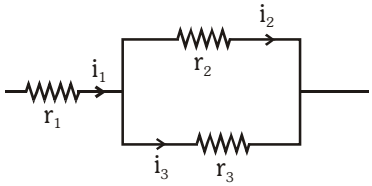
Ans. (2)

Sol. V = ir

$$i = \frac{V}{r}$$

$$i \propto \frac{1}{r} \text{ [v is same for } r_2 \text{ \& } r_3]$$

$$\frac{i_2}{i_3} = \frac{r_3}{r_2}$$



$$i_3 = \frac{r_2}{r_2+r_3} i_1$$

$$\frac{i_3}{i_1} = \frac{r_2}{r_2+r_3}$$

43. In the product

$$\vec{F} = q\left(\vec{v}\times\vec{B}\right)$$

$$= q\vec{v}\times\left(B\hat{i}+B\hat{j}+B_0\hat{k}\right)$$

For q = 1 and $\vec{v} = 2\hat{i}+4\hat{j}+6\hat{k}$ and

$$\vec{F} = 4\hat{i}-20\hat{j}+12\hat{k}$$

What will be the complete expression for $\vec{B}$?

(1) $-8\hat{i}-8\hat{j}-6\hat{k}$ (2) $-6\hat{i}-6\hat{j}-8\hat{k}$

(3) $8\hat{i}+8\hat{j}-6\hat{k}$ (4) $6\hat{i}+6\hat{j}-8\hat{k}$

Ans. (2)

Sol. $\vec{F} = q(\vec{\upsilon} \times \vec{B})$

$$4i - 20j + 12\hat{k} = 1\begin{vmatrix} i & j & \hat{k} \\ 2 & 4 & 6 \\ B & B & B_0 \end{vmatrix}$$

Comparing

$$\Rightarrow \left.\begin{array}{l} 4 = 4B_0 - 6B \\ -20 = -2B_0 + 6B \\ 12 = 2B - 4B \end{array}\right\} \begin{array}{l} \text{Solving} \\ B = -6 \\ B_0 = -8 \end{array}$$

$$\therefore \quad \vec{B} = -6\,\hat{i} - 6\hat{j} - 8\hat{k}$$

44. A particle of mass 'm' is projected with a velocity $\upsilon = kV_e$ ($k < 1$) from the surface of the earth. (V_e = escape velocity)

The maximum height above the surface reached by the particle is :

(1) $R\left(\frac{k}{1-k}\right)^2$ (2) $R\left(\frac{k}{1+k}\right)^2$

(3) $\frac{R^2k}{1+k}$ (4) $\frac{Rk^2}{1-k^2}$

Ans. (4)

Sol. $h = \frac{R}{\frac{2gR}{V^2} - 1} = \frac{R}{\frac{V_e^2}{K^2V_e^2} - 1} = \frac{RK^2}{1-K^2}$

45. Twenty seven drops of same size are charged at 220 V each. They combine to form a bigger drop. Calculate the potential of the bigger drop.

(1) 660 V (2) 1320 V

(3) 1520 V (4) 1980 V

Ans. (4)

Sol. $\frac{4}{3}\pi R^3 = 27\left(\frac{4}{3}\pi r^3\right) \Rightarrow R = 3r$ ...(1)

$$V = \frac{Kq}{r} \Rightarrow \frac{V_1}{V_2} = \left(\frac{q_1}{q_2}\right)\left(\frac{r_2}{r_1}\right)$$

$$\Rightarrow \frac{220}{V_2} = \left(\frac{q}{27q}\right)\left(\frac{3r}{r}\right)$$

$$\Rightarrow \frac{220}{V_2} = \frac{1}{9}$$

$\Rightarrow V_2 = 220 \times 9 = 1980$ Volt

46. A series LCR circuit containing 5.0 H inductor, 80 μF capacitor and 40 Ω resistor is connected to 230 V variable frequency ac source. The angular frequencies of the source at which power transferred to the circuit is half the power at the resonant angular frequency are likely to be :

(1) 25 rad/s and 75 rad/s

(2) 50 rad/s and 25 rad/s

(3) 46 rad/s and 54 rad/s

(4) 42 rad/s and 58 rad/s

Ans. (3)

Sol. $Q = \frac{\omega}{\Delta\omega} = \frac{\omega L}{R} \Rightarrow \Delta\omega = R/L = \frac{50}{4} = 8 \text{ rad/sec}$

$$\omega_0 = \frac{1}{\sqrt{LC}} = \frac{1}{\sqrt{5 \times 80 \times 10^{-6}}} = 50 \text{ rad/sec.}$$

$$\omega_{min} = \omega_0 - \frac{\Delta\omega}{2} = 46 \text{ rad/sec}$$

$$\omega_{max} = \omega_0 - \frac{\Delta\omega}{2} = 54 \text{ rad/sec}$$

47. A uniform conducting wire of length 12a and resistance 'R' is wound up as a current carrying coil in the shape of,

(i) an equilateral triangle of side 'a'.

(ii) a square of side 'a'.

The magnetic dipole moments of the coil in each case respectively are:

(1) $\sqrt{3}\,Ia^2$ and $3\,Ia^2$

(2) $3\,Ia^2$ and Ia^2

(3) $3\,Ia^2$ and $4\,Ia^2$

(4) $4\,Ia^2$ and $3\,Ia^2$

Ans. (1)

Sol. $M_1 = \left(\frac{\sqrt{3}}{4}a^2\right) I \times 4 = \sqrt{3}\,Ia^2$ (no. of turns = 4)

$M_2 = a^2I \times 3 = 3Ia^2$ (no. of turns = 3)

48. From a circular ring of mass 'M' and radius 'R' an arc corresponding to a 90° sector is removed. The moment of inertia of the remaining part of the ring about an axis passing through the centre of the ring and perpendicular to the plane of the ring is 'K' times 'MR^2'. Then the value of 'K' is :

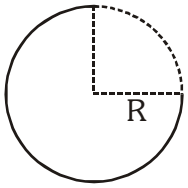
(1) $\frac{3}{4}$ (2) $\frac{7}{8}$ (3) $\frac{1}{4}$ (4) $\frac{1}{8}$

Ans. (1)

Sol. $M_{remain} = \frac{3}{4}M$

$I = M_{remain} R^2$

$= \frac{3}{4}MR^2$



49. Two conducting circular loops of radii R_1 and R_2 are placed in the same plane with their centres coinciding. If $R_1 >> R_2$, the mutual inductance M between them will be directly proportional to:

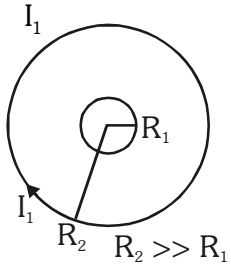
(1) $\frac{R_1}{R_2}$ (2) $\frac{R_2}{R_1}$ (3) $\frac{R_1^2}{R_2}$ (4) $\frac{R_2^2}{R_1}$

Ans. (4)

Sol. $M = \frac{\phi_{12}}{I_1} = \frac{B_1 A_2}{I_1} = \frac{\left(\frac{\mu_0 I_1}{2R_1}\right)(\pi R_2^2)}{I_1}$

$M = \frac{\mu_0 \pi R_2^2}{2\,R_1}$

$M \propto \frac{R_2^2}{R_1}$



50. A particle moving in a circle of radius R with a uniform speed takes a time T to complete one revolution.

If this particle were projected with the same speed at an angle 'θ' to the horizontal, the maximum height attained by it equals 4R. The angle of projection, θ, is then given by :

(1) $\theta = \cos^{-1}\left(\frac{gT^2}{\pi^2 R}\right)^{1/2}$ (2) $\theta = \cos^{-1}\left(\frac{\pi^2 R}{gT^2}\right)^{1/2}$

(3) $\theta = \sin^{-1}\left(\frac{\pi^2 R}{gT^2}\right)^{1/2}$ (4) $\theta = \sin^{-1}\left(\frac{2gT^2}{\pi^2 R}\right)^{1/2}$

Ans. (4)

Sol. $T = \frac{2\pi R}{v} \Rightarrow v = \frac{2\pi R}{T}$ ...(1)

$H_{max} = \frac{v^2 \sin^2\theta}{2g} = \frac{2\pi^2 R^2 \sin^2\theta}{gT^2} = 4R$

$\sin\theta = \left(\frac{2gT^2}{\pi^2 R}\right)^{1/2}$

$\theta = \sin^{-1}\left[\frac{2gT^2}{\pi^2 R}\right]^{1/2}$

FINAL NEET(UG)–2021 EXAMINATION

(Held On Sunday 12th SEPTEMBER, 2021)

CHEMISTRY — TEST PAPER WITH ANSWER & SOLUTION

SECTION-A (CHEMISTRY)

51. Given below are two statements:

Statement I :

Aspirin and Paracetamol belong to the class of narcotic analgesics.

Statement II :

Morphine and Heroin are non-narcotic analgesics. In the light of the above statements, choose the **correct** answer from the options given below.

(1) Both **Statement I** and **Statement II** are true.

(2) Both **Statement** I and **Statement II** are false.

(3) **Statement I** is correct but **Statement II** is false.

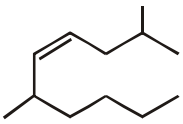
(4) **Statement I** is incorrect but **Statement II** is true.

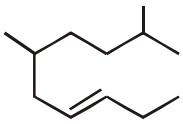
Ans. (2)

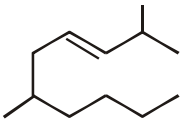
Sol. Aspirin and paracetamol belongs to the class of non-narcotic analgesic.

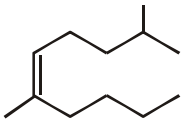
Morphine and heroin are narcotic analgesics.

52. The correct structure of 2,6-Dimethyl-dec-4-ene is:

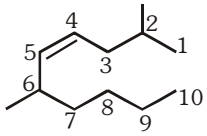
(1) 

(2) 

(3) 

(4) 

Ans. (1)

Sol. 

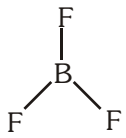
2,6-Dimethyldec-4-ene

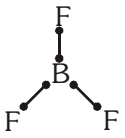
53. BF_3 is planar and electron deficient compound. Hybridization and number of electrons around the central atom, respectively are:

(1) sp^3 and 4 (2) sp^3 and 6

(3) sp^2 and 6 (4) sp^2 and 8

Ans. (3)

Sol. 



sp^2, Trigonal planar $6e^-$ around central atom

54. Noble gases are named because of their inertness towards reactivity. Identify an **incorrect** statement about them.

(1) Noble gases are sparingly soluble in water.

(2) Noble gases have very high melting and boiling points.

(3) Noble gases have weak dispersion forces.

(4) Noble gases have large positive values of electron gain enthalpy.

Ans. (2)

Sol. Noble gases have weak dispersion forces so their melting and boiling point are very low.

55. The molar conductance of NaCl, HCl and CH_3COONa at infinite dilution are 126.45, 426.16 and 91.0 S cm^2 mol^{-1} respectively. The molar conductance of CH_3COOH at infinite dilution is.

Choose the right option for your answer.

(1) 201.28 S cm^2 mol^{-1}

(2) 390.71 S cm^2 mol^{-1}

(3) 698.28 S cm^2 mol^{-1}

(4) 540.48 S cm^2 mol^{-1}

Ans. (2)

Sol. $\Lambda^{\infty}_{m\,(NaCl)} = 126.45\ Scm^2\ mol^{-1}$

$\Lambda^{\infty}_{m\,(HCl)} = 426.16\ Scm^2\ mol^{-1}$

$\Lambda^{\infty}_{m(CH_3COONa)} = 91\ Scm^2\ mol^{-1}$

$\therefore \quad \Lambda^{\infty}_{m(CH_3COOH)} = \Lambda^{\infty}_{m(CH_3COONa)} + \Lambda^{\infty}_{m(HCl)} - \Lambda^{\infty}_{m(NaCl)}$

$= 91 + 426.16 - 126.45$

$= 391.72\ Scm^2\ mol^{-1}$

56. The right option for the statement "Tyndall effect is exhibited by", is :

(1) NaCl solution (2) Glucose solution

(3) Starch solution (4) Urea solution

Ans. (3)

Sol. Tyndall effect is exhibited by colloidal solutions. Starch solution is a colloidal solution.

57. The RBC deficiency is deficiency disease of:

(1) Vitamin B_{12} (2) Vitamin B_6

(3) Vitamin B_1 (4) Vitamin B_2

Ans. (1)

Sol. Vitamin B_{12} deficiency $\rightarrow$ Pernicious anaemia (RBC deficient in heamoglobin)

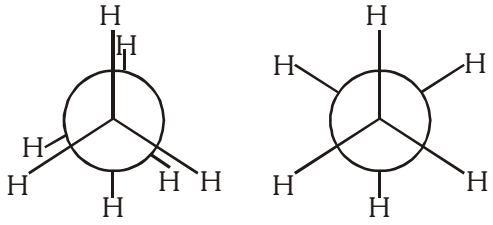
58. Dihedral angle of least stable conformer of ethane is :

(1) 120° (2) 180°

(3) 60° (4) 0°

Ans. (4)

Sol. Dihedral angle (D.A.) of least stable conformer of ethane = 0°



D.A. = 0° (Eclipsed) D.A. = 60° (Staggered)

59. The **incorrect** statement among the following is :

(1) Actinoid contraction is greater for element to element than Lanthanoid contraction.

(2) Most of the trivalent Lanthanoid ions are colorless in the solid state.

(3) Lanthanoids are good conductors of heat and electricity.

(4) Actinoids are highly reactive metals, especially when finely divided.

Ans. (2)

Sol. Most of the trivalent lanthanoid ions are coloured in the solid state.

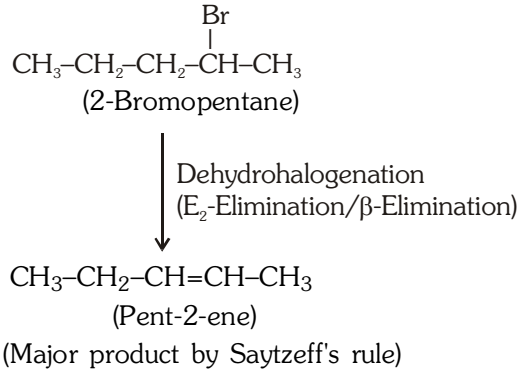
60. The major product formed in dehydrohalogenation reaction of 2-Bromo pentane is Pent-2-ene. This product formation is based on ?

(1) Saytzeff's Rule (2) Hund's Rule

(3) Hoffmann Rule (4) Huckel's Rule

Ans. (1)

Sol.



(Major product by Saytzeff's rule)

61. Which one among the following is the correct option for right relationship between C_P and C_V for one mole of ideal gas ?

(1) $C_P+C_V=R$ (2) $C_P-C_V=R$

(3) $C_P = RC_V$ (4) $C_V=RC_P$

Ans. (2)

Sol. For one mole of an ideal gas

$C_p - C_v = R$

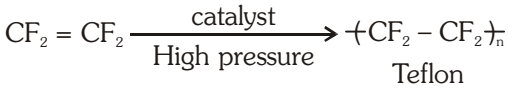
62. Which one of the following polymers is prepared by addition polymerisation ?

(1) Teflon (2) Nylon-66

(3) Novolac (4) Dacron

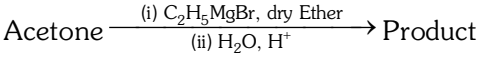
Ans. (1)

Sol. Teflon are prepared by addition polymerisation from tetrafluroethene



Nylon-66, Novolac, Dacron are prepared by condensation polymerisation.

63. What is the IUPAC name of the organic compound formed in the following chemical reaction ?

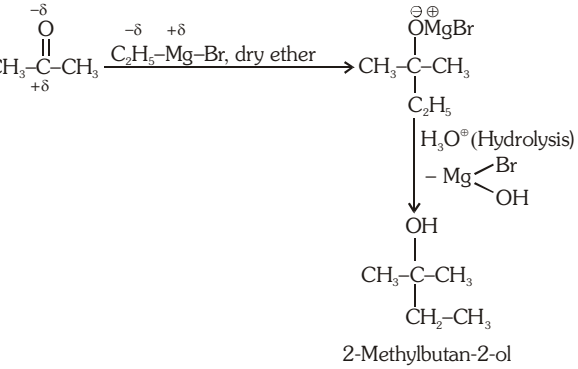


(1) 2-methyl propan-2-ol (2) pentan-2-ol

(3) pentan-3-ol (4) 2-methyl butan-2-ol

Ans. (4)

Sol.



2-Methylbutan-2-ol

64. Match **List - I** with **List - II**.

List-I	List-II
(a) PCl_5	(i) Square pyramidal
(b) SF_6	(ii) Trigonal planar
(c) BrF_5	(iii) Octahedral
(d) BF_3	(iv) Trigonal bipyramidal

Choose the **correct** answer from the options given below.

(1) (a)-(iv), (b)-(iii), (c)-(i), (d)-(ii)

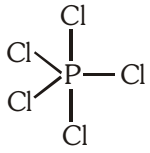
(2) (a)-(ii), (b)-(iii), (c)-(iv), (d)-(i)

(3) (a)-(iii), (b)-(i), (c)-(iv), (d)-(ii)

(4) (a)-(iv), (b)-(iii), (c)-(ii), (d)-(i)

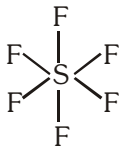
Ans. (1)

Sol. PCl_5 :



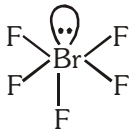
Trigonal bipyramidal sp^3d

SF_6 :



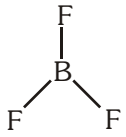
Octahedral sp^3d^2

BrF_5 :



Square pyramidal sp^3d^2

BF_3 :



Trigonal planar sp^2

65. Which one of the following methods can be used to obtain highly pure metal which is liquid at room temperature ?

(1) Electrolysis

(2) Chromatography

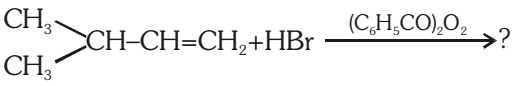
(3) Distillation

(4) Zone refining

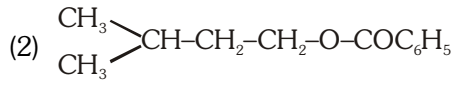
Ans. (3)

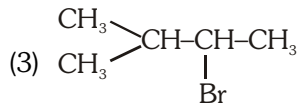
Sol. At room temperature Hg is liquid and it is purified by 'Distillation method'.

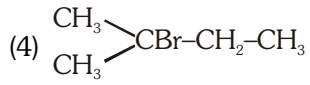
66. The major product of the following chemical reaction is:



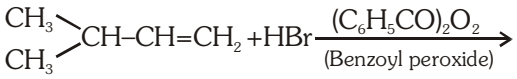
(1) 

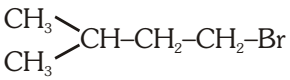
(2) 

(3) 

(4) 

Ans. (1)

Sol. 



In the presence of peroxide, addition of HBr to unsymmetrical alkenes take place by anti-Markovnikov's rule/Peroxide effect/Kharash effect.

67. Tritium, a radioactive isotope of hydrogen, emits which of the following particles ?

(1) Beta(β^-)

(2) Alpha (α)

(3) Gamma (γ)

(4) Neutron (n)

Ans. (1)

Sol. Tritium is radioactive and emits low energy β^- particles ($_{-1}e^0$)

68. The correct sequence of bond enthalpy of 'C-X' bond is

(1) $CH_3–F < CH_3–Cl < CH_3–Br < CH_3–I$

(2) $CH_3–F > CH_3–Cl > CH_3–Br > CH_3–I$

(3) $CH_3–F < CH_3–Cl > CH_3–Br > CH_3–I$

(4) $CH_3–Cl > CH_3–F > CH_3–Br > CH_3–I$

Ans. (2)

Sol. Correct sequence of bond enthalpy of C–X bond is $CH_3–F > CH_3 – Cl > CH_3 – Br > CH_3 – I$

69. Right option for the number of tetrahedral and octahedral voids in hexagonal primitive unit cell are:

(1) 8, 4

(2) 6, 12

(3) 2, 1

(4) 12,6

Ans. (4)

Sol. No. of atoms in Hexagonal primitive unit cell = 6

No. of Tetrahedral voids = 2 × No. of atoms per unit cell

$= 2 \times 6$

$= 12$

No. of Octahedral voids = No. of atoms per unit cell

$= 6$

70. Which of the following reactions is the metal displacement reaction ? Choose the right option.

(1) $2KClO_3 \xrightarrow{\Delta} 2KCl + 3O_2$

(2) $Cr_2O_3 + 2Al \xrightarrow{\Delta} Al_2O_3 + 2Cr$

(3) $Fe + 2HCl \rightarrow FeCl_2 + H_2\uparrow$

(4) $2Pb(NO_3)_2 \rightarrow 2PbO + 4NO_2 + O_2\uparrow$

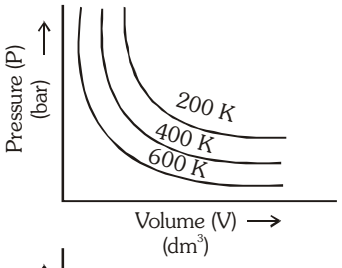
Ans. (2)

Sol. Aluminium is more electropositive than Cr, so it displaced chromium from Cr_2O_3.

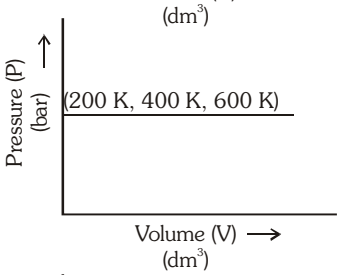
$Cr_2O_3 + Al \xrightarrow{\Delta} Al_2O_3 + Cr$

71. Choose the correct option for graphical representation of Boyle's law, which shows a graph of pressure vs. volume of a gas at different temperatures:

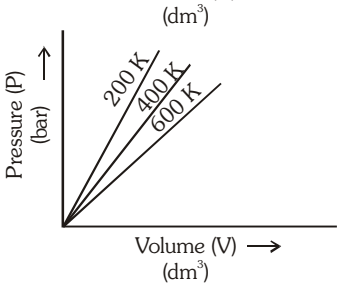
(1)



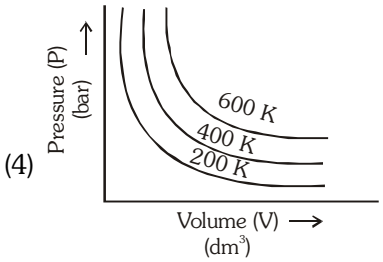
(2)



(3)



(4)



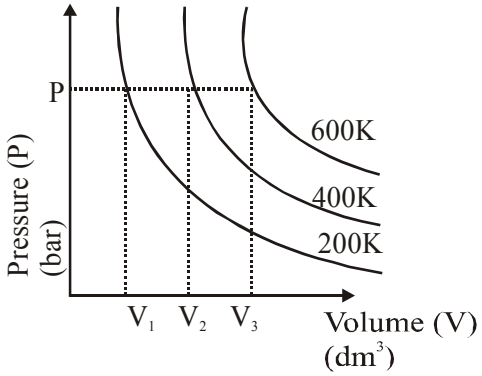
Ans. (4)

Sol. According to Boyle's law

$$P \propto \frac{1}{V}$$

At a given pressure,

$V \propto T$



72. The pK_b of dimethylamine and pK_a of acetic acid are 3.27 and 4.77 respectively at T (K). The correct option for the pH of dimethylammonium acetate solution is:

(1) 8.50 (2) 5.50

(3) 7.75 (4) 6.25

Ans. (3)

Sol. Dimethylammonium acetate is a weak acid & weak base type of salt

$$pH = 7 + \frac{1}{2}pK_a - \frac{1}{2}pK_b$$

$$= 7 + \frac{1}{2} \times 4.77 - \frac{1}{2} \times 3.27$$

$= 7.75$

73. Among the following alkaline earth metal halides, one which is covalent and soluble in organic solvents is:

(1) Calcium chloride

(2) Strontium chloride

(3) Magnesium chloride

(4) Beryllium chloride

Ans. (4)

Sol. $BeCl_2$ is covalent and soluble in a organic solvent.

74. The maximum temperature that can be achieved in blast furnace is :

(1) upto 1200 K

(2) upto 2200 K

(3) upto 1900 K

(4) upto 5000 K

Ans. (2)

Sol. The maximum temperature that can be achieved in blast furnace is upto 2200 K.

75. Ethylene diaminetetraacetate (EDTA) ion is :

(1) Hexadentate ligand with four "O" and two "N" donor atoms

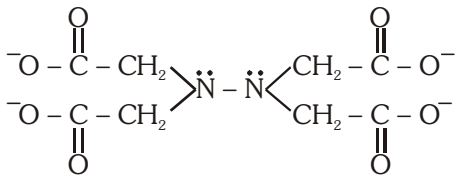
(2) Unidentate ligand

(3) Bidentate ligand with two "N" donor atoms

(4) Tridentate ligand with three "N" donor atoms

Ans. (1)

Sol.



Donar atom (N, N, O, O, O, O)

76. The following solutions were prepared by dissolving 10 g of glucose ($C_6H_{12}O_6$) in 250 ml of water (P_1), 10 g of urea (CH_4N_2O) in 250 ml of water (P_2) and 10 g of sucrose ($C_{12}H_{22}O_{11}$) in 250 ml of water (P_3). The right option for the decreasing order of osmotic pressure of these solutions is :

(1) $P_2 > P_1 > P_3$

(2) $P_1 > P_2 > P_3$

(3) $P_2 > P_3 > P_1$

(4) $P_3 > P_1 > P_2$

Ans. (1)

Sol. $\pi = iCRT$

$$P_1 = 1 \times \frac{10}{180} \times R \times T \quad \text{(For Glucose)}$$

$$P_2 = 1 \times \frac{10}{60} \times R \times T \quad \text{(For Urea)}$$

$$P_3 = 1 \times \frac{10}{342} \times R \times T \quad \text{(For Sucrose)}$$

$\therefore P_2 > P_1 > P_3$

77. **Statement I :**

Acid strength increases in the order given as HF << HCl << HBr << HI.

Statement II :

As the size of the elements F, Cl, Br, I increases down the group, the bond strength of HF, HCl, HBr and HI decreases and so the acid strength increases.

In the light of the above statements, choose the **correct** answer from the options given below.

(1) Both **Statement I** and **Statement II** are true.

(2) Both **Statement I** and **Statement II** are false.

(3) **Statement I** is correct but **Statement II** is false.

(4) **Statement I** is incorrect but **Statement II** is true.

Ans. (1)

Sol.

H–F	H–Cl	H–Br	H–I
1s–2p	1s–3p	1s–4p	1s–5p

Down the group size increases

Overlapping decreases

Acidic strength increases

78. The structures of beryllium chloride in solid state and vapour phase, are:

(1) Chain and dimer, respectively

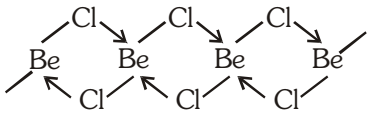
(2) Linear in both

(3) Dimer and Linear, respectively

(4) Chain in both

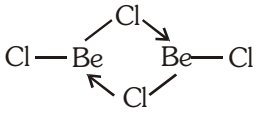
Ans. (1)

Sol. $BeCl_2$ in solid state exist in a polymeric form & in a vapour state in exist in a dimeric form.

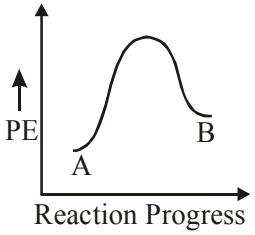


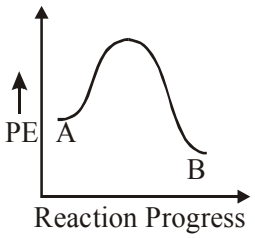
chain polymeric structure

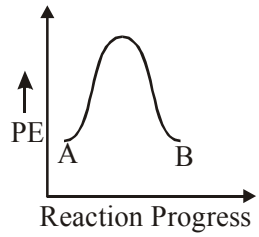
Vapour state exist in a dimeric form

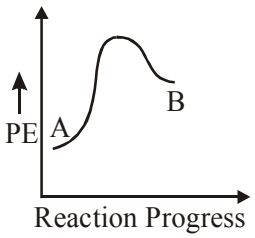


79. For a reaction A → B, enthalpy of reaction is –4.2 kJ mol^{-1} and enthalpy of activation is 9.6 kJ mol^{-1}. The correct potential energy profile for the reaction is shown in option.

(1) 

(2) 

(3) 

(4) 

Ans. (2)

Sol. For a given reaction ΔH is negative. Hence, potential energy profile is of an exothermic reaction.

80. Zr (Z =40) and Hf (Z =72) have similar atomic and ionic radii because of :

(1) belonging to same group

(2) diagonal relationship

(3) lanthanoid contraction

(4) having similar chemical properties

Ans. (3)

Sol. Due to lanthanoid contraction Zr and Hf has similar atomic and ionic radii.

81. A particular station of All India Radio, New Delhi, broadcasts on a frequency of 1,368 kHz (kilohertz). The wavelength of the electromagnetic radiation emitted by the transmitter is :

[speed of light c = 3.0×10^8 ms^{-1}]

(1) 219.3 m (2) 219.2 m

(3) 2192 m (4) 21.92 cm

Ans. (1)

Sol. $\lambda = \frac{c}{\nu}$

$$\lambda = \frac{3\times10^8}{1368\times10^3} = 219.298\text{m} \simeq 219.3\,\text{m}$$

82. An organic comopound contains 78% (by wt.) carbon and remaining percentage of hydrogen. The right option for the empirical formula of this compound is [Atomic wt. of C is 12, H is 1]

(1) CH (2) CH_2

(3) CH_3 (4) CH_4

Ans. (3)

Sol.

Element	%	At.weight	$\frac{\%}{\text{At.weight}}$	simplest ratio
C	78	12	6.5	1
H	22	1	22	≃3

Empirical formula of this compound is CH_3

83. The compound which shows metamerism is :

(1) C_5H_{12} (2) C_3H_8O

(3) C_3H_6O (4) $C_4H_{10}O$

Ans. (4)

Sol. (4) $C_4H_{10}O$ will have different alkyl group attached with polyvalent functional group that's why show metamerism

$CH_3–CH_2–O–CH_2–CH_3$

$CH_3–O–CH_2–CH_2–CH_3$

(3) $C_3H_6O \Rightarrow CH_3–\underset{\underset{O}{\|}}{C}–CH_3$

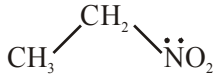
Only one arrangement possible so can not show metamerism.

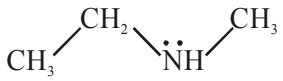
(2) $C_3H_8O \Rightarrow CH_3–O–CH_2–CH_3$

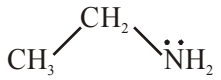
Only one arrangement possible so can not show metamerism.

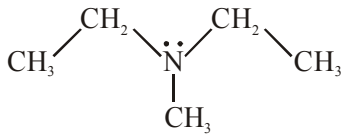
(1) No polyvalent functional group in C_5H_{12}, so can not show metamerism.

84. Identify the compound that will react with Hinsberg's reagent to give a solid which dissolves in alkali :

(1) 

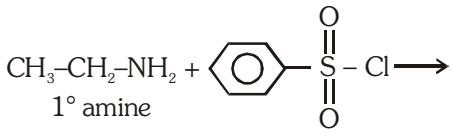
(2) 

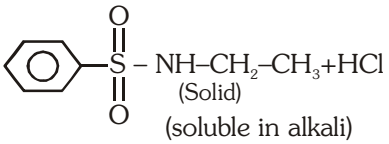
(3) 

(4) 

Ans. (3)

Sol. 1° amines react with Hingsberg's reagent to give a solid, which dissolve in alkali.





85. The correct option for the number of body centred unit cells in all 14 types of Bravais lattice unit cells is :

(1) 7 (2) 5

(3) 2 (4) 3

Ans. (4)

Sol. The number of Body centred unit cells in all 14 types of Bravais lattice unit cells is 3.

SECTION-B

86. Match List-I with List-II

List-I		List-II	
(a)	$[Fe(CN)_6]^{3-}$	(i)	5.92 BM
(b)	$[Fe(H_2O)_6]^{3+}$	(ii)	0 BM
(c)	$[Fe(CN)_6]^{4-}$	(iii)	4.90 BM
(d)	$[Fe(H_2O)_6]^{2+}$	(iv)	1.73 BM

Choose the **correct** answer from the options given below

(1) (a)-(iv), (b)-(ii), (c)-(i), (d)-(iii)

(2) (a)-(ii), (b)-(iv), (c)-(iii), (d)-(i)

(3) (a)-(i), (b)-(iii), (c)-(iv), (d)-(ii)

(4) (a)-(iv), (b)-(i), (c)-(ii), (d)-(iii)

Ans. (4)

Sol. $[Fe(CN)_6]^{-3}$ $Fe^{+3} = 3d^5$

Unpaired electron = 1, μ = 1.7 BM

$[Fe(H_2O)_6]^{+3}$ $Fe^{+3} = 3d^5$ 

Unpaired electrons = 5, μ = 5.9 BM

$[Fe(CN)_6]^{-4}$ $Fe^{+2} = 3d^6$ 

Unpaired electron = 0, μ = 0 BM

$[Fe(H_2O)_6]^{+2}$ $Fe^{+2} = 3d^6$ 

Unpaired electrons = 4, μ = 4.9 BM

87. Choose the correct option for the total pressure (in atm.) in a mixture of 4 g O_2 and 2 g H_2 confined in a total volume of one litre at 0°C is: [Given R = 0.082 L atm $mol^{-1}K^{-1}$, T=273K]

(1) 2.518 (2) 2.602

(3) 25.18 (4) 26.02

Ans. (3)

Sol. $n_{O_2} = \frac{4}{32} = \frac{1}{8}$ mol

$n_{H_2} = \frac{2}{2}$ = 1 mol

$n_{Total} = n_{O_2} + n_{H_2} = \frac{1}{8} + 1 = \frac{9}{8}$ mol

PV = nRT

$P_{Total} \times 1 = \frac{9}{8} \times 0.082 \times 273$

P_{Total} = 25.18 atm

88. $CH_3CH_2COO^-Na^+ \xrightarrow[\text{Heat}]{NaOH, +?} CH_3CH_3 + Na_2CO_3$.

Consider the above reaction and identify the missing reagent/chemical.

(1) B_2H_6 (2) Red Phosphorus

(3) CaO (4) DIBAL-H

Ans. (3)

Sol. $CH_3–CH_2–COO^- Na^+ \xrightarrow[\text{Heat}]{NaOH+?}$

$CH_3–CH_3 + Na_2CO_3$

Decarboxylation takes place by soda-lime (NaOH + CaO)

89. For irreversible expansion of an ideal gas under isothermal condition, the correct option is :

(1) $\Delta U = 0$, $\Delta S_{total} = 0$ (2) $\Delta U \neq 0$, $\Delta S_{total} \neq 0$

(3) $\Delta U = 0$, $\Delta S_{total} \neq 0$ (4) $\Delta U \neq 0$, $\Delta S_{total} = 0$

Ans. (3)

Sol. For irreversible expansion of an ideal gas under isothermal condition

$\Delta U = 0$, $\Delta S_{Total} \neq 0$

90. In which one of the following arrangements the given sequence is not strictly according to the properties indicated against it ?

(1) $HF < HCl < HBr < HI$: Increasing acidic strength

(2) $H_2O < H_2S < H_2Se < H_2Te$: Increasing pK_a values

(3) $NH_3 < PH_3 < AsH_3 < SbH_3$: Increasing acidic character

(4) $CO_2 < SiO_2 < SnO_2 < PbP_2$: Increasing oxidizing power

Ans. (2)

Sol. $H_2O < H_2S < H_2Se < H_2Te$

$\longrightarrow$

Down the group acidic strength increases

So pK_a value decreases

91. The molar conductivity of 0.007 M acetic acid is 20 S cm^2 mol^{-1}. What is the dissociation constant of acetic acid ? Choose the correct option.

$$\begin{bmatrix} \Lambda^\circ_{H^+} = 350\,S\,cm^2mol^{-1} \\ \Lambda^\circ_{CH_3COO^-} = 50\,S\,cm^2mol^{-1} \end{bmatrix}$$

(1) 1.75×10^{-4} mol L^{-1}

(2) 2.50×10^{-4} mol L^{-1}

(3) 1.75×10^{-5} mol L^{-1}

(4) 2.50×10^{-5} mol L^{-1}

Ans. (3)

Sol. $\Lambda^0_{M(CH_3COOH)} = \Lambda^0_{M_{(H^+)}} + \Lambda^0_{M_{(CH_3COO^-)}}$

$= 350 + 50 = 400\ Scm^2mol^{-1}$

$$\alpha = \frac{\Lambda^C_M}{\Lambda^0_M}$$

$$\alpha = \frac{20}{400} = 5 \times 10^{-2}$$

$$K_{a(CH_3COOH)} = C\alpha^2$$

$= 0.007 \times (5 \times 10^{-2})^2$

$= 1.75 \times 10^{-5}$ mol L^{-1}

92. The slope of Arrhenius Plot $\left(\ln k\ v/s\ \frac{1}{T}\right)$ of first order reaction is -5×10^3 K. The value of E_a of the reaction is. Choose the correct option for your answer.

[Given R=8.314 JK^{-1} mol^{-1}]

(1) 41.5 kJ mol^{-1} (2) 83.0 kJ mol^{-1}

(3) 166 kJ mol^{-1} (4) –83 kJ mol^{-1}

Ans. (1)

Sol. $\ell nK = \ell nA - \frac{Ea}{R}\left(\frac{1}{T}\right)$

In ℓnk v/s $\frac{1}{T}$ graph

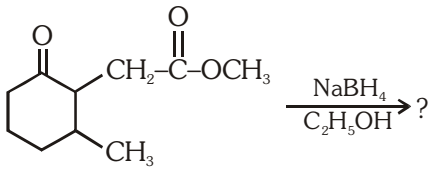
$$\text{Slope} = -\frac{Ea}{R}$$

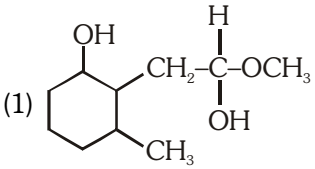
$$-5\times10^3 = \frac{-Ea}{8.314}$$

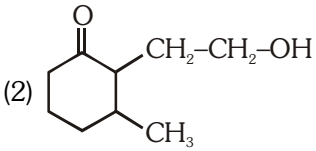
$Ea = 5 \times 10^3 \times 8.314$

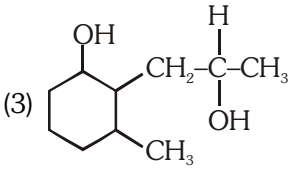
$= 41500$ J mol^{-1} or 41.5 kJ mol^{-1}

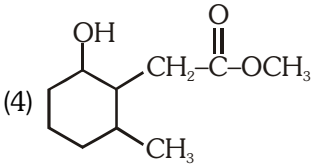
93. The product formed in the following chemical reaction is



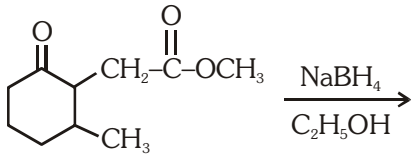
(1) 

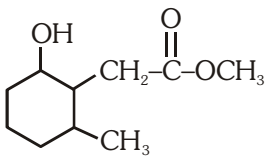
(2) 

(3) 

(4) 

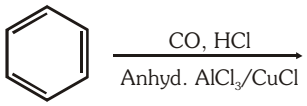
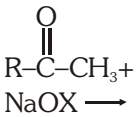
Ans. (4)

Sol. 



$NaBH_4$ reduces aldehyde/ketone but does not reduce ester.

94. Match **List-I** with **List-II**.

List-I	**List-II**
(a) 	(i) Hell-Volhard-Zelinsky reaction
(b) 	(ii) Gattermann-Koch reaction
(c) $R-CH_2-OH$ + R'COOH $\xrightarrow{Conc.\ H_2SO_4}$	(iii) Haloform reaction
(d) $R-CH_2-COOH$ $\xrightarrow[(ii)\ H_2O]{(i)\ X_2/Red\ P}$	(iv) Esterification

Choose the **correct** answer from the options given below.

(1) (a)-(iv), (b)-(i), (c)-(ii), (d)-(iii)

(2) (a)-(iii), (b)-(ii), (c)-(i), (d)-(iv)

(3) (a)-(i), (b)-(iv), (c)-(iii), (d)-(ii)

(4) (a)-(ii), (b)-(iii), (c)-(iv), (d)-(i)

Ans. (4)

Sol.

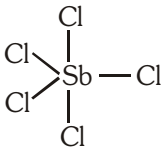
List-I		**List-II**
(a) 	$\xrightarrow[\text{Anhydrous } AlCl_3/CuCl]{CO,\ HCl}$	(ii) Gattermann-Koch reaction
(b) $R-\overset{O}{\overset{\|}{C}}-CH_3 + NaOX$	$\longrightarrow$	(iii) Haloform reaction
(c) $R-CH_2OH + R'COOH$	$\xrightarrow{conc.\ H_2SO_4}$	(iv) Esterification
(d) $R-CH_2COOH$	$\xrightarrow[(ii)\ H_2O]{(i)\ X_2/Red\ P}$	(i) Hell-Volhard Zelinsky reaction

95. Which of the following molecules is non-polar in nature ?

(1) $POCl_3$ (2) CH_2O

(3) $SbCl_5$ (4) NO_2

Ans. (3)

Sol. 

sp^3d Dipole moment (μ) = 0

Trigonal bipyramidal Non-polar

96. From the following pairs of ions which one is not an iso-electronic pair ?

(1) O^{2-}, F^-

(2) Na^+, Mg^{2+}

(3) Mn^{2+}, Fe^{3+}

(4) Fe^{2+}, Mn^{2+}

Ans. (4)

Sol.

		Total no. of e^-
$_{26}Fe \rightarrow 3d^6 4s^2$,	$Fe^{+2} \rightarrow 3d^6$	24
$_{25}Mn \rightarrow 3d^5 4s^2$,	$Mn^{+2} \rightarrow 3d^5$	23

97. The correct option for the value of vapour pressure of a solution at 45°C with benzene to octane in molar ratio 3 : 2 is :

[At 45°C vapour pressure of benzene is 280 mm Hg and that of octane is 420 mm Hg. Assume Ideal gas]

(1) 160 mm of Hg (2) 168 mm of Hg

(3) 336 mm of Hg (4) 350 mm of Hg

Ans. (3)

Sol. $\frac{n_B}{n_O} = \frac{3}{2}$

$n_B = 3$, $n_O = 2$

$n_{Total} = 3 + 2 = 5$

$$X_B = \frac{n_B}{n_T} = \frac{3}{5}$$

$$X_O = \frac{n_O}{n_T} = \frac{2}{5}$$

$$P_S = P_B^\circ \times_B + P_O^\circ \times_O$$

$$P_S = 280 \times \frac{3}{5} + 420 \times \frac{2}{5}$$

= 336 mm of Hg

98. Match **List-I** with **List-II** :

	List-I		**List-II**
(a)	$2SO_2(g) + O_2(g) \rightarrow 2SO_3(g)$	(i)	Acid rain
(b)	$HOCl(g) \xrightarrow{h\nu} \dot{O}H + \dot{C}l$	(ii)	Smog
(c)	$CaCO_3 + H_2SO_4 \rightarrow CaSO_4 + H_2O + CO_2$	(iii)	Ozone depletion
(d)	$NO_2(g) \xrightarrow{h\nu} NO(g) + O(g)$	(iv)	Tropospheric pollution

Choose the **correct** answer from the options given below.

(1) (a)-(i), (b)-(ii), (c)-(iii), (d)-(iv)

(2) (a)-(ii), (b)-(iii), (c)-(iv), (d)-(i)

(3) (a)-(iv), (b)-(iii), (c)-(i), (d)-(ii)

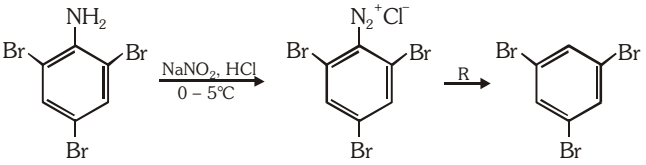
(4) (a)-(iii), (b)-(ii), (c)-(iv), (d)-(i)

Ans. (3)

Sol.

	List-I		**List-II**
(a)	$2SO_2(g) + O_2(g) \rightarrow 2SO_3(g)$	(iv)	Tropospheric pollution
(b)	$HOCl(g) \xrightarrow{h\nu} \dot{O}H + \dot{C}l$	(iii)	Ozone depletion
(c)	$CaCO_3 + H_2SO_4 \rightarrow CaSO_4 + H_2O + CO_2$	(i)	Acid rain
(d)	$NO_2(g) \xrightarrow{h\nu} NO(g) + O(g)$	(ii)	Smog

99. The reagent 'R' in the given sequence of chemical reaction is :

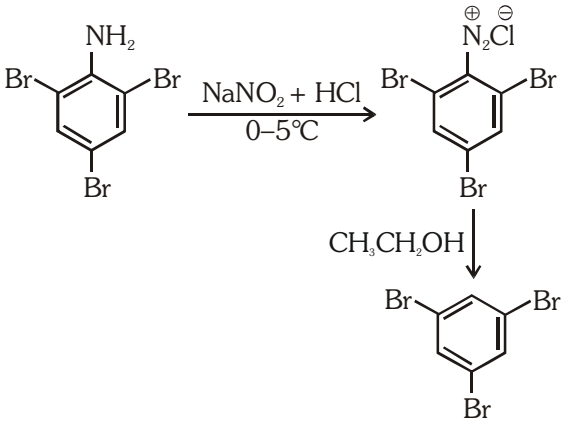


(1) H_2O (2) CH_3CH_2OH

(3) HI (4) CuCN/KCN

Ans. (2)

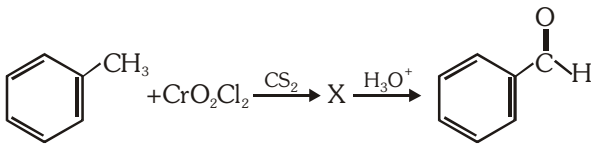
Sol.

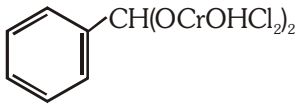


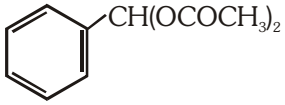
R : CH_3CH_2OH

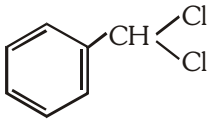
Certain mild reducing agents like hypophosphorus acid or ethanol reduce diazonium salts to arene and themselves get oxidised to phosphorous acid and ethanal respectively.

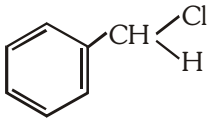
100. The intermediate compound 'X' in the following chemical reaction is :



(1) 

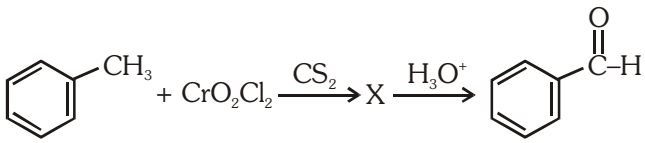
(2) 

(3) 

(4) 

Ans. (1)

Sol.



Toluene Benzaldehyde

X = 

FINAL NEET(UG)–2021 EXAMINATION

(Held On Sunday 12th SEPTEMBER, 2021)

BOTANY

TEST PAPER WITH ANSWER

Section-A (Biology : Botany)

101. Inspite of interspecific competition in nature, which mechanism the competing species might have evolved for their survival ?

(1) Resource partitioning (2) Competitive release

(3) Mutualism (4) Predation

Ans. (1)

102. Match **List - I** with **List - II.**

	List -I		List - II
(a)	Cells with active cell division capacity	(i)	Vascular tissues
(b)	Tissue having all cells similar in structure and function	(ii)	Meristematic tissue
(c)	Tissue having different types of cells	(iii)	Sclereids
(d)	Dead cells with highly thickened walls and narrow lumen	(iv)	Simple tissue

Select the **correct** answer from the options given below.

	(a)	(b)	(c)	(d)
(1)	(ii)	(iv)	(i)	(iii)
(2)	(iv)	(iii)	(ii)	(i)
(3)	(i)	(ii)	(iii)	(iv)
(4)	(iii)	(ii)	(iv)	(i)

Ans. (1)

103. During the purification process for recombinant DNA technology, addition of chilled ethanol precipitates out:

(1) RNA (2) DNA

(3) Histones (4) Polysaccharides

Ans. (2)

104. Match **List - I** with **List - II.**

	List -I		List - II
(a)	Cohesion	(i)	More attraction in liquid phase
(b)	Adhesion	(ii)	Mutual attraction among water molecules
(c)	Surface tension	(iii)	Water loss in liquid phase
(d)	Guttation	(iv)	Attraction towards polar surfaces

Choose the **correct** answer from the options given below.

	(a)	(b)	(c)	(d)
(1)	(ii)	(iv)	(i)	(iii)
(2)	(iv)	(iii)	(ii)	(i)
(3)	(iii)	(i)	(iv)	(ii)
(4)	(ii)	(i)	(iv)	(iii)

Ans. (1)

105. The term used for transfer of pollen grains from anthers of one plant to stigma of a different plant which, during pollination, brings genetically different types of pollen grains to stigma, is :

(1) Xenogamy (2) Geitonogamy

(3) Chasmogamy (4) Cleistogamy

Ans. (1)

106. Which of the following stages of meiosis involves division of centromere ?

(1) Metaphase I (2) Metaphase II

(3) Anaphase II (4) Telophase II

Ans. (3)

107. Which of the following is a **correct** sequence of steps in a PCR (Polymerase Chain Reaction) ?

(1) Denaturation, Annealing, Extension

(2) Denaturation, Extension, Annealing

(3) Extension, Denaturation, Annealing

(4) Annealing, Denaturation, Extension

Ans. (1)

108. Gemmae are present in :

(1) Mosses

(2) Pteridophytes

(3) Some Gymnosperms

(4) Some Liverworts

Ans. (4)

109. The production of gametes by the parents, formation of zygotes, the F_1 and F_2 plants, can be understood from a diagram called :

(1) Bullet square (2) Punch square

(3) Punnett square (4) Net square

Ans. (3)

110. The factor that leads to Founder effect in a population is:
(1) Natural selection
(2) Genetic recombination
(3) Mutation
(4) Genetic drift

Ans. (4)

111. Genera like *Selaginella* and *Salvinia* produce two kinds of spores. Such plants are known as :
(1) Homosorus (2) Heterosorus
(3) Homosporous (4) Heterosporous

Ans. (4)

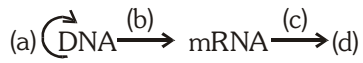
112. Plants follow different pathways in response to environment or phases of life to form different kinds of structures. This ability is called :
(1) Elasticity (2) Flexibility
(3) Plasticity (4) Maturity

Ans. (3)

113. Which of the following are **not** secondary metabolites in plants ?
(1) Morphine, codeine (2) Amino acids, glucose
(3) Vinblastin, curcumin (4) Rubber, gums

Ans. (2)

114. Complete the flow chart on central dogma.



(1) (a)-Replication; (b)-Transcription; (c)-Transduction; (d)-Protein
(2) (a)-Translation; (b)-Replication; (c)-Transcription; (d)-Transduction
(3) (a)-Replication; (b)-Transcription; (c)-Translation; (d)-Protein
(4) (a)-Transduction; (b)-Translation; (c)-Replication; (d)-Protein

Ans. (3)

115. When the centromere is situated in the middle of two equal arms of chromosomes, the chromosome is referred as :
(1) Metacentric (2) Telocentric
(3) Sub-metacentric (4) Acrocentric

Ans. (1)

116. DNA strands on a gel stained with ethidium bromide when viewed under UV radiation, appear as :
(1) Yellow bands (2) Bright orange bands
(3) Dark red bands (4) Bright blue bands

Ans. (2)

117. The site of perception of light in plants during photoperiodism is :
(1) Shoot apex (2) Stem
(3) Axillary bud (4) Leaf

Ans. (4)

118. When gene targetting involving gene amplification is attempted in an individual's tissue to treat disease, it is known as :
(1) Biopiracy (2) Gene therapy
(3) Molecular diagnosis (4) Safety testing

Ans. (2)

119. Which of the following plants is monoecious ?
(1) *Carica papaya*
(2) *Chara*
(3) *Marchantia polymorpha*
(4) *Cycas circinalis*

Ans. (2)

120. Which of the following is **not** an application of PCR (Polymerase Chain Reaction) ?
(1) Molecular diagnosis
(2) Gene amplification
(3) Purification of isolated protein
(4) Detection of gene mutation

Ans. (3)

121. Match **List -I** with **List - II.**

	List -I		**List -II**
(a)	Cristae	(i)	Primary constriction in chromosome
(b)	Thylakoids	(ii)	Disc-shaped sacs in Golgi apparatus
(c)	Centromere	(iii)	Infoldings in mitochondria
(d)	Cisternae	(iv)	Flattened membranous sacs in stroma of plastids

Choose the **correct** answer from the options given below.

	(a)	**(b)**	**(c)**	**(d)**
(1)	(iv)	(iii)	(ii)	(i)
(2)	(i)	(iv)	(iii)	(ii)
(3)	(iii)	(iv)	(i)	(ii)
(4)	(ii)	(iii)	(iv)	(i)

Ans. (3)

122. Diadelphous stamens are found in:
(1) China rose (2) Citrus
(3) Pea (4) China rose and citrus

Ans. (3)

123. Match **List -I** with **List - II.**

	List -I		List - II
(a)	Protoplast fusion	(i)	Totipotency
(b)	Plant tissue culture	(ii)	Pomato
(c)	Meristem culture	(iii)	Somaclones
(d)	Micropropagation	(iv)	Virus free plants

Choose tho **correct** answer from the options given below.

	(a)	(b)	(c)	(d)
(1)	(iii)	(iv)	(ii)	(i)
(2)	(ii)	(i)	(iv)	(iii)
(3)	(iii)	(iv)	(i)	(ii)
(4)	(iv)	(iii)	(ii)	(i)

Ans. (2)

124. Amensalism can be represented as :
(1) Species A (–); Species B (0)
(2) Species A (+); Species B (+)
(3) Species A (–); Species B (–)
(4) Species A (+); Species B (0)

Ans. (1)

125. Which of the following is an **incorrect** statement?
(1) Mature sieve tube elements possess a conspicuous nucleus and usual cytoplasmic organelles.
(2) Microbodies are present both in plant and animal cells.
(3) The perinuclear space forms a barrier between the materials present inside the nucleus and that of the cytoplasm.
(4) Nuclear pores act as passages for proteins and RNA molecules in both directions between nucleus and cytoplasm.

Ans. (1)

126. A typical angiosperm embryo sac at maturity is :
(1) 8-nucleate and 7-celled
(2) 7-nucleate and 8-celled
(3) 7-nucleate and 7-celled
(4) 8-nucleate and 8-celled

Ans. (1)

127. Which of the following algae contains mannitol as reserve food material ?
(1) *Ectocarpus* (2) *Gracilaria*
(3) *Volvox* (4) *Ulothrix*

Ans. (1)

128. The plant hormone used to destroy weeds in a field is :
(1) IAA (2) NAA (3) 2,4-D (4) IBA

Ans. (3)

129. The amount of nutrients, such as carbon, nitrogen, phosphorus and calcium present in the soil at any given time, is referred as :
(1) Climax (2) Climax community
(3) Standing state (4) Standing crop

Ans. (3)

130. Mutations in plant cells can be induced by:
(1) Kinetin (2) Infrared rays
(3) Gamma rays (4) Zeatin

Ans. (3)

131. Which of the following statements is **not** correct ?
(1) Pyramid of biomass in sea is generally inverted.
(2) Pyramid of biomass in sea is generally upright.
(3) Pyramid of energy is always upright.
(4) Pyramid of numbers in a grassland ecosystem is upright.

Ans. (2)

132. In the equation GPP–R = NPP
R represents :
(1) Radiant energy (2) Retardation factor
(3) Environment factor (4) Respiration losses

Ans. (4)

133. Which of the following algae produce Carrageen ?
(1) Green algae (2) Brown algae
(3) Red algae (4) Blue-green algae

Ans. (3)

134. The first stable product of CO_2 fixation in sorghum is :
(1) Pyruvic acid (2) Oxaloacetic acid
(3) Succinic acid (4) Phosphoglyceric acid

Ans. (2)

135. Match **List -I** with **List - II.**

	List -I		List - II
(a)	Lenticels	(i)	Phellogen
(b)	Cork cambium	(ii)	Suberin deposition
(c)	Secondary cortex	(iii)	Exchange of gases
(d)	Cork	(iv)	Phelloderm

Choose the **correct** answer from the options given below.

	(a)	(b)	(c)	(d)
(1)	(iv)	(i)	(iii)	(ii)
(2)	(iii)	(i)	(iv)	(ii)
(3)	(ii)	(iii)	(iv)	(i)
(4)	(iv)	(ii)	(i)	(iii)

Ans. (2)

Section-B (Biology : Botany)

136. Which of the following statements is **incorrect** ?

(1) During aerobic respiration, role of oxygen is limited to the terminal stage.

(2) In ETC (Electron Transport Chain), one molecule of NADH + H^+ gives rise to 2 ATP molecules, and one $FADH_2$ gives rise to 3 ATP molecules.

(3) ATP is synthesized through complex V.

(4) Oxidation-reduction reactions produce proton gradient in respiration.

Ans. (2)

137. Match **Column -I** with **Column - II.**

Column -1		**Column - II**
(a)	$\%\,\male\!\!\female K_{(5)}C_{1+2+(2)}A_{(9)+1}\underline{G}_1$	(i) Brassicaceae
(b)	$\oplus\,\male\!\!\female K_{(5)}\overset{\frown}{C_{(5)}A_5}\underline{G}_2$	(ii) Liliaceae
(c)	$\oplus\,\male\!\!\female \overset{\frown}{P_{(3+3)}A_{3+3}}\underline{G}_{(3)}$	(iii) Fabaceae
(d)	$\oplus\,\male\!\!\female K_{2+2}C_4A_{2-4}\underline{G}_{(2)}$	(iv) Solanaceae

Select the **correct** answer from the options given below.

	(a)	**(b)**	**(c)**	**(d)**
(1)	(iii)	(iv)	(ii)	(i)
(2)	(i)	(ii)	(iii)	(iv)
(3)	(ii)	(iii)	(iv)	(i)
(4)	(iv)	(ii)	(i)	(iii)

Ans. (1)

138. Match **List -I** with **List - II.**

List -I		**List -II**	
(a)	S phase	(i)	Proteins are synthesized
(b)	G_2 phase	(ii)	Inactive phase
(c)	Quiescent stage	(iii)	Interval between mitosis and initiation of DNA replication
(d)	G_1 phase	(iv)	DNA replication

Choose the **correct** answer from the options given below.

	(a)	**(b)**	**(c)**	**(d)**
(1)	(iii)	(ii)	(i)	(iv)
(2)	(iv)	(ii)	(iii)	(i)
(3)	(iv)	(i)	(ii)	(iii)
(4)	(ii)	(iv)	(iii)	(i)

Ans. (3)

139. Plasmid pBR322 has PstI restriction enzyme site within gene amp^R that confers ampicillin resistance. If this enzyme is used for inserting a gene for β-galactoside production and the recombinant plasmid is inserted in an *E.coli* strain

(1) it will not be able to confer ampicillin resistance to the host cell.

(2) the transformed cells will have the ability to resist ampicillin as well as produce β-galactoside.

(3) it will lead to lysis of host cell.

(4) it will be able to produce a novel protein with dual ability.

Ans. (1)

140. Identify the **correct** statement.

(1) In capping, methyl guanosine triphosphate is added to the 3' end of hnRNA.

(2) RNA polymerase binds with Rho factor to terminate the process of transcription in bacteria.

(3) The coding strand in a transcription unit is copied to an mRNA.

(4) Split gene arrangement is characteristic of prokaryotes.

Ans. (2)

141. Now a days it is possible to detect the mutated gene causing cancer by allowing radioactive probe to hybridise its complimentary DNA in a clone of cells, followed by its detection using autoradiography because:

(1) mutated gene partially appears on a photographic film.

(2) mutated gene completely and clearly appears on a photographic film.

(3) mutated gene does not appear on a photographic film as the probe has no complimentarity with it.

(4) mutated gene does not appear on photographic film as the probe has complimentarity with it.

Ans. (3)

142. In the exponential growth equation $N_t = N_0e^{rt}$, *e* represents:
(1) The base of number logarithms
(2) The base of exponential logarithms
(3) The base of natural logarithms
(4) The base of geometric logarithms

Ans. (3)

143. Select the **correct** pair.
(1) Large colorless empty cells in the epidermis of grass leaves – Subsidiary cells
(2) In dicot leaves, vascular bundles are surrounded by large thick-walled cells – Conjunctive tissue
(3) Cells of medullary rays that form part of cambial ring – Interfascicular cambium
(4) Loose parenchyma cells rupturing the epidermis and forming a lens-shaped opening in bark – Spongy parenchyma

Ans. (3)

144. In some members of which of the following pairs of families, pollen grains retain their viability for months after release ?
(1) Poaceae ; Rosaceae
(2) Poaceae; Leguminosae
(3) Poaceae; Solanaceae
(4) Rosaceae ; Leguminosae

Ans. (4)

145. What is the role of RNA polymerase III in the process of transcription in eukaryotes ?
(1) Transcribes rRNAs (28S, 18S and 5.8S)
(2) Transcribes tRNA, 5s rRNA and snRNA
(3) Transcribes precursor of mRNA
(4) Transcribes only snRNAs

Ans. (2)

146. Which of the following statements is **incorrect** ?
(1) Both ATP and NADPH + H^+ are synthesized during non-cyclic photophosphorylation.
(2) Stroma lamellae have PS I only and lack NADP reductase.
(3) Grana lamellae have both PS I and PS II.
(4) Cyclic photophosphorylation involves both PS I and PS II.

Ans. (4)

147. Which of the following statements is **correct** ?
(1) Fusion of two cells is called Karyogamy.
(2) Fusion of protoplasms between two motile on non-motile gametes is called plasmogamy.
(3) Organisms that depend on living plants are called saprophytes.
(4) Some of the organisms can fix atmospheric nitrogen in specialized cells called sheath cells.

Ans. (2)

148. Match **List - I** with **List - II.**

List -I		**List - II**	
(a)	Protein	(i)	C = C double bonds
(b)	Unsaturated fatty acid	(ii)	Phosphodiester bonds
(c)	Nucleic acid	(iii)	Glycosidic bonds
(d)	Polysaccharide	(iv)	Peptide bonds

Choose the **correct** answer from the options given below.

	(a)	**(b)**	**(c)**	**(d)**
(1)	(iv)	(i)	(ii)	(iii)
(2)	(i)	(iv)	(iii)	(ii)
(3)	(ii)	(i)	(iv)	(iii)
(4)	(iv)	(iii)	(i)	(ii)

Ans. (1)

149. DNA fingerprinting involves identifying differences in some specific regions in DNA sequence, called as :
(1) Satellite DNA (2) Repetitive DNA
(3) Single nucleotides (4) Polymorphic DNA

Ans. (2)

150. Match **Column - I** with **Column - II.**

Column -I		**Column - II**	
(a)	*Nitrococcus*	**(i)**	Denitrification
(b)	*Rhizobium*	**(ii)**	Conversion of ammonia to nitrite
(c)	*Thiobacillus*	**(iii)**	Conversion of nitrite to nitrate
(d)	*Nitrobacter*	**(iv)**	Conversion of atmospheric nitrogen to ammonia

Choose the **correct** answer from options given below.

	(a)	**(b)**	**(c)**	**(d)**
(1)	(ii)	(iv)	(i)	(iii)
(2)	(i)	(ii)	(iii)	(iv)
(3)	(iii)	(i)	(iv)	(ii)
(4)	(iv)	(iii)	(ii)	(i)

Ans. (1)

FINAL NEET(UG)–2021 EXAMINATION

(Held On Sunday 12th SEPTEMBER, 2021)

ZOOLOGY

TEST PAPER WITH ANSWER

Section - A (Biology : Zoology)

151. A specific recognition sequence identified by endonucleases to make cuts at specific positions within the DNA is :
(1) Degenerate primer sequence
(2) Okazaki sequences
(3) Palindromic Nucleotide sequences
(4) Poly(A) tail sequences

Ans. (3)

152. The fruit fly has 8 chromosomes (2n) in each cell. During interphase of Mitosis if the number of chromosomes at G_1 phase is 8, what would be the number of chromosomes after S phase ?
(1) 8 (2) 16 (3) 4 (4) 32

Ans. (1)

153. Which one of the following belongs to the family Muscidae ?
(1) Fire fly (2) Grasshopper
(3) Cockroach (4) House fly

Ans. (4)

154. Succus entericus is referred to as :
(1) Pancreatic juice (2) Intestinal juice
(3) Gastric juice (4) Chyme

Ans. (2)

155. With regard to insulin choose correct options.
(a) C-peptide is not present in mature insulin.
(b) The insulin produced by rDNA technology has C-peptide.
(c) The pro-insulin has C-peptide.
(d) A-peptide and B-peptide of insulin are interconnected by disulphide bridges.
Choose the **correct** answer from the options given below.
(1) (b) and (d) only (2) (b) and (c) only
(3) (a), (c) and (d) only (4) (a) and (d) only

Ans. (3)

156. Persons with 'AB' blood group are called as "Universal recipients". This is due to :
(1) Absence of antigens A and B on the surface of RBCs
(2) Absence of antigens A and B in plasma
(3) Presence of antibodies, anti-A and anti-B, on RBCs
(4) Absence of antibodies, anti-A and anti-B, in plasma

Ans. (4)

157. In a cross between a male and female, both heterozygous for sickle cell anaemia gene, what percentage of the progeny will be diseased?
(1) 50% (2) 75% (3) 25% (4) 100%

Ans. (3)

158. Which enzyme is responsible for the conversion of inactive fibrinogens to fibrins ?
(1) Thrombin (2) Renin
(3) Epinephrine (4) Thrombokinase

Ans. (1)

159. The partial pressures (in mm Hg) of oxygen (O_2) and carbon dioxide (CO_2) at alveoli (the site of diffusion) are :
(1) $pO_2 = 104$ and $pCO_2 = 40$
(2) $pO_2 = 40$ and $pCO_2 = 45$
(3) $pO_2 = 95$ and $pCO_2 = 40$
(4) $pO_2 = 159$ and $pCO_2 = 0.3$

Ans. (1)

160. Chronic auto immune disorder affecting neuro muscular junction leading to fatigue, weakening and paralysis of skeletal muscle is called as:
(1) Arthritis (2) Muscular dystrophy
(3) Myasthenia gravis (4) Gout

Ans. (3)

161. Which is the "Only enzyme" that has "Capability" to catalyse Initiation, Elongation and Termination in the process of transcription in prokaryotes ?
(1) DNA dependent DNA polymerase
(2) DNA dependent RNA polymerase
(3) DNA Ligase
(4) DNase

Ans. (2)

162. Which of the following RNAs is not required for the synthesis of protein ?
(1) mRNA (2) tRNA
(3) rRNA (4) siRNA

Ans. (4)

163. Which one of the following is an example of Hormone releasing IUD ?
(1) CuT (2) LNG 20
(3) Cu 7 (4) Multiload 375

Ans. (2)

164. If Adenine makes 30% of the DNA molecule, what will be the percentage of Thymine, Guanine and Cytosine in it ?

(1) T : 20 ; G : 30 ; C : 20

(2) T : 20 ; G : 20 ; C : 30

(3) T : 30 ; G : 20 ; C : 20

(4) T : 20 ; G : 25 ; C : 25

Ans. (3)

165. Match **List - I** with **List - II.**

	List-I		**List-II**
(a)	*Aspergillus niger*	(i)	Acetic Acid
(b)	*Acetobacter aceti*	(ii)	Lactic Acid
(c)	*Clostridium butylicum*	(iii)	Citric Acid
(d)	*Lactobacillus*	(iv)	Butyric Acid

Choose the **correct** answer from the options given below.

	(a)	**(b)**	**(c)**	**(d)**
(1)	(iii)	(i)	(iv)	(ii)
(2)	(i)	(ii)	(iii)	(iv)
(3)	(ii)	(iii)	(i)	(iv)
(4)	(iv)	(ii)	(i)	(iii)

Ans. (1)

166. Read the following statements.

(a) Metagenesis is observed in Helminths.

(b) Echinoderms are triploblastic and coelomate animals.

(c) Round worms have organ-system level of body organization.

(d) Comb plates present in ctenophores help in digestion.

(e) Water vascular system is characteristic of Echinoderms.

Choose the **correct** answer from the options given below.

(1) (c), (d) and (e) are correct

(2) (a), (b) and (c) are correct

(3) (a), (d) and (e) are correct

(4) (b), (c) and (e) are correct

Ans. (4)

167. Receptors for sperm binding in mammals are present on:

(1) Corona radiata

(2) Vitelline membrane

(3) Perivitelline space

(4) Zona pellucida

Ans. (4)

168. Match **List - I** with **List - II.**

	List-I		**List-II**
(a)	Metamerism	(i)	Coelenterata
(b)	Canal system	(ii)	Ctenophora
(c)	Comb plates	(iii)	Annelida
(d)	Cnidoblasts	(iv)	Porifera

Choose the **correct** answer from the options given below.

	(a)	**(b)**	**(c)**	**(d)**
(1)	(iv)	(iii)	(i)	(ii)
(2)	(iii)	(iv)	(i)	(ii)
(3)	(iii)	(iv)	(ii)	(i)
(4)	(iv)	(i)	(ii)	(iii)

Ans. (3)

169. Erythropoietin hormone which stimulates R.B.C. formation is produced by :

(1) Alpha cells of pancreas

(2) The cells of rostral adenohypophysis

(3) The cells of bone marrow

(4) Juxtaglomerular cells of the kidney

Ans. (4)

170. Veneral diseases can spread through :

(a) Using sterile needles

(b) Transfusion of blood from infected person

(c) Infected mother to foetus

(d) Kissing

(e) Inheritance

Choose the **correct** answer from the options given below.

(1) (a), (b) and (c) only

(2) (b), (c) and (d) only

(3) (b) and (c) only

(4) (a) and (c) only

Ans. (3)

171. Which of the following characteristics is **incorrect** with respect to cockroach?

(1) A ring of gastric caeca is present at the junction of midgut and hind gut.

(2) Hypopharynx lies within the cavity enclosed by the mouth parts.

(3) In females, 7^{th} - 9^{th} sterna together form a genital pouch.

(4) 10^{th} abdominal segment in both sexes, bears a pair of anal cerci.

Ans. (1)

172. Match the following:

List-I		List-II	
(a)	*Physalia*	(i)	Pearl oyster
(b)	*Limulus*	(ii)	Portuguese Man of War
(c)	*Ancylostoma*	(iii)	Living fossil
(d)	*Pinctada*	(iv)	Hookworm

Choose the **correct** answer from the options given below.

	(a)	(b)	(c)	(d)
(1)	(ii)	(iii)	(i)	(iv)
(2)	(iv)	(i)	(iii)	(ii)
(3)	(ii)	(iii)	(iv)	(i)
(4)	(i)	(iv)	(iii)	(ii)

Ans. (3)

173. Which one of the following organisms bears hollow and pneumatic long bones?

(1) *Neophron* (2) *Hemidactylus*
(3) *Macropus* (4) *Ornithorhynchus*

Ans. (1)

174. The centriole undergoes duplication during :

(1) S-phase (2) Prophase
(3) Metaphase (4) G_2 phase

Ans. (1)

175. During the process of gene amplification using PCR, if very high temperature is not maintained in the beginning, then which of the following steps of PCR will be affected first ?

(1) Annealing (2) Extension
(3) Denaturation (4) Ligation

Ans. (3)

176. Which of the following is **not** an objective of Biofortification in crops?

(1) Improve protein content
(2) Improve resistance to diseases
(3) Improve vitamin content
(4) Improve micronutrient and mineral content

Ans. (2)

177. Dobson units are used to measure thickness of:

(1) CFCs (2) Stratosphere
(3) Ozone (4) Troposphere

Ans. (3)

178. Sphincter of oddi is present at :

(1) Ileo-caecal junction
(2) Junction of hepato-pancreatic duct and duodenum
(3) Gastro-oesophageal junction
(4) Junction of jejunum and duodenum

Ans. (2)

179. Select the favourable conditions required for the formation of oxyhaemoglobin at the alveoli.

(1) High pO_2, low pCO_2, less H^+, lower temperature
(2) Low pO_2, high pCO_2, more H^+, higher temperature
(3) High pO_2, high pCO_2, less H^+, higher temperature
(4) Low pO_2, low pCO_2, more H^+, higher temperature

Ans. (1)

180. Identify the **incorrect** pair.

(1) Alkaloids - Codeine
(2) Toxin - Abrin
(3) Lectins - Concanavalin A
(4) Drugs - Ricin

Ans. (4)

181. Which of the following statements wrongly represents the nature of smooth muscle?

(1) These muscle have no striations
(2) They are involuntary muscles
(3) Communication among the cells is performed by intercalated discs
(4) These muscles are present in the wall of blood vessels

Ans. (3)

182. For effective treatment of the disease, early diagnosis and understanding its pathophysiology is very important. Which of the following molecular diagnostic techniques is very useful for early detection?

(1) Western Blotting Technique
(2) Southern Blotting Technique
(3) ELISA Technique
(4) Hybridization Technique

Ans. (3)

183. Match **List-I** with **List-II.**

List–I		List–II	
(a)	Vaults	(i)	Entry of sperm through Cervix is blocked
(b)	IUDs	(ii)	Removal of Vas deferens
(c)	Vasectomy	(iii)	Phagocytosis of sperms within the Uterus
(d)	Tubectomy	(iv)	Removal of fallopian tube

Choose the **correct** answer from the options given below.

	(a)	(b)	(c)	(d)
(1)	(iv)	(ii)	(i)	(iii)
(2)	(i)	(iii)	(ii)	(iv)
(3)	(ii)	(iv)	(iii)	(i)
(4)	(iii)	(i)	(iv)	(ii)

Ans. (2)

184. The organelles that are included in the endomembrane system are:
(1) Endoplasmic reticulum, Mitochondria, Ribosomes and Lysosomes
(2) Endoplasmic reticulum, Golgi complex, Lysosomes and Vacuoles
(3) Golgi complex, Mitochondria, Ribosomes and Lysosomes
(4) Golgi complex, Endoplasmic reticulum, Mitochondria and Lysosomes

Ans. (2)

185. Which stage of meiotic prophase shows terminalisation of chiasmata as its distinctive feature?
(1) Leptotene (2) Zygotene
(3) Diakinesis (4) Pachytene

Ans. (3)

Section - B (Biology : Zoology)

186. Which of these is not an important component of initiation of parturition in humans?
(1) Increase in estrogen and progesterone ratio
(2) Synthesis of prostaglandins
(3) Release of Oxytocin
(4) Release of Prolactin

Ans. (4)

187. Which of the following is **not** a step in Multiple Ovulation Embryo Transfer Technology (MOET)?
(1) Cow is administered hormone having LH like activity for super ovulation
(2) Cow yields about 6-8 eggs at a time
(3) Cow is fertilized by artificial insemination
(4) Fertilized eggs are transferred to surrogate mothers at 8-32 cell stage

Ans. (1)

188. Match **List - I** with **List - II.**

List–I		**List–II**	
(a)	Allen's Rule	(i)	Kangaroo rat
(b)	Physiological adaptation	(ii)	Desert lizard
(c)	Behavioural adaptation	(iii)	Marine fish at depth
(d)	Biochemical Adaptation	(iv)	Polar seal

Choose the **correct** answer from the options given below.

	(a)	**(b)**	**(c)**	**(d)**
(1)	(iv)	(ii)	(iii)	(i)
(2)	(iv)	(i)	(iii)	(ii)
(3)	(iv)	(i)	(ii)	(iii)
(4)	(iv)	(iii)	(ii)	(i)

Ans. (3)

189. Assertion (A) :
A person goes to high altitude and experiences 'altitude sickness' with symptoms like breathing difficulty and heart palpitations.
Reason (R) :
Due to low atmospheric pressure at high altitude, the body does not get sufficient oxygen.
In the light of the above statements, choose the **correct** answer from the options given below.
(1) Both **(A)** and **(R)** are true and **(R)** is the correct explanation of **(A)**
(2) Both **(A)** and **(R)** are true but **(R)** is not the correct explanation of (A)
(3) **(A)** is true but **(R)** is false
(4) **(A)** is false but **(R)** is true

Ans. (1)

190. Following are the statements with reference to 'lipids'.
(a) Lipids having only single bonds are called unsaturated fatty acids.
(b) Lecithin is a phospholipid.
(c) Trihydroxy propane is glycerol.
(d) Palmitic acid has 20 carbon atoms including carboxyl carbon.
(e) Arachidonic acid has 16 carbon atoms.
Choose the **correct** answer from the options given below.
(1) (a) and (b) only (2) (c) and (d) only
(3) (b) and (c) only (4) (b) and (e) only

Ans. (3)

191. Match **List - I** with **List - II.**

List–I		**List–II**	
(a)	Scapula	(i)	Cartilaginous joints
(b)	Cranium	(ii)	Flat bone
(c)	Sternum	(iii)	Fibrous joints
(d)	Vertebral column	(iv)	Triangular flat bone

Choose the **correct** answer from the options given below.

	(a)	**(b)**	**(c)**	**(d)**
(1)	(i)	(iii)	(ii)	(iv)
(2)	(ii)	(iii)	(iv)	(i)
(3)	(iv)	(ii)	(iii)	(i)
(4)	(iv)	(iii)	(ii)	(i)

Ans. (4)

192. Identify the types of cell junctions that help to stop the leakage of the substances across a tissue and facilitation of communication with neighbouring cells via rapid transfer of ions and molecules.
(1) Gap junctions and Adhering junctions, respectively.
(2) Tight junctions and Gap junctions, respectively.
(3) Adhering junctions and Tight junctions, respectively.
(4) Adhering junctions and Gap junctions, respectively.

Ans. (2)

193. **Statement I :**
The condon 'AUG' codes for methionine and phenylalanine.
Statement II :
'AAA' and 'AAG' both codons code for the amino acid lysine.
In the light of the above statements, choose the **correct** answer from the options given below.
(1) Both **statement I** and **Statement II** are true.
(2) Both **Statement I** and **Statement II** are false
(3) **Statement I** is correct but **Statement II** is false
(4) **Statement I** is incorrect but **Statement II** is true

Ans. (4)

194. Which of the following secretes the hormone, relaxin, during the later phase of pregnancy?
(1) Graafian follicle (2) Corpus luteum
(3) Foetus (4) Uterus

Ans. (2)

195. Following are the statements about prostomium of earthworm.
(a) It serves as a covering for mouth.
(b) It helps to open cracks in the soil into which it can crawl.
(c) It is one of the sensory structures.
(d) It is the first body segment.
Choose the **correct** answer from the options given below.
(1) (a), (b) and (c) are correct
(2) (a), (b) and (d) are correct
(3) (a), (b), (c) and (d) are correct
(4) (b) and (c) are correct

Ans. (1)

196. Which one of the following statements about Histones is **wrong**?
(1) Histones are organized to form a unit of 8 molecules.
(2) The pH of histones is slightly acidic.
(3) Histones are rich in amino acids - Lysine and Arginine.
(4) Histones carry positive charge in the side chain.

Ans. (2)

197. During muscular contraction which of the following events occur ?
(a) 'H' zone disappears
(b) 'A' band widens
(c) 'I' band reduces in width
(d) Myosine hydrolyzes ATP, releasing the ADP and Pi
(e) Z-lines attached to actins are pulled inwards
Choose the **correct** answer from the options given below.
(1) (a), (c), (d), (e) only (2) (a), (b), (c), (d) only
(3) (b), (c), (d), (e) only (4) (b), (d), (e), (a) only

Ans. (1)

198. The Adenosine deaminase deficiency results into :
(1) Dysfunction of Immune system
(2) Parkinson's disease
(3) Digestive disorder
(4) Addison's disease

Ans. (1)

199. Match **List - I** with **List -II.**

List - I		**List - II**	
(a)	Adaptive radiation	(i)	Selection of resistant varieties due to excessive use of herbicides and pesticides
(b)	Convergent evolution	(ii)	Bones of forelimbs in Man and Whale
(c)	Divergent evolution	(iii)	Wings of Butterfly and Bird
(d)	Evolution by anthropogenic action	(iv)	Darwin Finches

Choose the **correct** answer from the options given below.

	(a)	**(b)**	**(c)**	**(d)**
(1)	(iv)	(iii)	(ii)	(i)
(2)	(iii)	(ii)	(i)	(iv)
(3)	(ii)	(i)	(iv)	(iii)
(4)	(i)	(iv)	(iii)	(ii)

Ans. (1)

200. Match **List - I** with **List -II.**

List-I		**List-II**	
(a)	Filariasis	(i)	*Haemophilus influenzae*
(b)	Amoebiasis	(ii)	*Trichophyton*
(c)	Pneumonia	(iii)	*Wuchereria bancrofti*
(d)	Ringworm	(iv)	*Entamoeba histolytica*

Choose the **correct** answer from the options given below.

	(a)	**(b)**	**(c)**	**(d)**
(1)	(iv)	(i)	(iii)	(ii)
(2)	(iii)	(iv)	(i)	(ii)
(3)	(i)	(ii)	(iv)	(iii)
(4)	(ii)	(iii)	(i)	(iv)

Ans. (2)