



DR ACADEMY

DO RIGHT FOR GENUINE EDUCATION

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NEET EXAMINATION - 2025

DATE : 04-05-2025

CODE - 45

TIME : 02:00 PM TO 05:00 PM

LONG TERM COACHING

1ST BATCH FOR NEET - 2026

5TH STARTS ON

JUNE - 2025

NEET TOPPERS OF DR ACADEMY

NEET - 2024 JIPMER - PUDUCHERRY  706 MARKS VENKATA SURYA TEJA GUDURI	NEET - 2021 JIPMER - PUDUCHERRY  695 MARKS LAKSHMAN REDDY B V	NEET - 2024 BMC - BANGALORE  690 MARKS ABHISHEK A BADAGOUDAR	NEET - 2024 BMC - BANGALORE  686 MARKS RAHUL KADLAGOND	NEET - 2024 BIMC - BELAGAVI  686 MARKS AMEERMUSADDIQ SANADI	NEET - 2024 KIMS - HUBLI  686 MARKS ADITYA SAKRI
NEET - 2024 BMC - BANGALORE  681 MARKS UTTAM SUBHASH HUKKERI	NEET - 2024 SABVIMS - BENGALURU  681 MARKS MOHAMMED NAASIRUDEEN D	NEET - 2024 MMCRI - MYSORE  680 MARKS SUHAS L KORABU	NEET - 2023 BMC, BANGALORE  680 MARKS SHRAVAN REDDY C N	NEET - 2023 JIPMER PUDUCHERRY  677 MARKS KAMALIKA CHALLA	NEET - 2022 BIMC, BELAGAVI  677 MARKS SACHI KALLOLI
NEET - 2023 AIIMS, NAGPUR  676 MARKS MOHAMMED SULEMAN	NEET - 2022 AIIMS, BHOPAL  675 MARKS CHATHUSH GOWDA D S	NEET - 2022 BMC, BANGALORE  672 MARKS CHANDANA D	NEET - 2022 BMC, BANGALORE  672 MARKS SOWRAV B	NEET - 2024 ESIMC - BANGALORE  671 MARKS ZOYA FIRDOUSE	NEET - 2024 MMCRI - MYSORE  671 MARKS GIRISH J PARAMAGOND
NEET - 2024 KIMS - HUBLI  670 MARKS SNEHA SUBHAS PATIL	NEET - 2024 KIMS - HUBLI  666 MARKS RAJIV BHEEMASHANKAR CHOUDHARY	NEET - 2024 KIMS - HUBLI  665 MARKS CHANDANA D	NEET - 2021 BMC, BANGALORE  665 MARKS SOWRAV B	NEET - 2020 BMC, BANGALORE  665 MARKS ZOYA FIRDOUSE	NEET - 2024 GIMS - GULBARGA  663 MARKS GIRISH J PARAMAGOND
NEET - 2024 MIMS - MANDYA  662 MARKS SNEHA SUBHAS PATIL	NEET - 2024 MMCRI - MYSORE  662 MARKS RAJIV BHEEMASHANKAR CHOUDHARY	NEET - 2022 BMC, BANGALORE  662 MARKS CHANDANA D	NEET - 2024 KIMS - HUBLI  661 MARKS SOWRAV B	NEET - 2023 JIPMER PUDUCHERRY  661 MARKS ZOYA FIRDOUSE	NEET - 2024 BIMC - BELAGAVI  660 MARKS GIRISH J PARAMAGOND
NEET - 2024 KIMS - BANGALORE  660 MARKS SNEHA SUBHAS PATIL	NEET - 2024 MMCRI - MYSORE  660 MARKS RAJIV BHEEMASHANKAR CHOUDHARY	NEET - 2024 SABVIMS - BENGALURU  660 MARKS CHANDANA D	NEET - 2024 SABVIMS - BENGALURU  660 MARKS SOWRAV B	NEET - 2021 KIMS, HUBLI  660 MARKS ZOYA FIRDOUSE	NEET - 2024 KIMS - HUBLI  657 MARKS GIRISH J PARAMAGOND

DAY & RESIDENTIAL
SEPARATE HOSTEL FOR BOYS & GIRLS

NELMANGALA - LTM BOYS CAMPUS

#2/5, Narayanappa Palya, Dasanpura, Tumkur Road, Bangalore - 560 062.
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DR ACADEMY IS THE PERFECT DESTINATION FOR MEDICAL ASPIRANTS

THE JOURNEY...
NEET MEDICAL
SELECTIONS

123
2018

210
2019

182
2020

279
2021

445
2022

452
2023

569
2024

TOTAL 2260 MEDICAL SELECTIONS

in seven consecutive years. Our students joined in many reputed medical colleges across Karnataka.

NEET - 2024 | MIMS - MANDYA

**657**
MARKS
S SUHAS

NEET - 2024 | SABVIMS - BENGALURU

**657**
MARKS
SHREEHARINATH A B

NEET - 2024 | GMC - SAMBAJINAGAR

**656**
MARKS
PRATEEK SUBHASH TOPINATTI

NEET - 2024 | KIMS - HUBLI

**656**
MARKS
YASEEN MULLA

NEET - 2024 | MIMS - MANDYA

**656**
MARKS
KUSUMA M

NEET - 2024 | SIMS - SHIMOGA

**656**
MARKS
NAGAVARDHAN MR

NEET - 2024 | VIMS - BELLARY

**656**
MARKS
N POOJITHA SHREE

NEET - 2023 | BMC, BANGALORE

**656**
MARKS
BHANU PRAKASH D M

NEET - 2021 | AIIMS, HYDERABAD

**656**
MARKS
VARUN KAJAGAR

NEET - 2024 | AIIMS, HYDERABAD.

**655**
MARKS
AMODH NAIK

NEET - 2024 | BIMC - BELAGAVI

**655**
MARKS
SAKSHI CHANDRASHEKHAR YALARADDI

NEET - 2024 | HIMS - HASSAN

**655**
MARKS
NITYA REDDY C

NEET - 2024 | SIMS - SHIMOGA

**655**
MARKS
MAHIPAL SINGH

NEET - 2024 | VIMS - BELLARY

**654**
MARKS
NIVEDITA

NEET - 2023 | BMC, BANGALORE

**654**
MARKS
ABHISHEK V G

NEET - 2021 | BMC, BANGALORE

**654**
MARKS
KUMARESH HIREMATH

NEET - 2024 | BIMC - BELAGAVI

**653**
MARKS
SIDDANAGOUDA S PATIL

NEET - 2024 | KIMS - HUBLI

**653**
MARKS
VINDHYA B G

NEET - 2024 | BIMC - BELAGAVI

**652**
MARKS
BHOOMIKA BAYAKOL

NEET - 2024 | VIMS - BELLARY

**652**
MARKS
CHIRANTHAN J

NEET - 2024 | VIMS - BELLARY

**652**
MARKS
B K V KARTHIKEYA

NEET - 2024 | KIMS - HUBLI

**651**
MARKS
SHASHANK VALIMARAD

NEET - 2024 | KIMS - HUBLI

**650**
MARKS
PARASHURAM KYADIGGERI

NEET - 2024 | MIMS - MANDYA

**650**
MARKS
PREETHAM K M

NEET-2022 | BMC, BANGALORE

**650**
MARKS
SANKALP

NEET-2022 | KIMS, HUBLI

**650**
MARKS
ABHIJIT RAMESH MIRJI

NEET - 2024 | VIMS - BELLARY

**649**
MARKS
KEERTI VEERANNA KORI

NEET - 2024 | VIMS - BELLARY

**648**
MARKS
SONIYA S

NEET - 2024 | BMC - BANGALORE

**647**
MARKS
NAVYA

NEET - 2024 | BIMC - BELAGAVI

**647**
MARKS
SIDDANAGOUDA PATIL

NEET - 2024 | BIMC - BELAGAVI

**647**
MARKS
OMKAR N MUDENUR

NEET-2024 | MIMS - MANDYA

**647**
MARKS
VIJAY KUMAR B DEYANAVAR

NEET-2022 | BMC, BANGALORE

**647**
MARKS
SUPRIT SAMJAY K

NEET-2021 | BMC, BANGALORE

**647**
MARKS
PRAMOD I HONAGOUD

NEET-2020 | BMC, BANGALORE

**647**
MARKS
CHANDAN S

NEET-2024 | CIMS - CHAMARAJANAGAR

**646**
MARKS
BUTHESH G

NEET-2024 | GIMS - GADAG

**646**
MARKS
BASAVAKIRAN DHAREPPANAVAR

NEET-2024 | VIMS - BELLARY

**646**
MARKS
VENKATESH REDDY

NEET-2022 | BMC, BANGALORE

**646**
MARKS
SHIVAANI S GOUNDER

NEET-2022 | KIMS, HUBLI

**646**
MARKS
ROHAN R KONGI

NEET-2024 | BIMC - BELAGAVI

**645**
MARKS
CHANDANA B

NEET-2024 | GIMS - GADAG

**645**
MARKS
SHASHANK CHANDRA SHEKHAR KANDAGAL

NEET-2024 | MIMS - MANDYA

**645**
MARKS
PRASHANTGOUDA MENASAGI

NEET-2024 | PSGIMS - COIMBATORE

**645**
MARKS
GOURAV S

NEET-2024 | VIMS - BELLARY

**645**
MARKS
MEHANTH SAI REDDY G R

NEET-2023 | BMC, BANGALORE

**645**
MARKS
NABIYA MUSHTAQ AHMED M

NEET-2023 | GMC, SECUNDERABAD

**645**
MARKS
VJESH KANNA K

NEET-2022 | BMC, BANGALORE

**645**
MARKS
SAATHVIK S G

NEET-2021 | MMCRI, MYSORE

**645**
MARKS
AJEETH MALLAPPA T

NEET-2024 | HIMS - HASSAN

**644**
MARKS
DEEPTHI S M

NEET-2024 | MIMS - MANDYA

**644**
MARKS
SANJANA R

NEET-2023 | MMCRI, MYSORE

**643**
MARKS
VISHAL S PATIL

NEET-2022 | BMC, BANGALORE

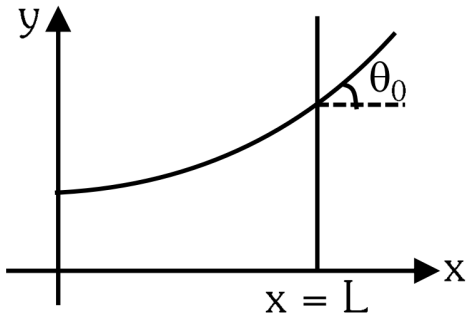
**643**
MARKS
VAISHNAVI REDDY

NEET-2022 | SMC, CHENNAI

**643**
MARKS
S NAYANA

PHYSICS

1. Consider a water tank shown in the figure. It has one wall at $x = L$ and can be taken to be very wide in the z direction. When filled with a liquid of surface tension S and density ρ , the liquid surface makes angle θ_0 ($\theta_0 \ll 1$) with the x -axis at $x = L$. If $y(x)$ is the height of the surface then the equation for $y(x)$ is:



(take $\theta(x) = \sin \theta(x) = \tan \theta(x) = \frac{dy}{dx}$,

g is the acceleration due to gravity)

- 1) $\frac{d^2y}{dx^2} = \frac{\rho g}{S} x$ 2) $\frac{d^2y}{dx^2} = \frac{\rho g}{S} y$
3) $\frac{d^2y}{dx^2} = \sqrt{\frac{\rho g}{S}}$ 4) $\frac{dy}{dx} = \sqrt{\frac{\rho g}{S} x}$

Ans. 2

Sol. According to Young-Laplace equation

$$\Delta P = -S \frac{d^2y}{dx^2}$$

Pressure difference is $\Delta P = \rho g y$

$$\text{Here, } S \frac{d^2y}{dx^2} = \rho g y$$

$$\frac{d^2y}{dx^2} = \frac{\rho g}{S} y$$

2. A microscope has an objective of focal length 2cm, eyepiece of focal length 4cm and the tube length of 40cm. If the distance of distinct vision of eye is 25cm, the magnification in the microscope is

- 1) 100 2) 125
3) 150 4) 250

Ans. 2

Sol. $M = \frac{L}{f_o} \times \frac{D}{f_e} = \frac{40}{2} \times \frac{25}{4} = 125$

3. An electron (mass $9 \times 10^{-31} \text{ kg}$ and charge $1.6 \times 10^{-19} \text{ C}$) moving with speed $c/100$ ($c = \text{speed of light}$) is injected into a magnetic field $\vec{B}$ of magnitude $9 \times 10^{-4} \text{ T}$ perpendicular to its direction of motion. We wish to apply a uniform electric field $\vec{E}$ together with the magnetic field so that the electron does not deflect from its path. Then (speed of light $c = 3 \times 10^8 \text{ ms}^{-1}$)

- 1) $\vec{E}$ is perpendicular to $\vec{B}$ and its magnitude is $27 \times 10^4 \text{ Vm}^{-1}$
2) $\vec{E}$ is perpendicular to $\vec{B}$ and its magnitude is $27 \times 10^2 \text{ Vm}^{-1}$
3) $\vec{E}$ is parallel to $\vec{B}$ and its magnitude is $27 \times 10^2 \text{ Vm}^{-1}$
4) $\vec{E}$ is parallel to $\vec{B}$ and its magnitude is $27 \times 10^4 \text{ Vm}^{-1}$

Ans. 2

Sol. $V = \frac{E}{B}$

$$\frac{C}{100} = \frac{E}{9 \times 10^{-4}}$$

$$E = \frac{9 \times 10^{-4} \times C}{100} = \frac{9 \times 10^{-4} \times 3 \times 10^8}{10^2}$$

$$E = 27 \times 10^2 \text{ Vm}^{-1}$$

4. There are two inclined surfaces of equal length (L) and same angle of inclination 45° with the horizontal. One of them is rough and the other is perfectly smooth. A given body takes 2 times as much time to slide down on rough surface than on the smooth surface. The coefficient of kinetic friction (μ_k) between the object and the rough surface is close to

- 1) 0.25 2) 0.40
3) 0.5 4) 0.75

Ans. 4

Sol. $\mu_k = \tan \theta \left(\frac{n^2 - 1}{n^2} \right)$

$$\mu_k = \tan 45^\circ \left(\frac{2^2 - 1}{2^2} \right) = \frac{3}{4} = 0.75$$

5. The kinetic energies of two similar cars A and B are 100 J and 225 J respectively. On applying breaks, car A stops after 1000m and car B stops after 1500m, If F_A and F_B are the forces applied by the breaks on cars A and B respectively, then the ratio $\frac{F_A}{F_B}$ is

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

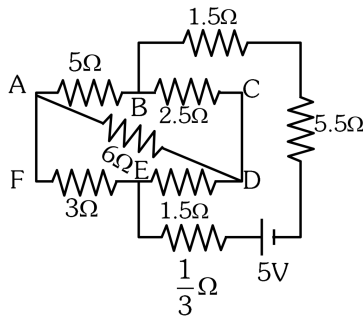
Ans. 2

Sol. $F \propto \frac{E}{x}$

$$\frac{F_A}{F_B} = \frac{E_A}{E_B} \times \frac{x_B}{x_A} = \frac{100}{225} \times \frac{1500}{1000}$$

$$\frac{F_A}{F_B} = \frac{2}{3}$$

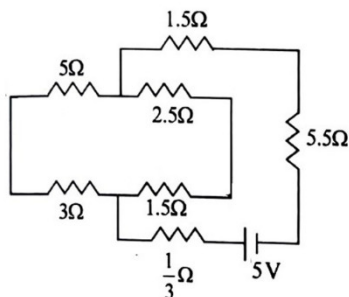
6. The current passing through the battery in the given circuit is



- 1) 2.0 A 2) 0.5 A
3) 2.5 A 4) 1.5 A

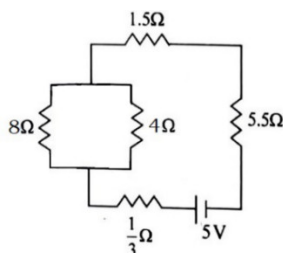
Ans. 2

Sol. 5Ω, 2.5Ω, 3Ω, 1.5Ω form Wheatstone network

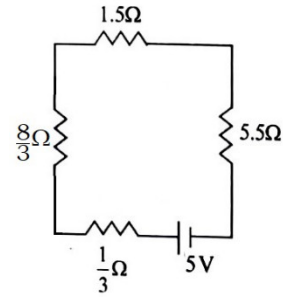


$$5\Omega, 3\Omega \text{ are series} \Rightarrow 5 + 3 = 8\Omega$$

$$2.5\Omega, 1.5\Omega \text{ are series} \Rightarrow 2.5 + 1.5 = 4\Omega$$



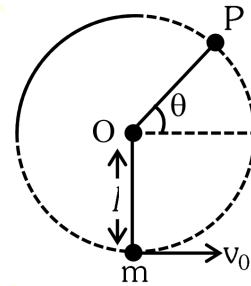
$$8\Omega, 4\Omega \text{ are parallel} = \frac{8 \times 4}{8 + 4} = \frac{8 \times 4}{12} = \frac{8}{3}$$



$$R_{\text{eff}} = 1.5 + 5.5 + \frac{8}{3} + \frac{1}{3} = 10\Omega$$

$$\text{Current } i = \frac{V}{R_{\text{eff}}} = \frac{5}{10} = 0.5 \text{ A}$$

7. A bob of heavy mass m is suspended by a light string of length l . The bob is given a horizontal velocity v_0 as shown in figure. If the string gets slack at some point P making an angle θ from the horizontal, the ratio of the speed v of the bob at point P to its initial speed v_0 is



- 1) $(\sin \theta)^{1/2}$ 2) $\left(\frac{1}{2 + 3 \sin \theta}\right)^{1/2}$
3) $\left(\frac{\cos \theta}{2 + 3 \sin \theta}\right)^{1/2}$ 4) $\left(\frac{\sin \theta}{2 + 3 \sin \theta}\right)^{1/2}$

Ans. 4

Sol. $T_p = 0$

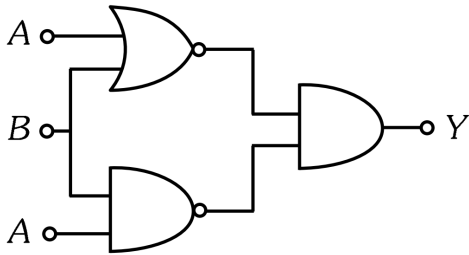
$$mg \sin \theta = \frac{mV^2}{r}$$

$$\cos(90^\circ + \theta) = \frac{2}{3} - \frac{V_0^2}{3gr} \Rightarrow -\sin \theta = \frac{2}{3} - \frac{V_0^2}{3gr}$$

$$\frac{V_0^2}{3gr} = \frac{2 + 3 \sin \theta}{3} \Rightarrow V_0^2 = gr(2 + 3 \sin \theta)$$

$$\frac{V^2}{V_0^2} = \frac{gr \sin \theta}{gr(2 + 3 \sin \theta)} \Rightarrow \frac{V}{V_0} = \left(\frac{\sin \theta}{2 + 3 \sin \theta}\right)^{1/2}$$

8. The output (Y) of the given logic implementation is similar to the output of an/a ____ gate



- 1) AND 2) NAND
3) OR 4) NOR

Ans. 4

Sol. $y = (A + B) \cdot (\overline{A \cdot B})$
 $\therefore$ NOR Gate

9. The electric field in a plane electromagnetic wave is given by

$$E_z = 60 \cos(5x + 1.5 \times 10^9 t) \text{ V/m.}$$

Then expression for the corresponding magnetic field is (here subscripts denote the direction of the field)

- 1) $B_y = 2 \times 10^{-7} \cos(5x + 1.5 \times 10^9 t) \text{ T}$
2) $B_x = 2 \times 10^{-7} \cos(5x + 1.5 \times 10^9 t) \text{ T}$
3) $B_z = 60 \cos(5x + 1.5 \times 10^9 t) \text{ T}$
4) $B_y = 60 \sin(5x + 1.5 \times 10^9 t) \text{ T}$

Ans. 1

Sol. $E_z = 60 \cos(5x + 1.5 \times 10^9 t) \text{ V}$

$$B_y = \frac{60}{3 \times 10^8} \cos(5x + 1.5 \times 10^9 t) \text{ T}$$

10. A ball of mass 0.5kg is dropped from a height of 40 m. The ball hits the ground and rises to a height of 10 m. The impulse imported to the ball during its collision with the ground is (Take $g = 9.8 \text{ m/s}^2$)

- 1) 21 NS 2) 7 NS
3) 0 4) 84 NS

Ans. 1

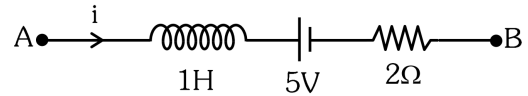
Sol. $m = 0.5 \text{ kg}$

$$h_1 = 40 \text{ m}$$

$$h_2 = 10 \text{ m}$$

$$\begin{aligned} \text{Impulse} &= m(\sqrt{2gh_1} + \sqrt{2gh_2}) \\ &= 0.5(\sqrt{2 \times 9.8 \times 40} + \sqrt{2 \times 9.8 \times 10}) \\ \text{Impulse} &= 0.5(28 + 14) = 21 \text{ NS} \end{aligned}$$

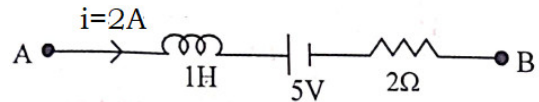
11. AB is a part of an electrical circuit (see figure). The potential difference " $V_A - V_B$ ", at the instant when current $i = 2 \text{ A}$ and is increasing at a rate of 1 amp / second is



- 1) 5 volt 2) 6 volt
3) 9 volt 4) 10 volt

Ans. 4

Sol.



$$V_A - L \frac{di}{dt} - E - ir - V_B = 0$$

$$V_A - 1 \times 1 - 5 - 2 \times 2 - V_B = 0$$

$$V_A - V_B = 10 \text{ volt}$$

12. A 2 amp current is flowing through two different small circular copper coils having radii ratio 1:2. The ratio of their respective magnetic moments will be

- 1) 1:4 2) 1:2
3) 2:1 4) 4:1

Ans. 1

Sol. $M = NiA$

$$\frac{M_1}{M_2} = \left(\frac{r_1}{r_2} \right)^2 = \left(\frac{1}{2} \right)^2 = \frac{1}{4}$$

13. In a certain camera, a combination of four similar thin convex lenses are arranged axially in contact. Then the power of the combination and the total magnification in comparison to the power (p) and magnification (m) for each lens will be, respectively

- 1) 4p and 4m 2) p^4 and 4m
3) 4p and m^4 4) p^4 and m^4

Ans. 3

Sol. $\frac{1}{f} = \frac{4}{P}$

$$P_e = 4P$$

$$m = m_1 \times m_2 \times m_3 \times m_4 = m^4$$

14. An oxygen cylinder of volume 30 litre has 18.20 moles of oxygen. After some oxygen is withdrawn from the cylinder. Its gauge pressure drops to 11 atmospheric pressure at temperature 27°C . The mass of the oxygen withdrawn from the cylinder is nearly equal to [Given, $R = \frac{100}{12} \text{ J mol}^{-1} \text{ K}^{-1}$, and molecular mass of $\text{O}_2 = 32$,
1 atm pressure $= 1.01 \times 10^5 \text{ N/m}^2$]
1) 0.125 kg 2) 0.144 kg
3) 0.116 kg 4) 0.156 kg

Ans. 3

Sol. $V = 30 \text{ lit}$
 $n = 18.2$
 $P = 11 \text{ atm} + 1 = 12 \text{ atm}$
 $P = 12 \times 1.01 \times 10^5$
 $P = 12.12 \times 10^5$
 $n_2 = \frac{P_2 V}{RT} = \frac{12.12 \times 10^5 \times 30 \times 10^{-3}}{\frac{10}{12} \times 300} = 14.544$
 $\Delta n = n_1 - n_2 = 18.20 - 14.544$
 $\Delta n = 3.656$
 $\Delta m = 3.656 \times \frac{32}{1000} = 0.116 \text{ kg}$

15. In some appropriate units, time (t) and position (x) relation of a moving particle is given by $t = x^2 + x$. The acceleration of the particle is
1) $-\frac{2}{(x+2)^3}$ 2) $-\frac{2}{(2x+1)^3}$
3) $+\frac{2}{(x+1)^3}$ 4) $+\frac{2}{2x+1}$

Ans. 2

Sol. $t = x^2 + x$
 $1 = (2x) \frac{dx}{dt} + \frac{dx}{dt} = (2x+1)V \quad \left(\because V = \frac{dx}{dt} \right)$
 $\therefore V = \frac{1}{(2x+1)}$
 $a = \frac{dV}{dt} = -\frac{2}{(2x+1)^3}$

16. To an ac power supply of 220 V at 50 Hz, a resistor of 20Ω , a capacitor of reactance 25Ω and an inductor of reactance 45Ω are connected in series. The corresponding current in the circuit and the phase angle between the current and the voltage is, respectively
1) 7.8 A and 30° 2) 7.8 A and 45°
3) 15.6 A and 30° 4) 15.6 A and 45°

Ans. 2

Sol. (I) $i = \frac{V}{\sqrt{(X_L - X_C)^2 + R^2}} = \frac{220}{20\sqrt{2}} = \frac{11}{\sqrt{2}} = 7.8 \text{ A}$
(II) Phase angle $\phi = \tan^{-1} \left(\frac{X_L - X_C}{R} \right)$
 $= \tan^{-1} \left(\frac{20}{20} \right) = \tan^{-1}(1) = 45^{\circ}$

17. The sun rotates around its centre once in 27 days. What will be the period of revolution if the sun were to expand to twice its present radius without any external influence? Assume the sun to be a sphere of uniform density.
1) 100 days 2) 105 days
3) 115 days 4) 108 days

Ans. 4

Sol. $I\omega = \text{constant}$
 $I_1\omega_1 = I_2\omega_2$
 $\frac{2}{5}MR_1^2 \frac{2\pi}{T_1} = \frac{2}{5}MR_2^2 \frac{2\pi}{T_2}$
 $T_2 = \left(\frac{R_2}{R_1} \right)^2 \times T_1 = \left(\frac{2R}{R} \right)^2 \times 27$
 $T_2 = \left(\frac{R_2}{R_1} \right)^2 \times T_1 = \left(\frac{2R}{R} \right)^2 \times 27 = 4 \times 27$
 $T_2 = 108 \text{ Days}$

18. A model for quantized motion of an electron in a uniform magnetic field B states that the flux passing through the orbit of the electron is $n(h/e)$ where n is an integer, h is Planck's constant and e is the magnitude of electron's charge. According to the model, the magnetic moment of an electron in its lowest energy state will be (m is the mass of the electron)
1) $\frac{he}{\pi m}$ 2) $\frac{he}{2\pi m}$
3) $\frac{heB}{\pi m}$ 4) $\frac{heB}{2\pi m}$

Ans. 2

Sol. $\phi = n \frac{h}{e} = \frac{h}{e}$

$$\phi = BA \Rightarrow \frac{h}{e} = B \cdot \pi r^2$$

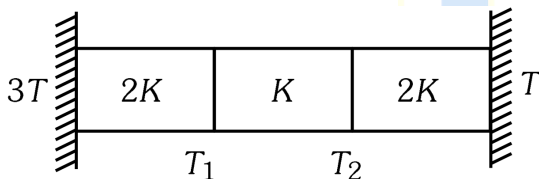
$$r^2 = \frac{h}{e\pi B}$$

$$I = \frac{e}{T} = \frac{e \cdot eB}{2\pi m} = \frac{e^2 B}{2\pi m}$$

$$\mu = IA = \frac{e^2 B}{2\pi m} \pi r^2 = \frac{e^2}{2m} \cdot \frac{h}{e\pi B}$$

$$\mu = \frac{eh}{2\pi m}$$

19. Three identical heat conducting rods are connected in series as shown in the figure. The rods on the sides have thermal conductivity $2K$ while that in the middle has thermal conductivity K . The left end of the combination is maintained at temperature $3T$ and the right end at T . The rods are thermally insulated from outside. In steady state, temperature at the left junction is T_1 and that at the right junction is T_2 . The ratio $\frac{T_1}{T_2}$ is



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

Ans. 3

Sol. $\frac{3T - T_1}{R_1} = \frac{T_1 - T_2}{R_2} = \frac{T_2 - T}{R_3}$

$$\frac{3T - T_1}{\frac{L}{2KA}} = \frac{T_1 - T_2}{\frac{L}{KA}} = \frac{T_2 - T}{\frac{L}{2KA}}$$

$$T_2 = \frac{3}{2}T, T_1 = \frac{5}{2}T$$

$$\frac{T_1}{T_2} = \frac{5}{3}$$

20. The plates of a parallel plate capacitor are separated by d . Two slabs of different dielectric constant K_1 and K_2 with thickness $\frac{3}{8}d$ and

$\frac{d}{2}$ respectively are inserted in the capacitor.

Due to this, the capacitance becomes two times larger than when there is nothing between the plates.

If $K_1 = 1.25 K_2$, the value of K_1 is

- 1) 2.66 2) 2.33
3) 1.60 4) 1.33

Ans. 1

Sol. $C = \frac{\epsilon_0 A}{d - [t_1 + t_2] + \frac{t_1}{K_1} + \frac{t_2}{K_2}}$

$$2C_0 = \frac{\epsilon_0 A}{d - \left(\frac{3d}{8} + \frac{d}{2}\right) + \frac{3d}{8(1.25K_2)} + \frac{d}{2K_2}}$$

$$K_2 = \frac{64}{30}$$

$$K_1 = 2.66$$

21. Two cities X and Y are connected by a regular bus service with a bus leaving in either direction every T min. A girl is driving scooty with a speed of 60 km/h in the direction X to Y notices that a bus goes past her every 30 minutes in the direction of her motion, and every 10 minutes in the opposite direction. Choose the correct option for the period T of the bus service and the speed (assumed constant) of the buses.

- 1) 9 min, 40 km/h 2) 25 min, 100 km/h
3) 10 min, 90 km/h 4) 15 min, 120 km/h

Ans. 4

Sol. $\frac{t_1}{t_2} = \frac{V_{R1}}{V_{R2}}$

$$\frac{30}{10} = \frac{V_B + V_S}{V_B - V_S}$$

$$3V_B - 3V_S = V_B + V_S$$

$$2V_B = 4V_S$$

$$V_B = 2V_S = 2 \times 60 = 120 \text{ km/h}$$

$$d = V_R t = 180 \times \frac{10}{60} = 30 \text{ km}$$

$$t = \frac{d}{V_B} = \frac{30}{120} = \frac{1}{4} = 15 \text{ min}$$

22. A uniform rod of mass 20 kg and length 5m leans against a smooth vertical wall making an angle of 60° with it. The other end rests on a rough horizontal floor. The friction force that the floor exerts on the rod is
(take $g = 10 \text{ m/s}^2$)

- 1) 100 N 2) $100\sqrt{3}$ N
3) 200 N 4) $200\sqrt{3}$ N

Ans. 2

Sol. $f = N_2$

$$N_1 = mg$$

Torque about A

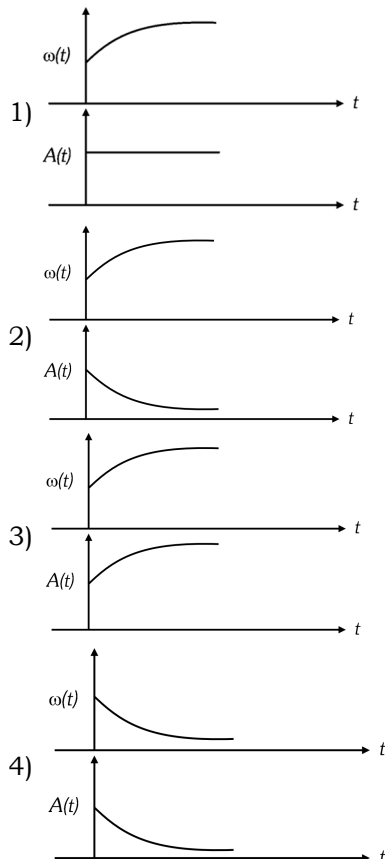
$$N_2 y - mgx = 0$$

$$N_2 y = mgx$$

$$N_2 = 10 \times 10 \times \frac{\sqrt{3}}{2} = 100\sqrt{3} \text{ N}$$

$$f = N_2 = 100\sqrt{3} \text{ N}$$

23. In an oscillating spring mass system, a spring is connected to a box filled with sand. As the box oscillates, sand leaks slowly out of the box vertically so that the average frequency $\omega(t)$ and average amplitude $A(t)$ of the system change with time t . Which one of the following options schematically depicts these changes correctly?



Ans. 2

Sol. as $\omega = \sqrt{\frac{k}{m}}$

as m decreases ω increases

Amplitude decreases exponentially

24. A balloon is made of a material of surface tension S and its inflation outlet (from where gas is filled in it) has small area A . It is filled with a gas of density ρ and takes a spherical shape of radius R . When the gas is allowed to flow freely out of it, its radius r changes from R to 0 (zero) in time T . If the speed $v(r)$ of gas coming out of the balloon depends on r as r^a and $T \propto S^\alpha A^\beta \rho^\gamma R^\delta$ then

- 1) $a = \frac{1}{2}, \alpha = \frac{1}{2}, \beta = -1, \gamma = +1, \delta = \frac{3}{2}$
2) $a = -\frac{1}{2}, \alpha = -\frac{1}{2}, \beta = -1, \gamma = -\frac{1}{2}, \delta = \frac{5}{2}$
3) $a = -\frac{1}{2}, \alpha = -\frac{1}{2}, \beta = -1, \gamma = \frac{1}{2}, \delta = \frac{7}{2}$
4) $a = \frac{1}{2}, \alpha = \frac{1}{2}, \beta = -\frac{1}{2}, \gamma = \frac{1}{2}, \delta = \frac{7}{2}$

Ans. 3

Sol. $T \propto S^\alpha A^\beta \rho^\gamma R^\delta$

$$T = [MT^{-2}]^\alpha [L^2]^\beta [ML^{-3}]^\gamma [L]^\delta$$

$$\alpha = -\frac{1}{2} \text{ as } \alpha + \gamma = 0$$

$$\gamma = -\alpha = \frac{1}{2}$$

25. Consider the diameter of a spherical object being measured with the help of a Vernier callipers. Suppose its 10 Vernier Scale Divisions (V.S.D.) are equal to its 9 Main Scale Divisions (M.S.D.). The least division in the M.S. is 0.1 cm and the zero of V.S. is at $x = 0.1 \text{ cm}$ when the jaws of Vernier callipers are closed.

If the main scale reading for the diameter is $M = 5 \text{ cm}$ and the number of coinciding vernier division is 8, the measured diameter after zero error correction, is

- 1) 5.18 cm 2) 5.08 cm
3) 4.98 cm 4) 5.00 cm

Ans. 3

Sol. 10 VSD = 9 MSD; (1MSD = 0.1cm)

$$1 \text{ VSD} = \frac{9}{10} \text{ MSD}$$

$$\text{L.C} = 1\text{MSD} - 1\text{VSD}$$

$$= 1 \text{ MSD} - \frac{9}{10} \text{ MSD} = \frac{1}{10} \text{ MSD}$$

$$= 0.1 \times 0.1 \text{ cm} = 0.01 \text{ cm}$$

Zero error is = +ve = 0.1 cm,

correction = -0.1 cm

MSR = 5 cm, V.C = 8

Diameter = MSR + V.C × L.C + Zero

correction

$$= 5 + 8 \times 0.01 - 0.1 = 5.08 - 0.1 = 4.98 \text{ cm}$$

26. A parallel plate capacitor made of circular plates is being charged such that the surface charge density on its plates is increasing at a constant rate with time. The magnetic field arising due to displacement current is :

- 1) zero at all places
- 2) constant between the plates and zero outside, the plates
- 3) non-zero everywhere with maximum at the imaginary cylindrical surface connecting peripheries of the plates
- 4) zero between the plates and non-zero outside

Ans. 3

Sol. $i_d = \epsilon_0 A \frac{dE}{dt}$, $j = \epsilon_0 \frac{d}{dt} \left(\frac{\sigma}{\epsilon_0} \right)$

$$j = \frac{d\sigma}{dt}$$

Between plates

$$B_{in} \times 2\pi r = \mu_0 i_d$$

$$B \times 2\pi r = \mu_0 (jA)$$

$$B \times 2\pi r = \mu_0 \times \left(\frac{d\sigma}{dt} \right) \times \pi r^2$$

$$B_{in} = \frac{\mu_0 r}{2} \left(\frac{d\sigma}{dt} \right)$$

$$\therefore B_{in} \propto r$$

Out side plates

$$B \times 2\pi r = \mu_0 \times \left(\frac{d\sigma}{dt} \right) \times \pi R^2$$

$$B_{out} = \left(\frac{\mu_0 R^2}{2r} \right) \left(\frac{d\sigma}{dt} \right) \Rightarrow B_{out} \propto \frac{1}{r}$$

27. An unpolarized light beam travelling in air is incident on a medium of refractive index 1.73 at Brewster's angle. Then-

- 1) reflected light is completely polarized and the angle of reflection is close to 60°
- 2) reflected light is partially polarized and the angle of reflection is close to 30°
- 3) both reflected and transmitted light are perfectly polarized with angles of reflection and refraction close to 60° and 30° , respectively.
- 4) transmitted light is completely polarized with angle of refraction close to 30°

Ans. 1

Sol. $\mu = \tan \theta_p \Rightarrow \theta_p = \tan^{-1}(1.73) = 60^\circ$

and reflected ray is completely polarised and Angle of reflection is close to 60°

28. Two identical charged conducting spheres A and B have their centres separated by a certain distance. Charge on each sphere is q and the force of repulsion between them is F . A third identical uncharged conducting sphere is brought in contact with sphere A first and then with B and finally removed from both. New force of repulsion between spheres A and B (Radii of A and B are negligible compared to the distance of separation so that for calculating force between them they can be considered as point charges) is best given as :

- 1) $\frac{3F}{5}$
- 2) $\frac{2F}{3}$
- 3) $\frac{F}{2}$
- 4) $\frac{3F}{8}$

Ans. 4

Sol. When A and B are separated by distance r then

$$F = \frac{1}{4\pi\epsilon_0} \frac{qq}{r^2} \dots (1)$$

Initially, A has charge q and C has charge 0

After touching A, both A and C have charge $\frac{q}{2}$

After touching B, both B and C have charge

$$\frac{q + \frac{q}{2}}{2} = \frac{3q}{4}$$

then new force of repulsion between A and B is

$$F^1 = \frac{1}{4\pi\epsilon_0} \frac{\frac{q}{2} \frac{3q}{4}}{r^2} \dots (2)$$

From (1) and (2) $F^1 = \frac{3F}{8}$

29. A container has two chambers of volumes $V_1 = 2$ litres and $V_2 = 3$ litres separated by a partition made of a thermal insulator. The chambers contains $n_1 = 5$ and $n_2 = 4$ moles of ideal gas at pressures $p_1 = 1$ atm and $p_2 = 2$ atm, respectively. When the partition is removed, the mixture attains an equilibrium pressure of :

- 1) 1.3 atm 2) 1.6 atm
3) 1.4 atm 4) 1.8 atm

Ans. 2

Sol. $P_{\text{equ}}(V_1 + V_2) = P_1V_1 + P_2V_2$

$$P_{\text{equ}}(2 + 3) = 1 \times 2 + 2 \times 3$$

$$P_{\text{equ}} = \frac{8}{5} = 1.6 \text{ atm}$$

30. A particle of mass m is moving around the origin with a constant force F pulling it towards the origin. If Bohr model is used to describe its motion, the radius r of the n^{th} orbit and the particle's speed v in the orbit depend on n as

- 1) $r \propto n^{1/3}; v \propto n^{1/3}$ 2) $r \propto n^{1/3}; v \propto n^{2/3}$
3) $r \propto n^{2/3}; v \propto n^{1/3}$ 4) $r \propto n^{4/3}; v \propto n^{-1/3}$

Ans. 3

Sol. $F = \frac{mv^2}{r}$

$$v = \sqrt{\frac{Fr}{m}} \dots (1)$$

$$mvr = \frac{nh}{2\pi}$$

$$v = \frac{nh}{2\pi mr} \dots (2)$$

From (1) and (2),

$$\frac{Fr}{m} = \frac{n^2 h^2}{4\pi^2 m^2 r^2}$$

$$\Rightarrow r^3 \propto n^2 \Rightarrow r \propto n^{2/3}$$

$$v = \frac{nh}{2\pi mr} = \frac{nh}{2\pi m \times n^{2/3}} \therefore [r \propto n^{2/3}]$$

$$v \propto n^{1/3}$$

31. The radius of Martian orbit around the Sun is about 4 times the radius of the orbit of Mercury. The Martian year is 687 Earth days. Then which of the following is the length of 1 year on Mercury ?

- 1) 88 earth days 2) 225 earth days
3) 172 earth days 4) 124 earth days

Ans. 1

Sol. $T^2 \propto R^3$

$$R_{\text{Martian}} = 4R_{\text{mercury}}$$

$$T_{\text{Martian}} = 687 \text{ Earth days}$$

$$\left(\frac{T_{\text{Martian}}}{T_{\text{Mercury}}}\right)^2 = \left(\frac{R_{\text{Martian}}}{R_{\text{Mercury}}}\right)^3$$

$$\frac{687}{T_{\text{Mer}}} = 4^{3/2}$$

$$T_{\text{Mer}} = 85.875 \text{ Earth days}$$

$$T_{\text{Mer}} \approx 88 \text{ Earth days}$$

32. A body weighs 48 N on the surface of the earth. The gravitational force experienced by the body due to the earth at a height equal to one-third the radius of the earth from its surface is:

- 1) 16 N 2) 27 N 3) 32 N 4) 36 N

Ans. 2

Sol. $g(h) = \frac{g}{\left(1 + \frac{h}{R}\right)^2}$

$$mg(h) = \frac{mg}{\left(1 + \frac{R}{3R}\right)^2} \left[\because h = \frac{R}{3}\right]$$

$$= \frac{48}{\left(\frac{4}{3}\right)^2}$$

$$F = mg(h) = 27 \text{ N}$$

33. A wire of resistance R is cut into 8 equal pieces. From these pieces two equivalent resistances are made by adding four of these together in parallel. Then these two sets are added in series. The net effective resistance of the combination is :

- 1) $\frac{R}{64}$ 2) $\frac{R}{32}$ 3) $\frac{R}{16}$ 4) $\frac{R}{8}$

Ans. 3

Sol. $R_{\text{eff}} = \frac{R/8}{4} + \frac{R/8}{4}$

$$= \frac{R}{32} + \frac{R}{32} = \frac{R}{16}$$

34. De-Broglie wavelength of an electron orbiting in the $n = 2$ state of hydrogen atom is close to (Given Bohr radius = 0.052 nm)

- 1) 0.067 nm 2) 0.67 nm
3) 1.67 nm 4) 2.67 nm

Ans. 2

Sol. $2\pi r_n = n\lambda$

$$= 3.14 \times 0.052 \text{ nm} \times 4 = 0.67 \text{ nm}$$

35. An electric dipole with dipole moment $5 \times 10^{-6} \text{ C m}$ is aligned with the direction of a uniform electric field of magnitude $4 \times 10^5 \text{ N/C}$. The dipole is then rotated through an angle of 60° with respect to the electric field. The change in the potential energy of the dipole is :

1) 0.8 J 2) 1.0 J 3) 1.2 J 4) 1.5 J

Ans. 2

Sol. $P = 5 \times 10^{-6} \text{ cm}$

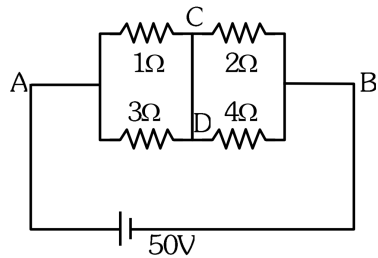
$$E = 4 \times 10^5 \text{ N/C}$$

$$\theta = 60^\circ$$

$$\Delta P.E = PE(1 - \cos \theta)$$

$$= 5 \times 10^{-6} \times 4 \times 10^5 \times \frac{1}{2} = 10 \times 10^{-1} = 1 \text{ J}$$

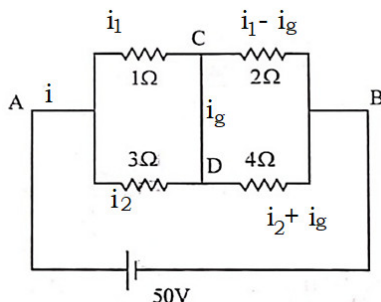
36. A constant voltage of 50 V is maintained between the points A and B of the circuit shown in the figure. The current through the branch CD of the circuit is :



1) 1.5 A 2) 2.0 A 3) 2.5 A 4) 3.0 A

Ans. 2

Sol.



$$-i_1 + 3i_2 = 0 \Rightarrow 3i_2 = i_1 \dots (i)$$

$$-i_1 - 2i_1 + 2i_g + 50 = 0 \dots (ii)$$

$$-3i_1 + 2i_g = -50$$

$$3i_1 - 2i_g = 50 \Rightarrow 3(3i_2) - 2i_g = 50$$

$$9i_2 - 2i_g = 50$$

$$-3i_2 - 4(i_2 + i_g) + 50 = 0$$

$$-3i_2 - 4i_2 - 4i_g = -50$$

$$3i_2 + 4i_2 + 4i_g = 50$$

$$7i_2 + 4i_g = 50 \dots (iii)$$

From (i) (ii) and (iii)

$$i_g = 2 \text{ A}$$

37. A photon and electron (mass m) have the same energy E . The ratio $(\lambda_{\text{photon}} / \lambda_{\text{electron}})$ of their de Broglie wavelengths is: (c is the speed of light)

1) $\sqrt{E/2m}$

2) $c\sqrt{2mE}$

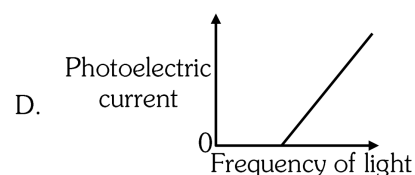
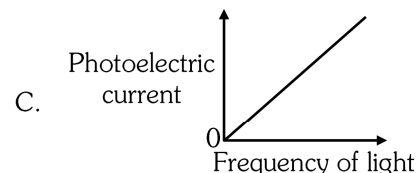
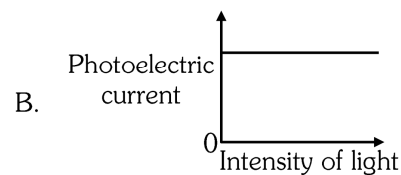
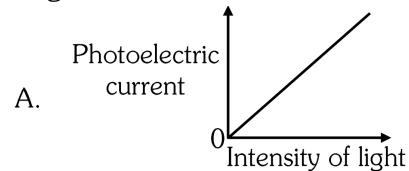
3) $c\sqrt{\frac{2m}{E}}$

4) $\frac{1}{c}\sqrt{E/2m}$

Ans. 3

Sol. $\frac{\lambda_{\text{photon}}}{\lambda_{\text{electron}}} = \frac{hc}{E} \times \frac{\sqrt{2mE}}{h} = c\sqrt{\frac{2mE}{E^2}} = c\sqrt{\frac{2m}{E}}$

38. Which of the following options represent the variation of photoelectric current with property of light shown on the x-axis?



1) A only

2) A and C

3) A and D

4) B and D

Ans. 1

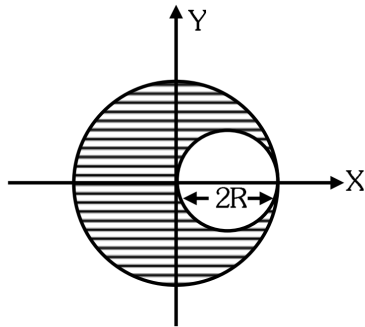
Sol. Photoelectric current, $i \propto$ intensity of light, I

So, the graph between them is straight line passing through origin.

Photoelectric current is independent of frequency of light

So, graph between them is straight line parallel to frequency axes

39. A sphere of radius R is cut from a larger solid sphere of radius $2R$ as shown in the figure. The ratio of the moment of inertia of the smaller sphere to that of the rest part of the sphere about the Y -axis is :



- 1) $\frac{7}{8}$ 2) $\frac{7}{40}$ 3) $\frac{7}{57}$ 4) $\frac{7}{64}$

Ans. 3

Sol. $M_{\text{small}} = \frac{M}{8}$

$$I_{\text{small}} = \frac{7MR^2}{5 \times 8} = \frac{7MR^2}{40}$$

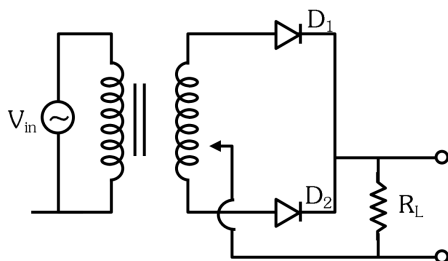
$$I_{\text{remaining}} = \frac{2M(2R)^2}{5} - \frac{7MR^2}{40}$$

$$= \frac{8MR^2}{5} - \frac{7MR^2}{40}$$

$$= \frac{57MR^2}{40}$$

$$\frac{I_{\text{small}}}{I_{\text{remaining}}} = \frac{\frac{7MR^2}{40}}{\frac{57MR^2}{40}} = \frac{7}{57}$$

40. A full wave rectifier circuit with diodes (D_1) and (D_2) is shown in the figure. If input supply voltage $V_{\text{in}} = 220\sin(100\pi t)$ volt, then at $t = 15\text{ms}$



- 1) D_1 is forward biased, D_2 is reverse biased
2) D_1 is reverse biased, D_2 is forward biased
3) D_1 and D_2 both are forward biased
4) D_1 and D_2 both are reverse biased

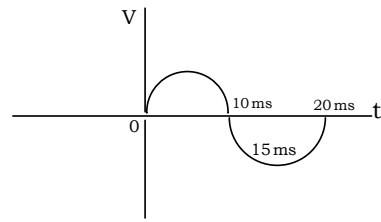
Ans. 2

Sol. $T = \frac{2\pi}{\omega} = \frac{2\pi}{100\pi} = \frac{1}{50} = 20 \text{ ms}$

At $t = 15 \text{ ms}$, input is negative half cycle

$\therefore D_1$ is reverse biased

D_2 is forward biased



41. Two gases A and B are filled at the same pressure in separate cylinders with movable pistons of radius r_A and r_B , respectively. On supplying an equal amount of heat to both the systems reversibly under constant pressure, the pistons of gas A and B are displaced by 16 cm and 9 cm, respectively. If the change in their internal energy is the same, then the ratio r_A / r_B is equal to

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

Ans. 1

Sol. $\frac{nRdT}{\gamma - 1} = dU = \frac{pdv}{\gamma - 1}$

$$p_1 dv_1 = p_2 dv_2$$

$$\frac{F}{\pi r_1^2} dx_1 A = \frac{F}{\pi r_2^2} dx_2 A$$

$$\frac{r_1}{r_2} = \sqrt{\frac{dx_1}{dx_2}} = \frac{16}{9} = \frac{4}{3}$$

42. A physical quantity P is related to four observations a, b, c and d as follows:

$$P = a^3 b^2 / c \sqrt{d}$$

The percentage errors of measurement in a, b, c and d are 1%, 3%, 2% and 4% respectively. The percentage error in the quantity P is

- 1) 10% 2) 2% 3) 13% 4) 15%

Ans. 3

Sol. $\frac{\Delta P}{P} \% = 3 \frac{\Delta a}{a} \% + 2 \frac{\Delta b}{b} \% + \frac{\Delta c}{c} \% + \frac{1}{2} \frac{\Delta d}{d} \%$

$$= \left(3 \times 1 + 2 \times 3 + 2 + \frac{1}{2} \times 4 \right)$$

$$= 13\%$$

43. The intensity of transmitted light when a polaroid sheet, placed between two crossed polaroids at 22.5° from the polarization axis of one of the polaroid, is (I_0 is the intensity of polarised light after passing through the first polaroid):

- 1) $\frac{I_0}{2}$ 2) $\frac{I_0}{4}$ 3) $\frac{I_0}{8}$ 4) $\frac{I_0}{16}$

Ans. 3

Sol. $I_3 = I_0 \cos^2 \theta \cos^2 (90 - \theta)$

$$= \frac{I_0}{4} \sin^2 2\theta = \frac{I_0}{4} \sin^2 2 \times 22.5 = \frac{I_0}{4} \sin^2 45^\circ$$

$$= \frac{I_0}{4} \times \frac{1}{2} = \frac{I_0}{8}$$

44. Two identical point masses P and Q, suspended from two separate massless springs of spring constants k_1 and k_2 , respectively, oscillate vertically. If their maximum speeds are the same. the ratio (A_Q / A_P) of the amplitude A_Q of mass Q to the amplitude A_P of mass P is:

- 1) $\frac{k_2}{k_1}$ 2) $\frac{k_1}{k_2}$ 3) $\sqrt{\frac{k_2}{k_1}}$ 4) $\sqrt{\frac{k_1}{k_2}}$

Ans. 3

Sol. $A_1 \omega_1 = A_2 \omega_2$

$$A_1 \sqrt{\frac{k_1}{m}} = A_2 \sqrt{\frac{k_2}{m}}$$

$$\frac{A_1}{A_2} = \sqrt{\frac{k_2}{k_1}}$$

45. A pipe open at both ends has a fundamental frequency f in air. The pipe is now dipped vertically in a water drum to half of its length, The fundamental frequency of the air column is now equal to:

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

Ans. 2

Sol. $f_0 = \frac{v}{2\ell}$, $f_c = \frac{v}{4\frac{\ell}{2}} = \frac{v}{2\ell} = f_0$

CHEMISTRY

46. The ratio of the wavelengths of the light absorbed by a Hydrogen atom when it undergoes $n = 2 \rightarrow n = 3$ and $n = 4 \rightarrow n = 6$ transitions, respectively, is

- 1) $\frac{1}{36}$ 2) $\frac{1}{16}$ 3) $\frac{1}{9}$ 4) $\frac{1}{4}$

Ans. 4

Sol. $\frac{1}{\lambda_1} = \frac{1}{\lambda_2} = R_H \left[\frac{1}{4} - \frac{1}{9} \right] \times = R_H \left[\frac{5}{36} \right] \dots\dots\dots (1)$

$$\frac{1}{\lambda_2} = \frac{1}{\lambda_2} = R_H \left[\frac{1}{16} - \frac{1}{36} \right] \times = R_H \left[\frac{20}{16 \times 36} \right] \dots\dots\dots (2)$$

The ratio of Eqn 2 to Eqn 1 gives

$$\frac{\lambda_1}{\lambda_2} = \frac{4}{16} = \frac{1}{4}$$

47. Which of the following statements are true?
 A. Unlike Ga that has a very high melting point, Cs has a very low melting point.
 B. On Pauling scale, the electronegative values of N and Cl are not the same.
 C. Ar, K^+ , Cl^- , Ca^{2+} , and S^{2-} are all isoelectronic species.
 D. The correct order of the first ionization enthalpies of Na, Mg, Al, and Si is $Si > Al > Mg > Na$.
 E. The atomic radius of Cs is greater than that of Li and Rb.

Choose the **correct** answer from the option given below:

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

Ans. 2

Sol. **Conceptual**

48. Match List I with List II

	List-I (Ion)		List - II (Group Number in Cation Analysis)
A	Co^{2+}	I	Group-1
B	Mg^{2+}	II	Group-III
C	Pb^{2+}	III	Group-IV
D	Al^{3+}	IV	Group-VI

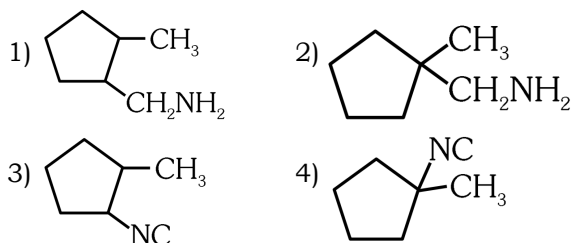
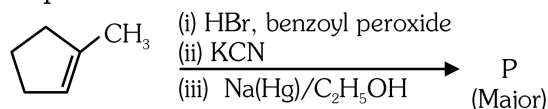
Choose the correct answer from the of given below:

- 1) A-III, B-IV, C-II, D-I 2) A-III, B-IV, C-I, D-II
 3) A-III, B-II, C-IV, D-I 4) A-III, B-II, C-I, D-IV

Ans. 2

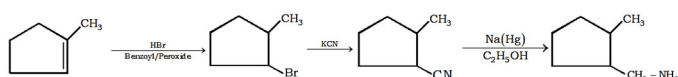
Sol. **Conceptual**

49. Predict the major product 'P' in the following sequence of reactions –



Ans. 1

Sol



50. Energy and radius of first Bohr orbit of He^+ and Li^{2+} are

[Given $R_H = 2.18 \times 10^{-18} \text{ J}$, $a_0 = 52.9 \text{ pm}$]

1) $E_n(\text{Li}^{2+}) = -19.62 \times 10^{-18} \text{ J}$;

$r_n(\text{Li}^{2+}) = 17.6 \text{ pm}$, $E_n(\text{He}^+) = -8.72 \times 10^{-18} \text{ J}$;

$r_n(\text{He}^+) = 26.4 \text{ pm}$

2) $E_n(\text{Li}^{2+}) = -8.72 \times 10^{-18} \text{ J}$;

$r_n(\text{Li}^{2+}) = 26.4 \text{ pm}$,

$E_n(\text{He}^+) = -19.62 \times 10^{-18} \text{ J}$;

$r_n(\text{He}^+) = 17.6 \text{ pm}$

3) $E_n(\text{Li}^{2+}) = -19.62 \times 10^{-18} \text{ J}$;

$r_n(\text{Li}^{2+}) = 17.6 \text{ pm}$

$E_n(\text{He}^+) = -8.72 \times 10^{-16} \text{ J}$;

$r_n(\text{He}^+) = 26.4 \text{ pm}$

4) $E_n(\text{Li}^{2+}) = -8.72 \times 10^{-16} \text{ J}$;

$r_n(\text{Li}^{2+}) = 17.6 \text{ pm}$

$E_n(\text{He}^+) = -19.62 \times 10^{-16} \text{ J}$;

$r_n(\text{He}^+) = 17.6 \text{ pm}$

Ans. 1

Sol. $E \text{ of } \text{He}^+ \Rightarrow E_n = -2.18 \times 10^{-18} \times \left(\frac{Z^2}{n^2}\right) \text{ J/atom}$

$\text{He}^+ \Rightarrow Z = 2, n = 1$

$E_1 \text{ of } \text{He}^+ = -2.18 \times 10^{-18} \times \frac{2^2}{1^2}$

$= -2.18 \times 10^{-18} \times 4$

$= -8.72 \times 10^{-18} \text{ J/atom}$

$r \text{ of } \text{He}^+ = 52.9 \times \frac{n^2}{Z} \text{ nm}$

$= \frac{52.9}{2} = 26.45 \text{ nm}$

$E \text{ of } \text{Li}^{+2} \Rightarrow E_n = -2.18 \times 10^{-18} \times \frac{3^2}{1^2}$

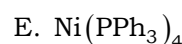
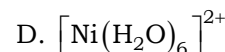
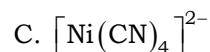
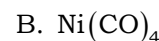
$= -2.18 \times 10^{-18} \times 9$

$= -19.62 \times 10^{-18} \text{ J/atom}$

$r \text{ of } \text{Li}^{+2} \Rightarrow r_n = 52.9 \times \frac{1}{3}$

$= 17.6 \text{ pm}$

51. Which of the following are paramagnetic?



Choose the correct answer from the options given below:

1) A and C only

2) B and E only

3) A and D only

4) A, D and E only

Ans. 3

Sol. Hybridisation (no. of unpaired electrons)

52. Given below are two statements:

Statement I: Like nitrogen that can form ammonia, arsenic can form arsine.

Statement II: Antimony cannot form antimony pentoxide.

In the light of the above statements, choose the most appropriate answer from the options given below:

1) Both Statement I and Statement II are correct

2) Both Statement I and Statement II are incorrect

3) Statement I is correct but Statement II is incorrect

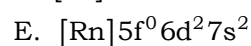
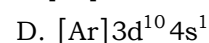
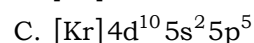
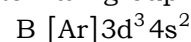
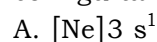
4) Statement I is incorrect but Statement II is correct

Ans. 3

Sol. **Statement -I:** NH_3 , AsH_3 exist

Statement -II: Sb_2O_5 exist

53. Which among the following electronic configurations belong to main group elements?



Choose the **correct** answer from the option given below:

1) B and E only

2) A and C only

3) D and E only

4) A, C and D only

Ans. 2

Sol. In periodic table s and P-block elements are regarded as main group elements or representative elements. Hence A and C options are correct.

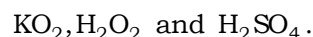
54. Dalton's Atomic theory could not explain which of the following?

- 1) Law of conservation of mass
- 2) Law of constant proportion
- 3) Law of multiple proportion
- 4) Law of gaseous volume

Ans. 4

Sol. **Conceptual**

55. Consider the following compounds:



The oxidation states of the underlined elements in them are, respectively,

- 1) +1, -1, and +6
- 2) +2, -2, and +6
- 3) +1, -2, and +4
- 4) +4, -4, and +6

Ans. 1

Sol. +1, -1, +6

KO_2 :- Potassium forms Super oxide

H_2O_2 :- Peroxides O.N.O is - 1

H_2SO_4 :- Sulphur oxidation state is +6

56. If the half-life ($t_{1/2}$) for a first order reaction is 1 minute, then the time required for 99.9% completion of the reaction is closest to:

- 1) 2 minutes
- 2) 4 minutes
- 3) 5 minutes
- 4) 10 minutes

Ans. 4

Sol. $t_{99.9\%} = 10 \times t_{1/2}$
 $= 10 \times 1 = 10 \text{ min}$

57. The correct order of the wavelength of light absorbed by the following complexes is,

- A. $[\text{Co}(\text{NH}_3)_6]^{3+}$ B. $[\text{Co}(\text{CN})_6]^{3-}$
 C. $[\text{Cu}(\text{H}_2\text{O})_4]^{2+}$ D. $[\text{Ti}(\text{H}_2\text{O})_6]^{3+}$

Choose the correct answer from the options given below:

- 1) $\text{B} < \text{D} < \text{A} < \text{C}$
- 2) $\text{B} < \text{A} < \text{D} < \text{C}$
- 3) $\text{C} < \text{D} < \text{A} < \text{B}$
- 4) $\text{C} < \text{A} < \text{D} < \text{B}$

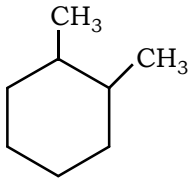
Ans. 2

Sol. Strength of the ligand $\propto \frac{1}{\lambda}$

58. Which one of the following compounds can exist as cis-trans isomers?

- 1) Pent - 1-ene
- 2) 2 - Methylhex-2-ene
- 3) 1,1-Dimethylcyclopropane
- 4) 1,2-Dimethylcyclohexane

Ans. 4

Sol.  exhibits Cis and Trans isomerism

59. Phosphoric acid ionizes in three steps with their ionization constant values K_{a_1} , K_{a_2} and K_{a_3} , respectively, while K is the overall ionization constant. Which of the following statements are true?

- A. $\log K = \log K_{a_1} + \log K_{a_2} + \log K_{a_3}$
 B. H_3PO_4 is a stronger acid than H_2PO_4^- and HPO_4^{2-} .
 C. $K_{a_1} > K_{a_2} > K_{a_3}$
 D. $K_{a_1} = \frac{K_{a_3} + K_{a_2}}{2}$

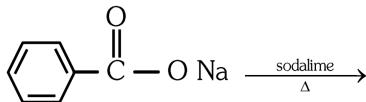
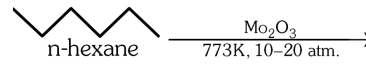
Choose the correct answer from the options given below:

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

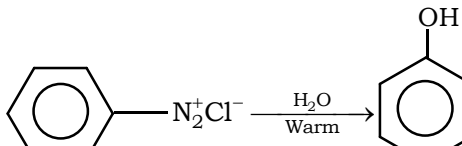
Ans. 4

Sol. $\Rightarrow \log K = \log K_{a_1} + \log K_{a_2} + \log K_{a_3}$
 $\Rightarrow \text{H}_3\text{PO}_4$ is stronger than H_2PO_4^- & HPO_4^{2-}
 $\Rightarrow K_{a_1} > K_{a_2} > K_{a_3}$ (correct)

60. Which one of the following reactions does NOT give benzene as the product?

- 1) 
- 2) 
- 3) $\text{H}-\text{C}\equiv\text{C}-\text{H} \xrightarrow[\text{at } 873\text{K}]{\text{red hot Iron Tube}}$
- 4) 

Ans. 4

Sol. 

61. If the molar conductivity (Λ_m) of a 0.050 mol L⁻¹ solution of a monobasic weak acid is 90 S cm² mol⁻¹, its extent (degree) of dissociation will be

[Assume $\Lambda_+^0 = 349.6 \text{ S cm}^2 \text{ mol}^{-1}$ and $\Lambda_-^0 = 50.4 \text{ S cm}^2 \text{ mol}^{-1}$]

- 1) 0.115 2) 0.125 3) 0.225 4) 0.215

Ans. **3**

Sol. $\lambda_m^c = 0.050 \text{ mol L}^{-1}$

conc = 90 S cm² mol⁻¹

$\alpha = ?$

$\lambda_m^a = 349.6 + 50.4$

$$\alpha = \frac{\lambda_m^c}{\lambda_m^a}$$

$$\alpha = \frac{90}{400} = 0.225$$

62. Given below are two statements:

Statement I: A hypothetical diatomic molecule with bond order zero is quite stable.
Statement II: As bond order increases, the bond length increases.

In the light of the above statements, choose the most appropriate 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 true but Statement II is false
4) Statement I is false but Statement II is true

Ans. **2**

Sol. **Statement-I:** incorrect molecules with B.O zero is unstable

Ex: He₂

Statement II: Incorrect B.O $\propto \frac{1}{B.L}$

63. Out of the following complex compounds, which of the compound will be having the minimum conductance in solution?

- 1) $[\text{Co}(\text{NH}_3)_3 \text{Cl}_3]$ 2) $[\text{Co}(\text{NH}_3)_4 \text{Cl}_2]$
3) $[\text{Co}(\text{NH}_3)_6] \text{Cl}_3$ 4) $[\text{Co}(\text{NH}_3)_5 \text{Cl}] \text{Cl}$

Ans. **4**

Sol. A & b are non-conductors

C $\rightarrow$ no. of Ions = 4

No. of Ions = 2

No. of Ions $\uparrow$ conductance in $\uparrow$

64. Match List - I with List - II

	Column- I		Column - II
A	XeO ₃	I	sp ³ d; linear
B	XeF ₂	II	sp ³ ; pyramidal
C	XeOF ₄	III	sp ³ d ³ ; distorted octahedral
D	XeF ₆	IV	sp ³ d ² ; square pyramidal

Choose the correct answer from the options given below:

- 1) A-II, B-I, C-IV, D-III 2) A-II, B-I, C-III, D-IV
3) A-IV, B-II, C-III, D-I 4) A-IV, B-II, C-I, D-III

Ans. **1**

Sol. A) XeO₃ - Sp³ - Pyramidal

B) XeF₂ - Sp³d - linear

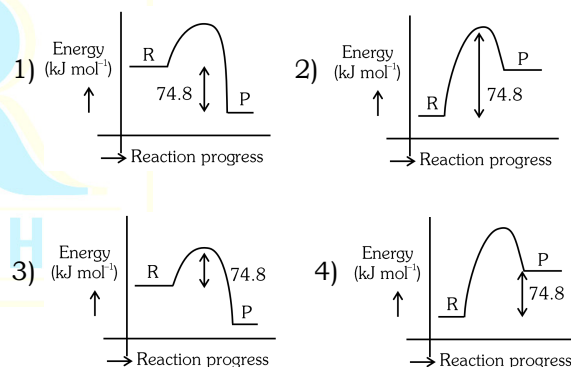
C) XeOF₄ - Sp³d² - Square Pyramidal

D) XeF₆ - Sp³d³ - Distorted Octahedral

65. $\text{C(s)} + 2\text{H}_2(\text{g}) \rightarrow \text{CH}_4(\text{g}); \Delta H = -74.8 \text{ kJ mol}^{-1}$

Which of the following diagrams gives an accurate representation of the above reaction?

[R $\rightarrow$ reactants P $\rightarrow$ products]



Ans. **1**

Sol. $\Delta H = -74.8$ ($\Delta H = \text{Negative}$)

$\therefore$ Energy of Reactants > Energy of products.

66. Match List - I with List - II

	List - I (Example)		List -II (Type of Solution)
A	Humidity	I	Solid in solid
B	Alloys	II	Liquid in gas
C	Amalgams	III	Solid in gas
D	Smoke	IV	Liquid in solid

Choose the correct answer from the options given below:

- 1) A-II, B-IV, C-I, D-III
2) A-II, B-I, C-IV, D-III
3) A-III, B-I, C-IV, D-II
4) A-III, B-II, C-I, D-IV

Ans. **2**

Sol. **NCERT Conceptual**

67. The correct order of decreasing basic strength of the given amines is:

- 1) N -methylaniline > benzenamine > ethanamine > N -ethylethanamine
- 2) N-ethylethanamine > ethanamine > benzenamine > N -methylaniline
- 3) N-ethylethanamine > ethanamine > N -methylaniline > benzenamine
- 4) benzenamine > ethanamine > N -methylaniline > N -ethylethanamine

Ans. **3**

Sol. **NCERT Conceptual**

68. Among the following, choose the ones with equal number of atoms.

- A. 212 g of Na_2CO_3 (s) [molar mass = 106 g]
- B. 248 g of Na_2O (s) [molar mass = 62 g]
- C. 240 g of NaOH (s) [molar mass = 40 g]
- D. 12 g of H_2 (g) [molar mass = 2 g]
- E. 220 g of CO_2 (g) [molar mass =44g]

Choose the correct answer from the options given below:

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

Ans. **2**

Sol. $A \Rightarrow \text{No of atoms} = \frac{W}{M.wt} \times \text{No of atoms} \times N_A$

$$= \frac{212}{106} \times 6 \times N_A = 12 \times N_A$$

$$B \Rightarrow \text{No of atoms} = \frac{248}{62} \times 3 \times N_A = 12 \times N_A$$

$$C \Rightarrow \text{No of atoms} = \frac{240}{40} \times 3 \times N_A = 18 \times N_A$$

$$D \Rightarrow \text{No of atoms} = \frac{12}{2} \times 2 \times N_A = 12 \times N_A$$

$$E \Rightarrow \text{No of atoms} = \frac{220}{44} \times 3 \times N_A = 15 \times N_A$$

69. Match List I with List II.

	List - I (Name of Vitamin)		List - II (Deficiency disease)
A	Vitamin B_{12}	I	Cheilosis
B	Vitamin D	II	Convulsions
C	Vitamin B_2	III	Rickets
D	Vitamin B_6	IV	Pernicious anaemia

Choose the correct answer from the options given below.

- 1) A-I, B-III, C-II, D-IV 2) A-IV, B-III, C-I, D-II
- 3) A-II, B-III, C-I, D-IV 4) A-IV, B-III, C-II, D-I

Ans. **2**

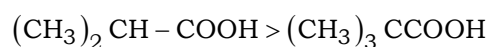
Sol. **NCERT Conceptual**

70. The correct order of decreasing acidity of the following aliphatic acids is:

- 1) $(\text{CH}_3)_3\text{CCOOH} > (\text{CH}_3)_2\text{CHCOOH} > \text{CH}_3\text{COOH} > \text{HCOOH}$
- 2) $\text{CH}_3\text{COOH} > (\text{CH}_3)_2\text{CHCOOH} > (\text{CH}_3)_3\text{CCOOH} > \text{HCOOH}$
- 3) $\text{HCOOH} > \text{CH}_3\text{COOH} > (\text{CH}_3)_2\text{CHCOOH} > (\text{CH}_3)_3\text{CCOOH}$
- 4) $\text{HCOOH} > (\text{CH}_3)_3\text{CCOOH} > (\text{CH}_3)_2\text{CHCOOH} > \text{CH}_3\text{COOH}$

Ans. **3**

Sol. $\text{H} - \text{COOH} > \text{CH}_3\text{COOH} >$



As No of

$\text{CH}_3 \uparrow$ EDG tendency $\uparrow$ Acidic strength $\downarrow$

71. Given below are two statements:

Statement -I : Ferromagnetism is considered as an extreme form of paramagnetism:

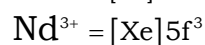
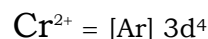
Statement -II: The number of unpaired electrons in a Cr^{2+} ion ($Z = 24$) is the same as that of a Nd^{3+} ion ($Z = 60$)

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 true but Statement II is false
- 4) Statement I is false but Statement II is true

Ans. **3**

Sol. Ferromagnetism is considered as an extreme form of paramagnetism:



72.

List-I (Mixture)		List -II (Method of separation)	
A	$\text{CHCl}_3 + \text{C}_6\text{H}_5\text{NH}_2$	I	Distillation under reduced pressure
B	Crude oil in petroleum industry	II	Steam distillation
C	Glycerol from Spent -lye	III	Fractional distillation
D)	Aniline -water	IV	Simple distillation

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

- 1) A-IV, B-III, C-I, D-II 2) A-IV, B-III, C-II, D-I
3) A-III, B-IV, C-I, D-II 4) A-III, B-IV, C-II, D-I

Ans. 1

Sol. The correct matching is as follows

List-I (Mixture)		List-II (Method of separation)	
A	$\text{CHCl}_3 + \text{C}_6\text{H}_5\text{NH}_2$	IV	Simple distillation
B	Crude oil in petroleum industry	III	Fractional distillation
C	Glycerol from Spent-lye	I	Distillation under reduced pressure
D)	Aniline -water	II	Steam distillation

73. For the reaction $\text{A(g)} \rightleftharpoons 2\text{B(g)}$, the backward reaction rate constant is higher than the forward reaction rate constant by a factor of 2500, at 1000K

[Given: $R=0.0831 \text{ L atm mol}^{-1}\text{K}^{-1}$]

K_p for the reaction at 1000 K is

- 1) 83.1 2) 2.077×10^5
3) 0.033 4) 0.021

Ans. 3

Sol. $K_c = \frac{k_f}{k_b} = \frac{1}{2500}$

$$K_p = K_c \times (RT)^{\Delta n} = \frac{1}{2500} \times 0.0831 \times 1000$$

($\therefore \Delta n = 1$)

$$\therefore K_p = 0.033$$

74. Given below are two statements:

Statement -I: Benzenediazonium salt is prepared by the reaction of aniline with nitrous acid at 273-278 K. It decomposes easily in the dry state.

Statement II: Insertion of iodine into the benzene ring is difficult and hence iodobenzene is prepared through the reaction of benzenediazonium salt with KI.

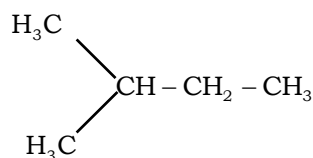
In the light of the above statements, choose the most appropriate answer from the options given below

- 1) Both Statement -I and Statement -II are correct
2) Both Statement -I and Statement -II are incorrect
3) Statement -I is correct but Statement -II is incorrect
4) Statement -I is incorrect but Statement -II is correct

Ans. 1

Sol. **Conceptual**

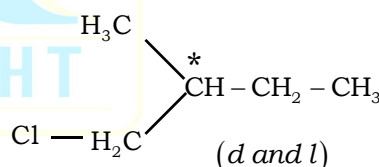
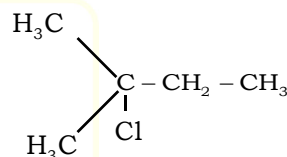
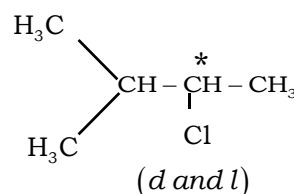
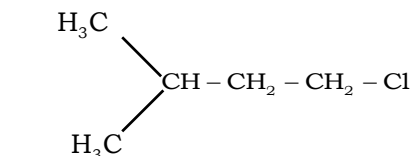
75. How many products (including stereoisomers) are expected from monochlorination of the following compound?



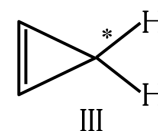
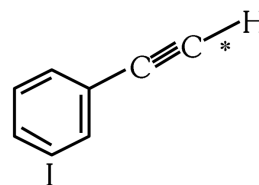
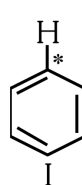
- 1) 2 2) 3
3) 5 4) 6

Ans. 4

Sol.



76. Among the given compounds I-III, the correct order of bond dissociation energy of C-H bond marked with * is:

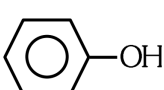
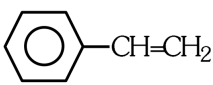
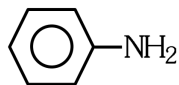


- 1) II>I>III 2) I>II>III
3) III>II>I 4) II>III>I

Ans. 1

Sol. $\text{C}_{\text{sp}} - \text{H} > \text{C}_{\text{sp}^2} - \text{H} > \text{C}_{\text{sp}^3} - \text{H}$

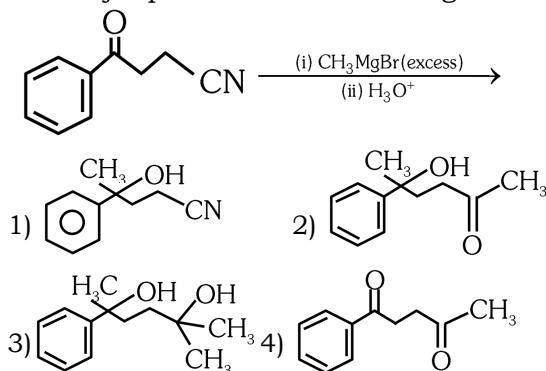
77. Which one of the following compound doesn't decolourize bromine water?

- 1)  2) 
3)  4) 

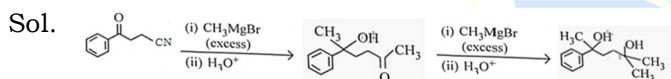
Ans. 1

Sol. Saturated hydrocarbons do not decolourise bromine water

78. The major product of the following reaction is:



Ans. 3



79. Which of the following aqueous solution will exhibit highest boiling point?

- 1) 0.01M Urea 2) 0.01M KNO₃
3) 0.01M Na₂SO₄ 4) 0.015m C₆H₁₂O₆

Ans. 3

Sol. B.P $\propto$ solute particle concentration ($i \times C$)

80. Match List-I with List -II

List-I		List-II	
A	Haber process	I	Fe catalyst
B	Wacker oxidation	II	PdCl ₂
C	Wilkinson catalyst	III	[(PPh ₃) ₃ RhCl]
D	Ziegler catalyst	IV	TiCl ₄ with Al(CH ₃) ₃

Choose the correct answer from the options given below:

- 1) A - I, B - II, C - IV, D - III
2) A - II, B - III, C - I, D - IV
3) A - I, B - II, C - III, D - IV
4) A - I, B - IV, C - III, D - II

Ans. 3

Sol. Haber process - Fe catalyst

Wacker oxidation - PdCl₂

Wilkinson catalyst - [(PPh₃)₃ RhCl]

Ziegler catalyst - TiCl₄ with Al(CH₃)₃

81. 5 moles of liquid X and 10 moles of liquid Y make a solution having a vapour pressure of 70 torr. The vapour pressures of pure X and Y are 63 torr and 78 torr respectively. Which of the following is true regarding the described solution?

- 1) The solution shows positive deviation
2) The solution shows negative deviation
3) The solution is ideal
4) The solution has volume greater than the sum of individual volumes

Ans. 2

Sol. $P_{\text{total}} = p_x^0 \cdot x_x + p_y^0 \cdot x_y$
 $= 63 \times \frac{5}{15} + 78 \times \frac{10}{15} = 73 \text{ torr}$

$\therefore P_{\text{total(ideal)}} > P_{\text{given}}$, The solution shows negative deviation

82. Sugar 'X'

- A. is found in honey
B. is a keto sugar
C. exist in α and β - anomeric forms
D. is laevorotatory.

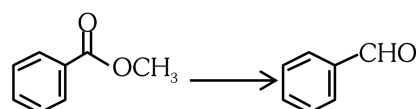
'X' is

- 1) D-Glucose 2) D-Fructose
3) Maltose 4) Sucrose

Ans. 2

Sol. Conceptual

83. Identify the suitable reagent for the following conversion

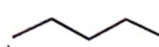


- 1) (i) LiAlH₄, (ii) H⁺ / H₂O
2) (i) AlH(iBu)₂, (ii) H₂O
3) (i) NaBH₄, (ii) H⁺ / H₂O
4) H₂ / Pd - BaSO₄

Ans. 2

Sol. DIBAL - H reduces ester to aldehyde

84. Given below are two statements: one is labelled as **Assertion (A)** and the other is labelled as **Reason (R)**

Assertion (A):  1 undergoes S_N2

reaction faster than  Cl.

Reason (R): Iodine is a better leaving group because of its large size.

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

Sol. R-I contains better leaving group than in R-Cl

85. The standard heat of formation, in kcal/ mol of Ba^{2+} is :

[Given: standard heat of formation of SO_4^{2-} ion (aq) = 216 kcal/mol, standard heat of crystallisation of $\text{BaSO}_4 = -4.5 \text{ kcal/mol}$ standard heat of formation

$$\text{BaSO}_4(\text{s}) = -349 \text{ kcal / mol] of}$$

- 1) -128.5 2) -133.0
3) +133.0 4) +220.2

Ans. **1**

Sol. $\text{Ba}_{(\text{aq})}^{2+} + \text{SO}_{4(\text{aq})}^{2-} \rightarrow \text{BaSO}_{4(\text{s})} \quad \Delta H = -4.5 \text{ k.cal / mol}$

from $\Delta H = \sum \Delta_f H(\text{products}) - \sum \Delta_f H(\text{Reactants})$

$$-4.5 = -349 - [\mathbf{x} + (-216)]$$

$$x = -349 + 216 + 4.5 = -128.5 \text{ k.cal / mol}$$

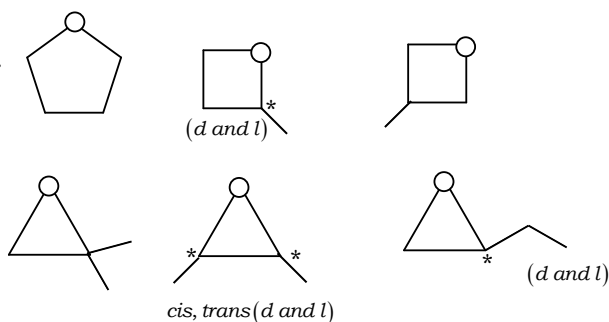
$$\therefore \Delta_f H^0 (\text{Ba}^{2+}) = -128.5 \text{ kcal / mol}$$

86. Total number of possible isomers (both structural as well stereoisomers) of cyclic ethers of molecular formula C_4H_8O is

- 1) 6 2) 8
3) 10 4) 11

Ans. 3

Sol.



87. Identify the correct orders against the property mentioned

- A. $\text{H}_2\text{O} > \text{NH}_3 > \text{CHCl}_3$ – dipole moment
 B. $\text{XeF}_4 > \text{XeO}_3 > \text{XeF}_2$ – number of lone pairs on central atom
 C. $\text{O} - \text{H} > \text{C} - \text{H} > \text{N} - \text{O}$ – bond length
 D. $\text{N}_2 > \text{O}_2 > \text{H}_2$ – bond enthalpy

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

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

Ans. **1**

Sol. $\text{H}_2\text{O} > \text{NH}_3 > \text{CHCl}_3$ -dipole moment

$$\text{N}_2 > \text{O}_2 > \text{H}_2 - \text{bond enthalpy}$$

88. Higher yield of NO in

$\text{N}_2(\text{g}) + \text{O}_2(\text{g}) \rightleftharpoons 2\text{NO}(\text{g})$ can be obtained at

$$\left[\Delta H \text{ of the reaction} = +180.7 \text{ kJ mol}^{-1} \right]$$

- A. higher temperature
B. lower temperature
C. higher concentration of N_2
D. higher concentration of O_2

Choose the correct answer from the options given below:

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

Ans. **4**

Sol. The given reaction is Endothermic and Higher yield of NO is favoured by

- higher temperature
- higher concentration of N_2 &
- higher concentration of O_2

89. If the rate constant of a reaction is 0.03 s^{-1} , how much time does it take for 7.2 mol L^{-1} concentration of the reactant to get reduced to 0.9 mol L^{-1} ? (Given: $\log 2 = 0.301$)

- 1) 69.3s 2) 23.1s
3) 210s 4) 21.0s

Ans. **1**

Sol. Given reaction is first order reaction

$$k = \frac{2.303}{t} \log \frac{[R]_0}{[R]}$$

$$0.03 = \frac{2.303}{t} \log \frac{7.2}{0.9}$$

$$t = \frac{0.693}{0.01} = 69.3 \text{ sec}$$

90. Which of the following reactions does **NOT** belong to "Lassaigne's test"?

- 1) $\text{Na} + \text{C} + \text{N} \xrightarrow{\Delta} \text{NaCN}$
- 2) $2\text{Na} + \text{S} \xrightarrow{\Delta} \text{Na}_2\text{S}$
- 3) $\text{Na} + \text{X} \xrightarrow{\Delta} \text{NaX}$
- 4) $2\text{CuO} + \text{C} \xrightarrow{\Delta} 2\text{Cu} + \text{CO}_2$

Ans. **4**

Sol. **Conceptual**

BIOLOGY

91. The complex II of mitochondrial electron transport chain is also known as

- 1) Cytochrome of bc_1
- 2) Succinate dehydrogenation
- 3) Cytochrome c oxidase
- 4) NADH dehydrogenase

Ans. **2**

92. Polymerase chain (PCR) amplifies DNA following the equation

- 1) N^2
- 2) 2^n
- 3) $2n + 1$
- 4) 2N^2

Ans. **2**

93. What are the potential drawbacks in adoption of the IVF method?

- A. High fatality risk to mother
- B. Expensive instruments and reagents
- C. Husband wife necessary for being donors
- D. Less adoption of orphans
- E. Not available in India
- F. Possible that the early embryo does not survive

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

- 1) B, D, F only
- 2) A, C, D only
- 3) A, B, C, D only
- 4) A, B, C, E, F only

Ans. **1**

94. What is the name of the blood vessel that carries deoxygenated blood from the body to the heart in a frog?

- 1) Aorta
- 2) Pulmonary artery
- 3) Pulmonary vein
- 4) Vena cava

Ans. **4**

95. Which of the following statements refers to reductionist biology?

- 1) Physico-chemical approach to study and understand living organisms
- 2) Physiological approach to study and understand living organisms
- 3) Chemical approach to study and understand living organisms
- 4) Behavioural approach to study and understand living organisms

Ans. **1**

96. Given below are two statements.

Statement-I : In the RNA world is considered the first genetic material evolved to carry out essential life process. RNA acts as a genetic material and also as a catalyst for some important biochemical reactions in living systems. Being reactive. RNA is unstable.

Statement-II : DNA evolved from RNA and is a more stable genetic material. Its double helical stands being complementary resists changes by evolving repairing mechanism. In the light of the above statements choose the most appropriate answer from the options given below.

- 1) Both Statements are correct
- 2) Both Statements are incorrect
- 3) Statement-I is correct, Statement-II is incorrect
- 4) Statement-I is incorrect, Statement-II is correct

Ans. 1

97. Epiphytes that are growing on a mango branch is an example of which of the following?

- 1) Commensalism
- 2) Mutualism
- 3) Predation
- 4) Amensalism

Ans. 1

98. From the statements given below choose the **correct** option.

- A) The eukaryotic ribosomes are 80S and prokaryotic ribosomes are 70S
- B) Each ribosomes has two sub units
- C) The two sub units of 80S ribosomes are 60S and 40S while that 70S are 50S and 30S
- D) The two sub units of 80S ribosomes 60S and 20S and that of 70S are 50S and 20S
- E) The two sub units of 80S and 60S and 30S and that of 70S are 50S and 30S

- 1) A, B, C are true
- 2) A, B, D are true
- 3) A, B, E are true
- 4) B, D, E are true

Ans. 1

99. Which of the following is an example of exsitu conservation?

- 1) National park
- 2) Wildlife Sanctuary
- 3) Zoos and botanical gardens
- 4) Protected areas

Ans. 3

100. Given below are two statements.

Statement-I : The primary source of energy is an ecosystem is solar energy.

Statement-II : The rate of production of organic matter during photosynthesis in an ecosystem is called net primary productivity (NPP)

In the light of the above statements choose the most appropriate answer from the options given below.

- 1) Both Statements are correct
- 2) Both Statements are incorrect
- 3) Statement-I is correct, Statement-II is incorrect
- 4) Statement-I is incorrect, Statement-II is correct

Ans. 3

101. Match List I with List II.

	List-I		List -II
A)	Emphysema	I)	Rapid spasms in muscle due to low Ca^{++} in body fluid
B)	Angina pectoris	II)	Damaged alveolar walls and decreased respiratory surface
C)	Glomerulonephritis	III)	Acute chest pain when not enough oxygen is reaching to heart muscle
D)	Tetany	IV)	Inflammation of glomeruli of kidney

Choose the correct answer from the options given below.

- 1) A - III; B - I; C - IV; D - II
- 2) A - III; B - I; C - II; D - IV
- 3) A - II; B - IV; C - III; D - I
- 4) A - II; B - III; C - IV; D - I

Ans. 4

102. Given below are two statements. One is labelled as Assertion (A) and other is labelled as Reason (R).

Assertion (A): Both wind and water pollinated flowers are not very colourful and do not produce nectar.

Reason (R): The flowers produce enormous amount of pollen grains in wind and water pollinated flowers.

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 and (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. 2

103. Which of the following is an example of non distilled alcoholic beverage produced by yeast?

- 1) Whisky 2) Brandy
 3) Beer 4) Rum

Ans. 3

104. Given below are two statements.

Statement-I : In a floral formula $\oplus$ stands for zygomorphic nature of the flower and $\underline{G}$ stands for inferior ovary.

Statement-II : In a floral formula $\oplus$ stands for actinomorphic nature of the flower and $\underline{G}$ stands for superior ovary

In the light of the above statements choose the most appropriate answer from the options given below.

- 1) Both Statements are correct
 2) Both Statements are incorrect
 3) Statement-I is correct, Statement-II is incorrect
 4) Statement-I is incorrect, Statement-II is correct

Ans. 4

105. Streptokinase produced by bacterium streptococcus is used for

- 1) Curd production
 2) Ethanol production
 3) Liver disease treatment
 4) Removing clots from blood vessels

Ans. 4

106. Which chromosome in the human genome has the highest number of genes?

- 1) Chromosome X 2) Chromosome Y
 3) Chromosome 1 4) Chromosome 10

Ans. 3

107. Which of the following statements is **correct** about location of the male frog copulatory pad?

- 1) First and second digit of fore limb
 2) First digit of hind limb
 3) Second digit of fore limb
 4) First digit of the fore limb

Ans. 4

108. Which one of the following phytohormones promotes nutrient mobilization which helps in the delay of leaf senescence in plants?

- 1) Ethylene 2) Absciscic acid
 3) Gibberellin 4) Cytokinin

Ans. 4

109. While trying to find out the characteristic of a newly found animal, a researcher did the histology of adult animal and observed a cavity with presence of mesodermal tissue towards the body wall but no mesodermal tissue was observed towards the alimentary canal. What could be the possible coelome of that animal?

- 1) Acoelomate 2) Pseudocoelomate
 3) Schizocoelomate 4) Spongocoelomate

Ans. 2

110. Match List I with List II.

	List-I		List -II
A)	Head	I)	Enzyme
B)	Middle piece	II)	Sperm motility
C)	Acrosome	III)	Energy
D)	Tail	IV)	Genetic material

- 1) A - IV; B - III; C - I; D - II
 2) A - IV; B - III; C - II; D - I
 3) A - III; B - IV; C - II; D - I
 4) A - III; B - II; C - I; D - IV

Ans. 1

111. Given below are the stages in the life cycle of pteridophytes. Arrange the following stages in the correct sequence.

- A) Prothallus stage
 B) Meiosis in spore mother cells
 C) Fertilisation
 D) Formation of archegonia and antheridia in gametophyte
 E) Transfer of antherozoids to the archegonia in presence of water

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

- 1) B, A, D, E, C 2) B, A, E, C, D
 3) D, E, C, A, B 4) E, D, C, B, A

Ans. 1

112. Cardiac activities of the heart are regulated by

- A) Nodal tissue
 B) A special neural centre in the medulla oblongata
 C) Adrenal medullary hormones
 D) Adrenal cortical hormones

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

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

Ans. 1

113. Which of the following organisms cannot fix nitrogen?

- A) Azotobacter B) Oscillatoria
C) Anabaena D) Volvox
D) Nostac

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

- 1) A only 2) D only
3) B only 4) E only

Ans. 2

114. Given below are two statements.

Statement-I : Transfer RNAs and ribosomal RNA do not interact with mRNA

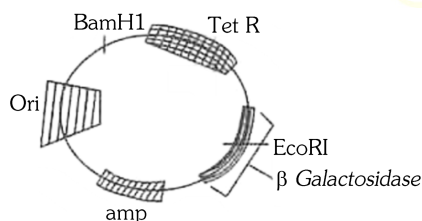
Statement-II : RNA interference (RNA) takes place in all eukaryotic organisms as a method of cellular defence.

In the light of the above statements choose the most appropriate answer from the options given below.

- 1) Both Statements are correct
2) Both Statements are incorrect
3) Statement-I is correct, Statement-II is incorrect
4) Statement-I is incorrect, Statement-II is correct

Ans. 4

115.



In the above represented plasmid an alien piece of DNA is inserted at EcoRI site. Which of the following strategies will be chosen to select the recombinant colonies?

- 1) using ampicillin & tetracyclin containing medium plate
2) Blue color colonies will be selected
3) White color colonies grown on ampicillin
4) Blue color colonies grown on ampicillin plates can be selected

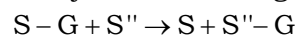
Ans. 3

116. Which of the following genetically engineered organisms was used by Eli, Lilly to prepare human insulin?

- 1) Bacterium 2) Yeast
3) Virus 4) Phage

Ans. 1

117. Name the class of enzymes that usually catalyse the following reactions.



Where G- a group other than hydrogen

S- a substrate

S''- another substrate

- 1) Hydrolysis 2) Lyase
3) Transferase 4) Ligase

Ans. 3

118. Find the statements that is **NOT** correct with regard to the structure of monocot stem.

- 1) hypodermis is parenchymatous
2) Vascular bundles are scattered
3) Vascular bundles are conjoint and closed
4) Phloem parenchyma is absent

Ans. 1

119. The correct sequence of events in the life cycle of Bryophytes is

- A) Fusion of antherozoid with egg
B) Attachment of gametophyte to substratum
C) Reduction division to produce haploid spores
D) Formation of sporophyte
E) Release of antherozoids into water

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

- 1) D, E, A, C, B 2) B, E, A, C, D
3) B, E, A, D, C 4) D, E, A, B, C

Ans. 3

120. Which are correct.

- A) Computed tomography and magnetic resonance imaging detect cancers of internal organs.
B) Chemotherapeutics drugs are used to kill non cancerous cells.
C) α -interferon activate the cancer patients immune system and helps in destroying the tumour
D) Chemotherapeutic drugs are biological response modifiers
E) In the case of leukaemia blood cell counts are decreased

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

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

Ans. 4

121. Match the Column I with Column II.

Column-I	Column-II
A. Centromere	I. Mitochondria
B. Cilium	II. Cell division
C. Cristae	III. Cell movement
D. Cell membrane	IV. Phospholipid Bilayer

Choose the correct answer from the options given below:

- 1) A-I, B-II, C-III, D-IV 2) A-II, B-I, C-IV, D-III
3) A-IV, B-II, C-III, D-I 4) A-II, B-III, C-I, D-IV

Ans. 4

122. Match the Column I with Column II.

Column-I	Column-II
A. Chlorophyll a	I. Yellow-green
B. Chlorophyll b	II. Yellow
C. Xanthophylls	III. Blue-green
D. Carotenoids	IV. Yellow to Yellow-orange

- 1) A-III, B-IV, C-II, D-I 2) A-III, B-I, C-II, D-IV
3) A-I, B-II, C-IV, D-III 4) A-I, B-IV, C-III, D-II

Ans. 2

123. Find the correct statements

- A. In human pregnancy, the major organ systems are formed at the end of 12 weeks
B. In human pregnancy the major organ systems are formed at the end of 8 weeks.
C. In human pregnancy heart is formed after one month of gestation
D. In human pregnancy, limbs and digits develop by the end of second month
E. In human pregnancy the appearance of hair is usually observed in the fifth month.

Choose the correct answer from the option given below.

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

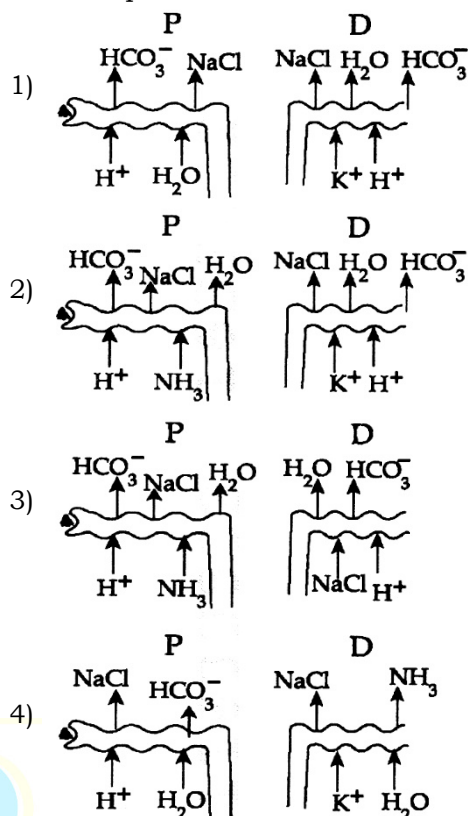
Ans. 4

124. In the seeds of cereals, the outer covering of endosperm separates the embryo by a protein-rich layer called

- 1) Coleoptile 2) Coleorhiza
3) Integument 4) Aleurone layer

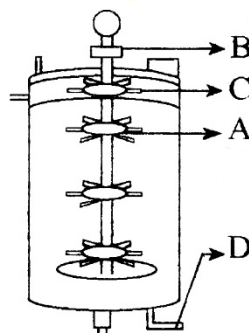
Ans. 4

125. Which of the following diagrams is correct with regard to the proximal (P) and distal (D) tubule of the Nephron.



Ans. 2

126. Identify the part of a bio-reactor which is used as a foam braker from the given figure



- 1) A 2) B
3) D 4) C

Ans. 4

127. Given below are two statements: One is labelled as Assertion(A) and the other is labelled as Reason(R).

Assertion (A) : A typical unfertilised, angiosperm embryo sac at maturity is 8 nucleate and 7-celled.

Reason(R) : The egg apparatus has 2 polar nuclei.

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 and (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. 3

128. A specialised membranous structure in a prokaryotic cell which helps in cell wall formation, DNA replication and respiration is

- 1) Mesosome
- 2) Chromatophores
- 3) Cristae
- 4) Endoplasmic reticulum

Ans. 1

129. Which of the following are the post transcriptional events in an eukaryotic cell?

- A. Transport of pre-mRNA to cytoplasm prior to splicing
- B. Removal of introns and joining of exons
- C. Addition of methyl group at 5' end of hnRNA
- D. Addition of adenine residues at 3' end of hnRNA
- E. Base pairing of two complementary RNAs

Choose the correct answer from the options given below

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

Ans. 2

130. What is the pattern of inheritance for polygenic trait?

- 1) Mendelian inheritance pattern
- 2) Non-mendelian inheritance pattern
- 3) Autosomal dominant pattern
- 4) X-linked recessive inheritance pattern

Ans. 2

131. Which one of the following enzymes contains 'Haem' as the prosthetic group?

- 1) RuBisCo
- 2) Carbonic anhydrase
- 3) Succinate dehydrogenase
- 4) Catalase

Ans. 4

132. Each of the following characteristics represent a Kingdom proposed by Whittaker. Arrange the following in increasing order of complexity of body organization.

- A. Multicellular heterotrophs with cell wall made of chitin
 - B. Heterotrophs with tissue/organ/organ system level of body organization
 - C. Prokaryotes with cell wall made of polysaccharides and amino acids
 - D. Eukaryotic autotrophs with tissue/organ level of body organization
 - E. Eukaryotes with cellular body organization
- Choose the correct answer from the options given below.

- 1) A, C, E, B, D
- 2) C, E, A, D, B
- 3) A, C, E, D, B
- 4) C, E, A, B, D

Ans. 2

133. Who is known as the father of Ecology in India?

- 1) S.R. Kashyap
- 2) Ramdeo Misra
- 3) Ram Udar
- 4) Birdal Sahni

Ans. 2

134. Match the List-I with List-II.

List-I	List-II
A. Alfred Hershey and Martha Chase	I. Streptococcus pneumoniae
B. Euchromatin	II. Densely packed and dark-stained
C. Frederick Griffith	III. Loosely packed and light-stained
D. Heterochromatin	IV. DNA as genetic material confirmation

Choose the correct answer from the options given below:

- 1) A-II, B-IV, C-I, D-III
- 2) A-IV, B-II, C-I, D-III
- 3) A-IV, B-III, C-I, D-II
- 4) A-III, B-II, C-IV, D-I

Ans. 3

135. Neoplastic characteristics of cells refer to

- A. A mass of proliferating cell
- B. Rapid growth of cells
- C. Invasion and damage to the surrounding tissue
- D. Those confined to original location

Choose the correct answer from the options given below

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

Ans. 2

136. Given below are two statements

Statement-I : The DNA fragments extracted from gel electrophoresis can be used in construction of recombinant DNA

Statement-II : Smaller size DNA fragments are observed near anode while larger fragments are found near the wells in an agarose gel.

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

- 1) Both S I and S II are correct
- 2) Both S I and S II are incorrect
- 3) S I is correct but S II is incorrect
- 4) S I is incorrect but S II is correct

Ans. 1

137. Match the List-I with List-II.

List-I	List-II
A. Adenosine	I. Nitrogen base
B. Adenylic acid	II. Nucleotide
C. Adenine	III. Nucleoside
D. Alanine	IV. Amino acid

Choose the option with all correct matches

- 1) A-III, B-IV, C-II, D-I
- 2) A-III, B-II, C-IV, D-I
- 3) A-III, B-II, C-I, D-IV
- 4) A-II, B-III, C-I, D-IV

Ans. 3

138. Consider the following.

A. The reductive division for the human female gametogenesis starts earlier than that of the male gametogenesis

B. The gap between the first meiotic division and the second meiotic division is much shorter for males compared to females

C. The first polar body is associated with the formation of the primary oocyte

D. Luteinizing Hormone (LH) surge leads to disintegration of the endometrium and onset of menstrual bleeding.

Choose the correct answer from the options given below

- 1) A and B are true
- 2) A and C are true
- 3) B and D are true
- 4) B and C are true

Ans. 1

139. All living members of the class Cyclostomata are:

- 1) Free living
- 2) Endoparasite
- 3) Symbiotic
- 4) Ectoparasite

Ans. 4

140. Given below are two statements: One is labelled as Assertion(A) and the other is labelled as Reason(R).

Assertion (A) : The primary function of the Golgi apparatus is to package the materials made by the endoplasmic reticulum and deliver it to intracellular targets and outside the cell.

Reason(R) : Vesicles containing materials made by the endoplasmic reticulum fuse with the cis face of the Golgi apparatus, and they are modified and released from the trans face of the Golgi apparatus

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 and (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

141. Match the List-I with List-II.

List-I	List-II
A. Scutellum	I. Persistent nucellus
B. Non-albuminous	II. Cotyledon of Monocot seed
C. Epiblast	III. Groundnut
D. Perisperm	IV. Rudimentary cotyledon

Choose the option with all correct matches

- 1) A-II, B-III, C-IV, D-I
- 2) A-IV, B-III, C-II, D-I
- 3) A-IV, B-III, C-I, D-II
- 4) A-II, B-IV, C-III, D-I

Ans. 1

142. Given below are two statements: One is labelled as Assertion(A) and the other is labelled as Reason(R).

Assertion (A) : All vertebrates are chordates but all chordates are not vertebrate.

Reason(R) : The members of subphylum vertebrata possess notochord during the embryonic period, the notochord is replaced by a cartilaginous or bony vertebral column in adults.

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 and (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

143. Identify the statement that is NOT correct.
- 1) Each antibody has two light and two heavy chains
 - 2) The heavy and light chains are held together by disulfide bonds
 - 3) Antigen binding site is located at C-terminal region of antibody molecules
 - 4) Constant region of heavy and light chains are located at C-terminus of antibody molecules

Ans. 3

144. Silencing of specific mRNA is possible via RNAi because of
- 1) Complementary dsRNA
 - 2) Inhibitory ssRNA
 - 3) Complementary tRNA
 - 4) Non-complementary ssRNA

Ans. 1

145. Genes R and Y follow independent assortment. If RRYYY produce round yellow seeds and rryy produce wrinkled green seeds, what will be the phenotypic ratio of the F₂ generation?
- 1) Phenotypic ratio - 1:2:1
 - 2) Phenotypic ratio - 3:1
 - 3) Phenotypic ratio - 9:3:3:1
 - 4) Phenotypic ratio - 9:7

Ans. 3

146. Histones are enriched with
- 1) Lysine & Arginine
 - 2) Leucine & Lysine
 - 3) Phenylalanine & Leucine
 - 4) Phenylalanine & Arginine

Ans. 1

147. The first menstruation is called:
- 1) Menopause
 - 2) Menarche
 - 3) Diapause
 - 4) Ovulation

Ans. 2

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

List-I	List-II
A. Heart	I. Erythropoietin
B. Kidney	II. Aldosterone
C. Gastro-intestinal tract	III. Atrial natriuretic factor
D. Adrenal Cortex	IV. Secretin

Choose the correct answer from the options given below:

- 1) A-II, B-I, C-III, D-IV
- 2) A-IV, B-III, C-II, D-I
- 3) A-I, B-III, C-IV, D-II
- 4) A-III, B-I, C-IV, D-II

Ans. 4

149. The protein portion of an enzyme is called:
- 1) Cofactor
 - 2) Coenzyme
 - 3) Apoenzyme
 - 4) Prosthetic group

Ans. 3

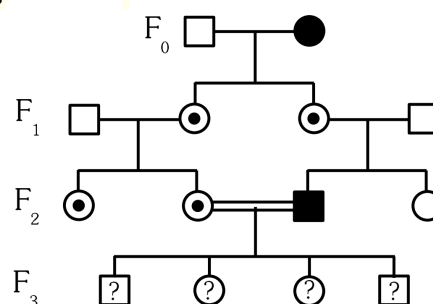
150. Which of the following is the unit of productivity of an Ecosystem?
- 1) gm^{-2}
 - 2) KCal m^{-2}
 - 3) KCal m^{-3}
 - 4) $(\text{KCal m}^{-2})\text{yr}^{-1}$

Ans. 4

151. Sweet potato and potato represent a certain type of evolution. Select the correct combination of terms to explain the evolution.
- 1) Analogy, convergent
 - 2) Homology, Divergent
 - 3) Homology, convergent
 - 4) Analogy, divergent

Ans. 1

152. With the help of given pedigree, find out the probability for the birth of a child having no disease and being a carrier (has the disease mutation in one allele of the gene) in F₃ generation



- Unaffected male
- Affected male
- ⊙ Carrier female
- Unaffected female
- Affected female

- 1) $\frac{1}{4}$
- 2) $\frac{1}{2}$
- 3) $\frac{1}{8}$
- 4) Zero

Ans. 2

153. Given below are two statements: One is labelled as **Assertion (A)** and the other is labelled as **Reason (R)**

Assertion (A): Cells Of the tapetum possess dense cytoplasm and generally have more than one nucleus.

Reason (R): Presence of more than one nucleus in the tapetum increases the efficiency of nourishing the developing microspore mother cells.

In light of the above-statements, choose the **most appropriate** 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 and **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

154. How many meiotic and mitotic divisions need to occur for the development of a mature female gametophyte from the megaspore mother cell in an angiosperm plant?

- 1) 2 Meiosis and 3 Mitosis
- 2) 1 Meiosis and 2 Mitosis
- 3) 1 Meiosis and 3 Mitosis
- 4) No meiosis and 2 Mitosis

Ans. 3

155. Which of the following is an example of a zygomorphic flower?

- 1) Petunia
- 2) Datura
- 3) Pea
- 4) Chilli

Ans. 3

156. After maturation, in primary lymphoid organs, the lymphocytes migrate for interaction with antigens to secondary lymphoid organ(s) / tissue (s) like:

- A) Thymus
- B) Bone marrow
- C) Spleen
- D) Lymph nodes
- E) Peyer's patches

Choose the correct answer from the options given below

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

Ans. 4

157. Given below are two statements:

Statement-I: Fig fruit is a non-vegetarian fruit as it has enclosed fig wasps in it.

Statement-II: Fig wasp and fig tree exhibit mutual relationship as fig wasp completes its life cycle in fig fruit and fig fruit gets pollinated by fig wasp.

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

- 1) Both statement-I and statement-II are correct
- 2) Both statement-I and statement-II are incorrect
- 3) Statement-I is correct but statement-II is incorrect
- 4) Statement-I is incorrect but statement-II is correct

Ans. 4

158. What is the main function of the spindle fibers during mitosis?

- 1) To separate the chromosomes
- 2) To synthesize new DNA
- 3) To repair damaged DNA
- 4) To regulate cell growth

Ans. 1

159. Which one of the following is the characteristic feature of gymnosperms?

- 1) Seeds are enclosed in fruits
- 2) Seeds are naked
- 3) Seeds are absent
- 4) Gymnosperms have flowers for reproduction

Ans. 2

160. Consider the following statements regarding function of adrenal medullary hormones

- A) It causes pupillary constriction
 - B) It is a hyperglycemic hormone
 - C) It caused piloerection
 - D) It increases strength of heart contraction
- Choose the **correct** answer from the options given below:

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

Ans. 2

161. Why can't insulin be given orally to diabetic patients?
- 1) Human body will elicit strong immune response
 - 2) It will be digested in Gastro-Intestinal (GI) tract
 - 3) Because of structural variation
 - 4) Its bioavailability will be increased

Ans. 2

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

List-I		List-II	
A	Pteridophyte	I	Salvia
B	Bryophyte	II	Ginkgo
C	Angiosperms	III	Polytrichum
D	Gymnosperms	IV	Salvinia

Choose the option with all **correct** matches

- 1) A-III, B-IV, C-II, D-I
- 2) A-IV, B-III, C-I, D-II
- 3) A-III, B-IV, C-I, D-II
- 4) A-IV, B-III, C-II, D-I

Ans. 2

163. Who proposed that the genetic code for amino acids should be made up of three nucleotides?
- 1) George Gamow
 - 2) Francis Crick
 - 3) Jacques Monod
 - 4) Franklin Stahl

Ans. 1

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

List-I		List-II	
A	The Evil Quartet	I	Cryopreservation
B	Ex situ conservation	II	Alien species invasion
C	Lantana camara	III	Causes of biodiversity losses
D	Dodo	IV	Extinction

Choose the option with all **correct** matches

- 1) A-III, B-II, C-I, D-IV
- 2) A-III, B-I, C-II, D-IV
- 3) A-III, B-IV, C-II, D-I
- 4) A-III, B-II, C-IV, D-I

Ans. 2

165. Which of the following hormones released from the pituitary is actually synthesized in the hypothalamus?
- 1) Luteinizing hormone (LH)
 - 2) Anti-diuretic hormone (ADH)
 - 3) Follicle-stimulating hormone (FSH)
 - 4) Adenocorticotrophic hormone (ACTH)

Ans. 2

166. Role of the water vascular system in Echinoderms is
- A) Respiration and Locomotion
 - B) Excretion and Locomotion
 - C) Capture and Transport of food
 - D) Digestion and Respiration
 - E) Digestion and Excretion

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

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

Ans. 2

167. Which of the following type of immunity is present at the time of birth and is a non-specific type of defence in the human body?
- 1) Acquired Immunity
 - 2) Innate Immunity
 - 3) Cell-mediated Immunity
 - 4) Humoral Immunity

Ans. 2

168. In bryophytes, the gemmae help in which one of the following?
- 1) Sexual reproduction
 - 2) Asexual reproduction
 - 3) Nutrient absorption
 - 4) Gaseous exchange

Ans. 2

169. In frog, the Renal portal system is a special venous connection that acts to link:
- 1) Liver and intestine
 - 2) Liver and kidney
 - 3) Kidney and intestine
 - 4) Kidney and lower part of body

Ans. 4

170. Given below are two statements:

Statement-I : In ecosystem, there is unidirectional flow of energy of sun from producers to consumers

Statement-II : Ecosystems are exempted from 2nd law of thermodynamics

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

- 1) Both S I and S II are correct
- 2) Both S I and S II are incorrect
- 3) S I is correct but S II is incorrect
- 4) S I is incorrect but S II is correct

Ans. 3

171. Which of the following statements about RuBisCO is true?
- 1) It is active only in the dark
 - 2) It has higher affinity for oxygen than carbon dioxide
 - 3) It is an enzyme involved in the photolysis of water
 - 4) It catalyzes the carboxylation of RuBP.

Ans. 4

172. Which of the following enzyme(s) are NOT essential for gene cloning?

- A. Restriction enzymes
- B. DNA ligase
- C. DNA mutase
- D. DNA recombinase
- E. DNA polymerase

Choose the correct answer from the options given below:

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

Ans. 1

173. Read the following statements on plant growth and development.

- A. Parthenocarpy can be induced by auxins
- B. Plant growth regulators can be involved in promotion as well as inhibition of growth
- C. Dedifferentiation is a pre-requisite for re-differentiation
- D. Absciscic acid is a plant growth promoter.
- E. Apical dominance promotes the growth of lateral buds.

Choose the option with all correct state

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

Ans. 1

174. Which factor is important for termination of transcription?

- 1) α (alpha)
- 2) σ (sigma)
- 3) ρ (rho)
- 4) γ (gamma)

Ans. 3

175. Frogs respire in water by skin and buccal cavity and on land by skin, buccal cavity and lungs

Choose the correct answer from the following.

- 1) The statement is true for water but false for land
- 2) The statement is true for both the environment
- 3) The statement is false for water but true for land
- 4) The statement is false for both the environment

Ans. 3

176. Twins are born to a family that lives next door to you. The twins are a boy and girl. Which of the following must be true?

- 1) They are monozygotic twins
- 2) They are fraternal twins
- 3) They were conceived through in vitro fertilization
- 4) They have 75% identical genetic content

Ans. 2

177. Which of the following microbes is NOT involved in the preparation of household products?

- A. *Aspergillus niger*
- B. *Lactobacillus*
- C. *Trichoderma polysporum*
- D. *Saccharomyces cerevisiae*
- E. *Propionibacterium sharmanii*

Choose the correct answer from the options given below

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

Ans. 2

178. Match the List-I with List-II.

List-I	List-II
A. Progesterone	I. Pars intermedia
B. Relaxin	II. Ovary
C. Melanocyte stimulating hormone	III. Adrenal Medulla
D. Catecholamines	IV. Corpus luteum

Choose the correct answer from the options given below:

- 1) A-IV, B-II, C-I, D-III
- 2) A-IV, B-II, C-III, D-I
- 3) A-II, B-IV, C-I, D-III
- 4) A-III, B-II, C-IV, D-I

Ans. 1

179. The blue and white selectable markers have been developed which differentiate recombinant colonies from non-recombinant colonies on the basis of their ability to produce colour in the presence of a chromogenic substrate.

Given below are two statements about this method:

Statement-I: The blue coloured colonies have DNA insert in the plasmid and they are identified as recombinant colonies

Statement-II: The colonies without blue colour have DNA insert in the plasmid and are identified as recombinant colonies.

In the light of the above statements, choose the **most appropriate** answer from the options given below:

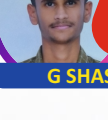
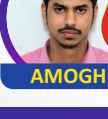
- 1) Both statement-I and statement-II are correct
- 2) Both statement-I and statement-II are incorrect
- 3) Statement-I is correct but statement-II is incorrect
- 4) Statement-I is incorrect but statement-II is correct

Ans. 4

180. Which one of the following equations represents the Verhulst-Pearl Logistic Growth of population?

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

Ans. 2

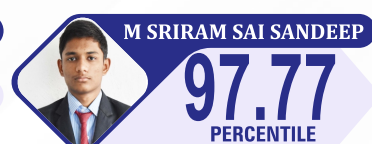
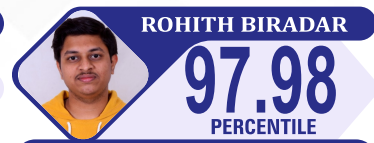
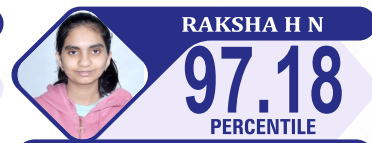
NEET-2021 MMCRI, MYSORE  643 MARKS CHANDANA N	NEET-2024 RIMS - RAICHUR  642 MARKS MOHD AFFAN HUSSAIN	NEET-2024 SABVIMS - BENGALURU  642 MARKS K RAKESH REDDY	NEET-2021 SMC, CHENNAI  642 MARKS NARENDRA BABU T V	NEET-2024 CIMS - CHAMARAJANAGAR  641 MARKS SIDDESH C S	NEET-2023 BMC, BANGALORE  641 MARKS SUDEEP TANKASALI
NEET-2022 BMC, BANGALORE  641 MARKS PRAJWAL PATIL B R	NEET-2022 BMC, BANGALORE  641 MARKS FIZA ANJUM I T	NEET-2024 BMC - BANGALORE  640 MARKS SACHIN R BHAJANTRI	NEET-2024 BGS - BANGALORE  640 MARKS MOKSHITH N G	NEET-2024 CIMS - CHIKKABALLAPURA  640 MARKS ARYA PRASAD	NEET-2024 GIMS - GADAG  640 MARKS MOHAMMED SOHEB DOTEGAR
NEET-2024 VIMS - BELLARY  640 MARKS VINOD B	NEET-2023 MMCRI, MYSORE  640 MARKS SRUJAN S PATIL	NEET-2022 BMC, BANGALORE  640 MARKS CHINMAY SWAMY A M	NEET-2022 MMCRI, MYSORE  640 MARKS YASHAS T S	NEET-2024 SIMS - SHIMOGA  639 MARKS KOMAL GURAV	NEET-2022 KIMS, HUBLI  639 MARKS SOUMYA R BADAI
NEET-2024 CIMS - CHAMARAJANAGAR  638 MARKS LEKHASHREE N S	NEET-2024 GIMS - GADAG  638 MARKS SANGAMESH APPANNA MAGADUM	NEET-2022 MMCRI, MYSORE  638 MARKS NATARAJ K V	NEET-2024 RIMS - RAICHUR  637 MARKS BUSHRA Z K	NEET-2022 BMC, BANGALORE  637 MARKS TEJA A	NEET-2022 BMC, BANGALORE  637 MARKS AKASH S PATHRI
NEET-2024 GIMS - GADAG  636 MARKS AMRUT GURUSIDDAPPA TORALI	NEET-2024 GIMS - GADAG  636 MARKS ADITYA	NEET-2024 GIMS - GADAG  636 MARKS TILAK V TALIKOTI	NEET-2024 RIMS - RAICHUR  636 MARKS NARESH GOWDA D	NEET-2024 SDM - DHARWAD  636 MARKS YANA P METI	NEET-2024 VIMS - BELLARY  636 MARKS YASHASVI
NEET-2023 HIMS, HASSAN  636 MARKS DHANYASHREE P	NEET-2023 RIMS, RAICHUR  636 MARKS E SNEHA	NEET-2022 BMC, BANGALORE  636 MARKS SHASHANK S K	NEET-2021 BMC, BANGALORE  636 MARKS CHANDAN B S	NEET-2021 KIMS, HUBLI  636 MARKS DILEEP KUMAR PAGI	NEET-2024 GIMS - GADAG  635 MARKS ADARSH KAMAGOUDA
NEET-2024 KIMS - BANGALORE  635 MARKS RAKSHA H N	NEET-2023 MMCRI, MYSORE  635 MARKS PRABHURAJ MAHADEV M	NEET-2022 BMC, BANGALORE  635 MARKS AVINASH FAKERAPPA Y	NEET-2022 BMC, BANGALORE  635 MARKS RAKESH M	NEET-2022 MMCRI, MYSORE  635 MARKS SURAJ B N MALALI	NEET-2024 BMC - BANGALORE  633 MARKS BANUSREE S
NEET-2024 DR. BRAMC - BANGALORE  633 MARKS MOHAMMAD ZAID	NEET-2021 SABVIMS, BENGALURU  633 MARKS ARJUN P J	NEET-2024 CIMS - CHAMARAJANAGAR  632 MARKS DAYENDRA A PATEL	NEET-2024 GIMS - GADAG  632 MARKS DARSHAN R MURAGUNDI	NEET-2024 GIMS - GADAG  632 MARKS VIKASGOUDA KUSHAL GOUDA PATIL	NEET-2024 ESIMC - GULBARGA  632 MARKS VAJRA
NEET-2024 GMC - MAHABUBNAGAR  632 MARKS GUJJULA HARSHITHA	NEET-2024 NIMS - HYDERABAD  632 MARKS VYKUNTAM SAI SATHVIKA	NEET-2022 MMCRI, MYSORE  632 MARKS MALLIKARJUNA B V	NEET-2024 KIMS - UTTARA KANNADA  631 MARKS KUSHI B M	NEET-2024 CIMS - CHIKKABALLAPURA  631 MARKS ANUSHREE M	NEET-2023 KIMS, HUBLI  631 MARKS SHIVAKUMAR NEELAKANTH H
NEET-2022 KIMS, HUBLI  631 MARKS SHRISHAIL SANASANI	NEET-2022 KIMS, HUBLI  631 MARKS SUJEET M ATHANI	NEET-2021 SABVIMS, BENGALURU  631 MARKS CHARITHA P S	NEET-2021 CIMS, CHIKKAMAGALURU  630 MARKS AMITH	NEET-2021 GIMS, GADAG  630 MARKS G SHASHANK	NEET-2021 HIMS, HAVERI  630 MARKS NISARGA T
NEET-2021 KIMS, KOPPAL  630 MARKS AMOGH B KOVALLI	NEET-2022 JSSMC, MYSORE  630 MARKS SHIVADEEP S S	NEET-2022 MMCRI, MYSORE  630 MARKS PANKAJ BASANAGOUD P	NEET-2021 BMC, BENGALURU  630 MARKS ARCHANA SUBHASH K	AND MANY MORE...	

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 585 MARKS DEEPAK ROOGI 20259142895	 585 MARKS PRATAP SIMHA N S 20259228895	 585 MARKS SPOONTHI 20259153027	 585 MARKS SHREYA S HARANAL 20259153006	 585 MARKS SUPRITA 20259153038	 585 MARKS POORVI M SURESH 20259152912

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LTM BOYS CAMPUS :- Defence Colony, Virognagar,
Cheemasandra, Avalahalli South, Hoskote - 560049
LTM GIRLS CAMPUS :- Ist Main Road,
Beside Adithya PU College,
4th Cross, TG Extension, Hoskote.

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NELMANGALA

LTM BOYS CAMPUS
DASANPURA
#2/5, Narayanappa Palya,
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