



# DR ACADEMY

DO RIGHT FOR GENUINE EDUCATION

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## KCET EXAMINATION - 2026

DATE : 23-04-2026

PHYSICS

CODE - C4

TIME : 10:30 AM TO 11:50 AM

### LONG TERM COACHING

1<sup>ST</sup> BATCH FOR NEET - 2027

### STARTS ON

# 5<sup>TH</sup> JUNE - 2026

## NEET - 2025 TOPPERS



AFNAAN PASHA

App No. 250410602893



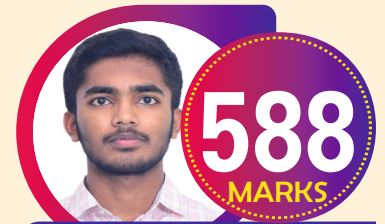
RAKESH KUMBAR

App No. 250410893858



M LEENA REDDY

App No. 250410154513



JAYANTH K S

App No. 250410619327



CHANDANA REDDY N G

App No. 250410232370



BHAGYASHRI PATTAR

App No. 250410153733



KOTTAPALLI ABDUL KALAM

App No. 250410865706



RAJMANE TRUPTI RAHUL

App No. 250410324087



CHANDANA B M

App No. 250410272395



CHANDRIKA SAJJANAR

App No. 250410695592



VIJAY M

App No. 250410629648



ANMOL SHEGUNASI

App No. 250410421533



AKSHATA GURAPPA J

App No. 250411245807



SUHAS GOWDA B R

App No. 250410159008



SAMEERAHMAD SAIFANSAB

App No. 250411621485



RAKSHITH KUMAR S

App No. 250410518308



M L THANMAYI ANNAPOORNA

App No. 250411113373



SHREE GOURI

App No. 250410227908



SUHAS MAHANTESH H

App No. 250410499664



YOGITHA D

App No. 250410071616



SURAJ K R

App No. 250410942156



NAGASAI CH

App No. 250410870699



PRAJWAL N S

App No. 250410415967



CHINMAYI SARANGAMATH

App No. 250410267618

# 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 CHOUDHARI

NEET - 2024 | KIMS - HUBLI



**665**  
MARKS

C SATHYAM

NEET - 2021 | BMC, BANGALORE



**665**  
MARKS

RASHMI PATIL

NEET - 2020 | BMC, BANGALORE



**665**  
MARKS

JAYANTH L S

NEET - 2024 | GIMS - GULBARGA



**663**  
MARKS

MOHAMMED ZEESHAN

NEET - 2024 | MIMS - MANDYA



**662**  
MARKS

POOJA U

NEET - 2024 | MMCRI - MYSORE



**662**  
MARKS

SAMPAT GOPAL GOKAK

NEET - 2022 | BMC, BANGALORE



**662**  
MARKS

SIDDHARTH A S

NEET - 2024 | KIMS - HUBLI



**661**  
MARKS

DIVYA M YALIGAR

NEET - 2023 | JIPMER PUDUCHERRY



**661**  
MARKS

SHASHANK SURAPOOR

NEET - 2024 | BIMC - BELAGAVI



**660**  
MARKS

ANMOL R KOTNAL

NEET - 2024 | KIMS - BANGALORE



**660**  
MARKS

ADHITHYA SUDARSAN GOKHALE

NEET - 2024 | MMCRI - MYSORE



**660**  
MARKS

SHRIDHAR BIRADAR

NEET - 2024 | SABVIMS - BENGALURU



**660**  
MARKS

POOJA N

NEET - 2024 | SABVIMS - BENGALURU



**660**  
MARKS

TARUN N

NEET - 2021 | KIMS, HUBLI



**660**  
MARKS

NACHIKET KEMPANNA

NEET - 2024 | KIMS - HUBLI



**657**  
MARKS

SINDHU VADAVADI

NEET - 2024 | MIMS - MANDYA



**657**  
MARKS

S SUHAS

NEET - 2024 | SABVIMS - BENGALURU



**657**  
MARKS

SHREEHARINATH A B

NEET - 2024 | GMC - SAMBHAJINAGAR



**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

**DAY & RESIDENTIAL**  
SEPARATE HOSTEL FOR BOYS & GIRLS

**LTM ADMISSIONS OPEN**

# QUESTION PAPER ANALYSIS

CHAPTER

NO. OF  
QUESTIONS

## I PUC

UNITS AND MEASUREMENT

1

MOTION IN A STRAIGHT LINE

2

MOTION IN A PLANE

1

LAWS OF MOTION

2

WORK, ENERGY & POWER

2

SYSTEM OF PARTICLES & ROTATIONAL MOTION

1

GRAVITATION

3

MECHANICAL PROPERTIES OF SOLIDS

1

MECHANICAL PROPERTIES OF FLUIDS

2

THERMAL PROPERTIES OF MATTER

0

THERMODYNAMICS

2

KINETIC THEORY

1

OSCILLATIONS

1

WAVES

1

## II PUC

ELECTRIC CHARGES AND FIELDS

4

ELECTROSTATIC POTENTIAL AND CAPACITANCE

3

CURRENT ELECTRICITY

6

MOVING CHARGES AND MAGNETISM

4

MAGNETISM AND MATTER

2

ELECTROMAGNETIC INDUCTION

2

ALTERNATING CURRENT

3

ELECTROMAGNETIC WAVES

2

RAY OPTICS AND OPTICAL INSTRUMENTS

5

WAVE OPTICS

1

DUAL NATURE OF RADIATION AND MATTER

2

ATOMS

3

NUCLEI

0

SEMI CONDUCTOR ELECTRONICS

3

1. The number of electrons moving per second through the filament of a lamp of 60 W operating at 120 V is nearly ( $e = 1.6 \times 10^{-19} \text{ C}$ )

- 1)  $6.2 \times 10^{18}$                       2)  $6.2 \times 10^{19}$   
 3)  $3.1 \times 10^{18}$                       4)  $3.1 \times 10^{19}$

**Ans. 3**

**Sol.**  $P = VI$   
 $P = V ne$

$$n = \frac{P}{ve} = \frac{60}{120 \times 1.6 \times 10^{-19}} = 3.1 \times 10^{18}$$

2. Given below are two statements:

**Statement-I:** The resistivity of a conductor is independent of its temperature.

**Statement-II:** The resistivity of a semiconductor decreases with increase in temperature.

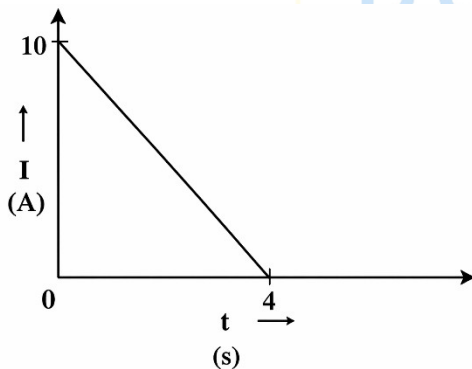
Select the correct option.

- 1) Both Statement I and Statement II are false  
 2) Both Statement I and Statement II are true  
 3) Statement I is true but Statement II is false  
 4) Statement I is false but Statement II is true

**Ans. 4**

**Sol.** Conceptual

3. Current flowing through a wire decreases linearly from 10 A to zero in 4 s as shown in the graph. Find the total charge flowing through the wire in the given time interval.



- 1) 40C      2) 20C      3) 10C      4) 80C

**Ans. 2**

**Sol.** Charge = area under curve  
 $= \frac{1}{2} bh = \frac{1}{2} \times 4 \times 10 = 20 \text{ C}$

4. In a conducting region,  $10^{19}$  electrons and  $10^{19}$  protons move to the left, while  $10^{19}$   $\alpha$  - particles move to the right per second. The resulting electric current is ( $e = 1.6 \times 10^{-19} \text{ C}$ )

- 1) 3.2 A towards left      2) 3.2 A towards right  
 3) 1.6 A towards left      4) 1.6 A towards right

**Ans. 2**

**Sol.**  $\frac{n_1(e) - n_2(e) + n_3(2e)}{t} = 3.2 \text{ A towards right}$

5. A point charge is placed in a moving train. A passenger A sitting in the train and person B on the ground observe the fields due to this charge. Then

- 1) A observes both electric and magnetic fields  
 2) B observes both electric and magnetic fields  
 3) A observes only magnetic field  
 4) B observes only electric field

**Ans. 2**

**Sol.** w.r.t 'B' charge is in motion, moving charge produce both electric and magnetic fields.

6. A proton, an electron and an  $\alpha$  -particle enter at right angles to a uniform magnetic field with the same velocity. If  $R_p, R_e$  and  $R_\alpha$  are the radii of circular paths of these particles, then

- 1)  $R_\alpha = R_p = R_e$                       2)  $R_\alpha > R_p > R_e$   
 3)  $R_\alpha < R_p < R_e$                       4)  $R_\alpha > R_p = R_e$

**Ans. 2**

**Sol.**  $r = \frac{mv}{Bq}$                        $r \propto \frac{m}{q}$

$$R_\alpha > R_p > R_e$$

7. Biot-Savart law indicates that an electron moving with a velocity  $\vec{V}$  produces a magnetic field  $\vec{B}$  around it such that

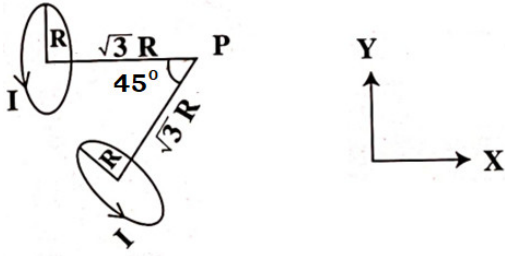
- 1)  $\vec{B}$  is parallel to  $\vec{V}$   
 2)  $\vec{B}$  is perpendicular to  $\vec{V}$   
 3)  $\vec{B}$  is anti-parallel to  $\vec{V}$   
 4)  $\vec{B}$  is inclined to  $\vec{V}$  by  $45^\circ$

**Ans. 2**

**Sol.** The direction of the magnetic  $\vec{B}$  field is always perpendicular to the velocity.

$$\vec{B} = \frac{\mu_0}{4\pi} q \frac{(\vec{v} \times \hat{r})}{r^2}$$

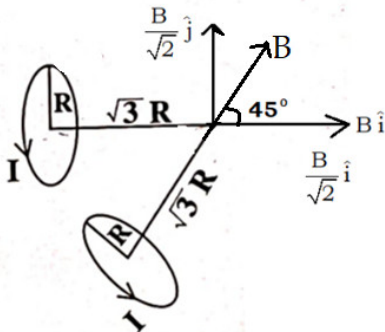
8. Two identical circular current loops carrying equal currents are placed with their axes inclined at  $45^\circ$  to each other as shown in the figure. The resultant magnetic field at P is



- 1)  $\frac{\mu_0 I}{16\sqrt{2}R} [(\sqrt{2}+1)\hat{i} + \hat{j}]$     2)  $\frac{\mu_0 I}{16\sqrt{2}R} [\sqrt{2}\hat{i} + \hat{j}]$   
 3)  $\frac{\mu_0 I}{16R} [(\sqrt{2}+1)\hat{i} + \hat{j}]$     4)  $\frac{\mu_0 I}{16R} [\sqrt{2}\hat{i} + \hat{j}]$

**Ans. 1**

**Sol.**  $B = \frac{\mu_0 i R^2}{2(R^2 + x^2)^{3/2}} = \frac{\mu_0 i}{16R}$



$$B_{\text{net}} = B\hat{i} + \frac{B}{\sqrt{2}}\hat{i} + \frac{B}{\sqrt{2}}\hat{j} = \frac{B}{\sqrt{2}}(\sqrt{2}\hat{i} + \hat{i} + \hat{j})$$

$$B_{\text{net}} = \frac{\mu_0 i}{16\sqrt{2}R} ((\sqrt{2}+1)\hat{i} + \hat{j})$$

9. If a paramagnetic bar is brought near a bar magnet, then it is  
 1) Attracted by both the poles of the bar magnet  
 2) Repelled by both the poles of the bar magnet  
 3) Attracted by the South-pole and repelled by the North-pole of the bar magnet  
 4) Attracted by the North-pole and repelled by the South-pole of the bar magnet

**Ans. 1**

**Sol.** Paramagnetic bar brought near a bar magnet attracted by both the poles of the bar magnet.

10. Pick out the WRONG statements about magnetic substances.  
 ( $\chi$  = magnetic susceptibility)  
 ( $\mu_r$  = relative permeability).

- I. Substances with  $-1 \leq \chi < 0$  are diamagnetic.  
 II. Substances with  $\chi \gg 1$  are paramagnetic.  
 III. Substances with  $\chi \ll 1$  are ferromagnetic.  
 IV. Substances with  $\mu_r \gg 1$  are ferromagnetic.
- 1) I and II                                      2) III and IV  
 3) II and III                                    4) II and IV

**Ans. 3**

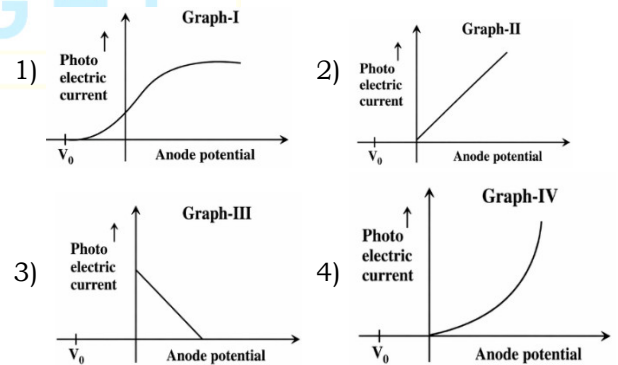
**Sol.**  $\mu_r = 1 + \chi$

11. Work function of the metal is  
 1) Maximum possible energy acquired by an electron  
 2) Equal for all metals  
 3) Minimum energy required by an electron to just eject from metal surface  
 4) Maximum energy which is given to electron to move out of metal surface

**Ans. 3**

**Sol.** The minimum energy required to remove the electron from the metal surface is called work function.

12. Variation of photoelectric current with anode potential is shown below. Choose the correct option ( $V_0$  = stopping potential)



**Ans. 1**

**Sol.** Conceptual

13. In Faraday-Henry's experiment, a coil is connected to a galvanometer. For the deflection of pointer in the galvanometer, which of the following statement/s is/are WRONG?

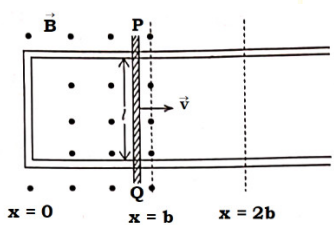
- The pointer in the galvanometer deflects -  
 (a) When the bar magnet is moved towards the stationary coil along its axis.  
 (b) When the bar magnet is moved away from the stationary coil along its axis.  
 (c) When the coil is moved towards the stationary bar magnet along its axis.  
 (d) When the coil and the magnet are moved without relative motion between them.

- 1) a and b                      2) b and c  
 3) a, b and c                4) Only d

**Ans. 4**

**Sol.**  $e = \frac{-d\phi}{dt}$

14. In the figure shown, the conductor PQ of length  $l$  is moved from  $x = 0$  to  $x = b$  and then up to  $x = 2b$  with a constant velocity  $\vec{v}$ . A uniform magnetic field  $\vec{B}$  is perpendicular to the plane of the paper and extends from  $x = 0$  to  $x = b$  and it is zero from  $x > b$ . The magnitude of emf Induced in the conductor is



- 1)  $Blx; 0 \leq x < b$             2) Zero;  $0 \leq x < b$   
 3)  $Blv; 0 \leq x \leq b$             4)  $Blv; b \leq x \leq 2b$

**Ans. 3**

**Sol.** The problem defines two distinct regions based on the presence of the magnetic field B.

Region 1 ( $0 \leq x \leq b$ ):

The problem states that a uniform magnetic field B exists in this region. As the conductor moves through this space, it cuts the magnetic field lines. Therefore, a constant emf is induced:  $\epsilon = Blv$

Region 2 ( $x > b$ ):

The problem explicitly states that the magnetic field is zero for  $x > b$ .

Since  $B = 0$ , there are no magnetic field lines to cut, and the induced emf drops to zero:

$\epsilon = (0)lv = 0$

15. In a circuit containing a pure resistor connected to an AC source,

- 1) Voltage leads the current by  $90^\circ$   
 2) Current leads the voltage by  $90^\circ$   
 3) Voltage and current are in same phase with each other  
 4) Current leads the voltage by  $180^\circ$

**Ans. 3**

**Sol.** Voltage and current are in same phase with each other.

16. A light bulb rated 100 W is connected to an AC source of 220 V, 50 Hz. The rms current through the bulb is

- 1) 0.454 A                      2) 0.545 A  
 3) 2.20 A                      4) 0.22 A

**Ans. 1**

**Sol.**  $P = V_{rms} i_{rms}$

$i_{rms} = \frac{P}{V_{rms}} = \frac{100}{220} = 0.454 \text{ A}$

17. A small town with a demand of 900 kW of electric power at 220 V is situated 20 km away from an electric power generating station. The two-wires line has resistance per unit length of  $5 \times 10^{-4} \Omega \text{ m}^{-1}$ . The town gets power from the line through 45000 V to 220 V stepdown transformer at a substation in the town. The line power loss in the form of heat is

- 1) 4 Kw    2) 8 kW    3) 40 kW    4) 80 kW

**Ans. 2**

**Sol.** Resistance per unit length of  $5 \times 10^{-4} \Omega \text{ m}^{-1}$ .

For 20 km,

Resistance (R) =  $20 \times 10^3 \times 5 \times 10^{-4} = 10 \Omega$

For Two wires  $R_{net} = 10 + 10 = 20 \Omega$

$P = Vi \Rightarrow 900 \times 10^3 = 45000 \times i$

$i = 20$

$P_{loss} = i^2 R = 20 \times 20 \times 20 = 8000 \text{ W}$

Power loss = 8 kW



# DR ACADEMY

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## BENGALURU | HYDERABAD

### JEE MAIN - 2025 ACHIEVERS



**99.42**  
NANDISH M



**99.24**  
JAYANTH K S



*Congratulations*

## EXEMPLARY PERFORMANCE IN THE JEE MAIN - 2026



JAYANTH GOWDA R  
**98.94**  
APP.NO. 260320062280



TEJAS KENCHAPPA  
**98.81**  
APP.NO. 260310597858



REDDY SRIHARI V  
**98.10**  
APP.NO. 260310192057

ABHISHEK ARAVIND P  
**97.96**  
APP.NO. 260310493466

MANOJ H  
**97.75**  
APP.NO. 260310797312

PAVAN R  
**97.34**  
APP.NO. 260310637090

AKASH J  
**97.21**  
APP.NO. 260310806003

MALLIKARJUN M  
**96.62**  
APP.NO. 260310638056

P SANJANA SHREE  
**96.43**  
APP.NO. 260310718943

SINCHANA R  
**96.34**  
APP.NO. 260310494746

NITHIN PATEL R  
**96.24**  
APP.NO. 260310917297

DEEPTHI T M  
**95.92**  
APP.NO. 260310488132

PUSHKAR GOWDA R  
**95.84**  
APP.NO. 2603106537512

PUNARAV  
**95.24**  
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SHASHANK A Y  
**95.22**  
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HARSHITH P  
**95.06**  
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GADHADHAR P  
**95.02**  
APP.NO. 260310493376

SHARAN KUMAR M S  
**94.82**  
APP.NO. 260310635876

MAHESHWAR NAVAK  
**94.82**  
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SANJAY M  
**94.79**  
APP.NO. 260310303978

MOHAMMED ZAID N A  
**94.72**  
APP.NO. 260310669444

UPPULEETHI NITISH  
**94.61**  
APP.NO. 260310627277

ABHINAVA B G  
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ABHILASH M REDDY C  
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APP.NO. 260310586338

K DYUTHIDHAR  
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GAGAN S GOWDA  
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APP.NO. 260310898333

NOOR ADIBA  
**94.07**  
APP.NO. 260310867994

SANDEEP REDDY  
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KRUTHIKA N  
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ROHITH A C  
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NIKHIL B V  
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ROHITH V  
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HARSHA VARDAN REDDY N  
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T L SHILPA  
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KRISHNA PRASAD D M  
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VISHRUTH R P  
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SHAIKSHA REDDY K  
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RAHUL T L  
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TEJAS GOWDA H E  
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NITHIN K M  
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ROHIT DASHARATH MOLE  
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ABHISHEK KARDI  
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VIDHYA SHREE H R  
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SOUMYAMANI P L  
**90.94**  
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18. Match the following Maxwell's equations:  
(The symbols used here have their usual meanings)

	List-I		List-II
(a)	Gauss' law for electrostatics	(i)	$\oint \vec{E} \cdot d\vec{A} = \frac{Q}{\epsilon_0}$
(b)	Gauss' law for magnetism	(ii)	$\oint \vec{B} \cdot d\vec{l} = \mu_0 \left[ i_c + \epsilon_0 \frac{d\phi_E}{dt} \right]$
(c)	Faraday's law	(iii)	$\oint \vec{B} \cdot d\vec{A} = 0$
(d)	Ampere-Maxwell's law	(iv)	$\oint \vec{E} \cdot d\vec{l} = -\frac{d\phi_B}{dt}$

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

**Ans. 1**

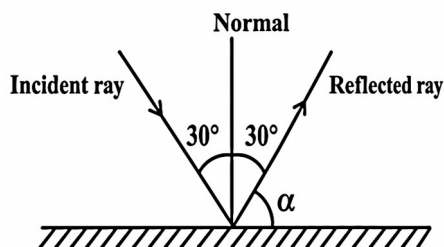
**Sol.** Gauss' law for electrostatics  $\rightarrow \oint \vec{E} \cdot d\vec{A} = \frac{Q}{\epsilon_0}$

Gauss' law for magnetism  $\rightarrow \oint \vec{B} \cdot d\vec{A} = 0$

Faraday's law  $\rightarrow \oint \vec{E} \cdot d\vec{l} = -\frac{d\phi_B}{dt}$

Ampere-Maxwell's law  $\rightarrow \oint \vec{B} \cdot d\vec{l} = \mu_0 \left[ i_c + \epsilon_0 \frac{d\phi_E}{dt} \right]$

19. With reference to the figure shown below, match the following:



	List-I		List-II
(a)	Angle of reflection	(i)	$60^\circ$
(b)	Value of $\alpha$	(ii)	$120^\circ$
(c)	Angle of deviation	(iii)	$30^\circ$

- 1) a-i, b-ii, c-iii      2) a - ii, b - i, c - iii  
 3) a-iii, b - i, c-ii      4) a - iii, b - ii, c - i

**Ans. 3**

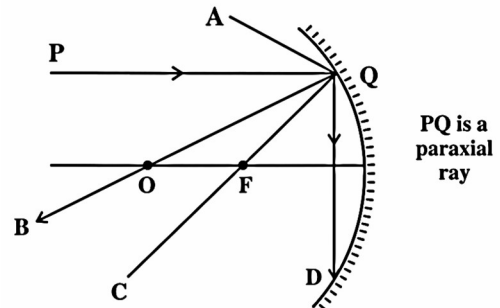
**Sol.** According to laws of reflection

$$\angle i = \angle r = 30^\circ$$

$$\alpha = 90 - r = 90 - 30 = 60^\circ$$

$$d = 180 - 2i = 180 - 60 = 120^\circ$$

20. The direction of a ray of light incident on a concave mirror is shown by PQ, while direction in which the ray would travel after reflection is shown by four rays marked as A, B, C and D as shown in the figure. Which of the four rays correctly shows the direction of the reflected ray?



- 1) D      2) C      3) B      4) A

**Ans. 2**

**Sol.** When the incident ray is parallel to the principle axis (i.e object is at  $\infty$ ) Then the reflected ray passes through the focus of the mirror.

21. The **incorrect** statement about refractive index for a pair of media is

- 1) It depends upon nature of the first medium,  
 2) It depends upon nature of the second medium.  
 3) It depends upon wavelength of light  
 4) It depends upon angle of incidence

**Ans. 4**

**Sol.** Conceptual

22. The critical angle for a monochromatic light going from medium A to medium B is  $\theta$ . If the speed of light in medium A is V, then the speed of light in medium B is

- 1)  $V(1 - \cos\theta)$       2)  $\frac{V}{\cos\theta}$   
 3)  $\frac{V}{\sin\theta}$       4)  $V(1 - \sin\theta)$

**Ans. 3**

**Sol.** According to Snell's law

$$\mu_A \sin \theta = \mu_B \sin 90^\circ$$

$$\Rightarrow \sin \theta = \frac{\mu_B}{\mu_A} = \frac{V_A}{V_B} = \frac{V}{V_B} \left( \because \mu \propto \frac{1}{V} \right)$$

$$\therefore V_B = \frac{V}{\sin \theta}$$

23. What range of electromagnetic spectrum is considered as light?  
 1) 1 mm to 700 nm    2) 400 nm to 1 nm  
 3) 400 nm to 700 nm    4) 1 nm to  $10^{-3}$  nm

**Ans. 3**

**Sol.** Conceptual (Visible light wave length range is 400 nm to 700 nm)

24. In Young's double slit experiment, how many maxima can be seen on a screen (including central maxima) if  $d = \frac{5\lambda}{2}$  (where  $\lambda$  is wavelength of light and d is distance between the two slits).

- 1) 5                    2) 4                    3) 7                    4) 1

**Ans. 1**

**Sol.** No of maxima =  $2[n] + 1$

$$\text{Here } n = \frac{d}{\lambda} = \frac{5\lambda/2}{\lambda} = \frac{5}{2} = 2.5$$

$$[n] = [2.5] = 2$$

$$\text{No. of maxima} = 2(2) + 1 = 5$$

25. The radius of first orbit in hydrogen atom is  $5.3 \times 10^{-11}$  m. The kinetic energy  $E_K$ , potential energy  $E_P$  and total energy  $E_T$  of electron in first orbit are

1)  $E_K = -13.6\text{eV}$ ,  $E_P = 27.2\text{eV}$ ,  $E_T = 13.6\text{eV}$

2)  $E_K = 13.6\text{eV}$ ,  $E_P = -27.2\text{eV}$ ,  $E_T = -13.6\text{eV}$

3)  $E_K = -27.2\text{eV}$ ,  $E_P = -13.6\text{eV}$ ,  $E_T = 13.6\text{eV}$

4)  $E_K = 13.6\text{eV}$ ,  $E_P = -6.8\text{eV}$ ,  $E_T = -13.6\text{eV}$

**Ans. 2**

**Sol.**

$$\text{PE } U = -\frac{Ze^2}{4\pi\epsilon_0 r} \text{ in J} = -\frac{Ze^2}{4\pi\epsilon_0 r (1.6 \times 10^{-19})} \text{ in eV}$$

$$U = -27.2\text{eV}$$

$$U : K : E = -2 : 1 : -1$$

$$= -27.2 : 13.6 : -13.6$$

26. Bohr's second postulate implies quantisation of

- 1) Charge of an electron  
 2) Energy of an electron  
 3) Angular momentum of electron  
 4) Radiated energy by an electron

**Ans. 3**

**Sol.** Boh's second postulate follows Quantisation of Angular momentum of electron

27. An electron transition takes place from excited state to ground state in hydrogen atom, then  
 1) Its kinetic energy increases but potential energy and total energy decrease  
 2) Its kinetic energy, potential energy and total energy decrease  
 3) Kinetic energy decreases, potential energy increases but total energy remains same  
 4) Kinetic energy and total energy decrease but potential energy increases

**Ans. 1**

**Sol.** When electron jumps for excited state to ground state then r decreases

$$\uparrow \text{K.E} \propto \frac{1}{r \downarrow}, \text{P.E} \propto -\frac{1}{r}, \text{T.E} \propto -\frac{1}{r}$$

K.E increases, PE decreases, TE decreases

28. An n-type and p-type semiconductor can be obtained by respectively doping pure silicon with

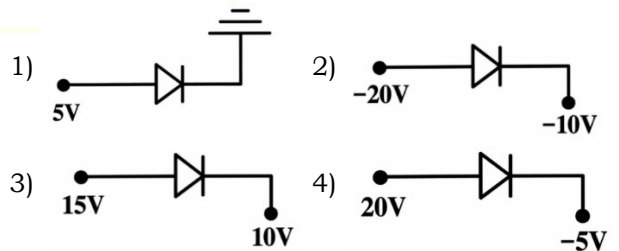
- 1) Arsenic and Phosphorous respectively  
 2) Indium and Aluminium respectively  
 3) Phosphorous and Indium respectively  
 4) Aluminium and Boron respectively

**Ans. 3**

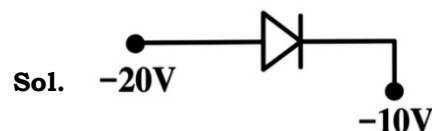
**Sol.** n-type semi conductor : pentavalent impurity added (Phosphorous)

p-type semi conductor : trivalent impurity added (Indium)

29. In which of the following figures, diode is reverse biased?



**Ans. 2**



**Sol.**

N type = Higher potential

P type = lower potential

Hence Reverse bias condition



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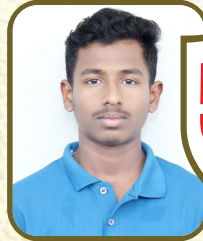
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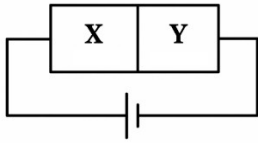
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30. A wafer of pure germanium crystal has two parts X and Y. The end X is obtained by doping with arsenic and Y with indium. It is connected to a battery as shown in the figure. Which of the following statements is correct?



- 1) X is p-type, Y is n-type and the junction is forward biased
- 2) X is n-type, Y is p-type and the junction is forward biased
- 3) X is p-type, Y is n-type and the junction is reverse biased
- 4) X is n-type, Y is p-type and the junction is reverse biased

**Ans. 4**

**Sol.** x = n type (Arsenic 5<sup>th</sup> group element )

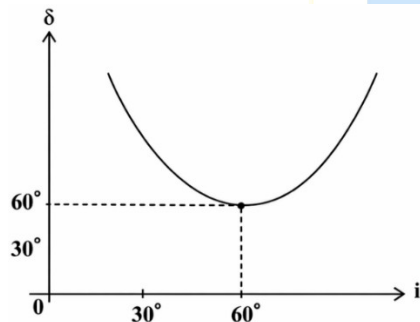
y = p type (Indium 3<sup>rd</sup> group element)

N type connected to positive terminal of battery

P Type connected to negative terminal of battery

Hence Reverse bias condition

31. From the graph of angle of deviation versus angle of incidence for an equilateral prism, the refractive index of material of prism is



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

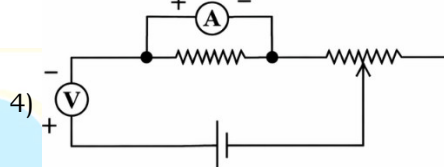
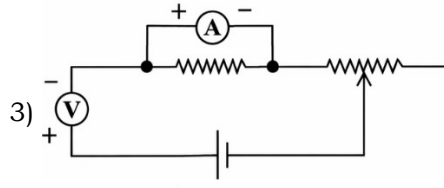
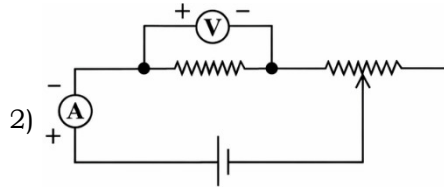
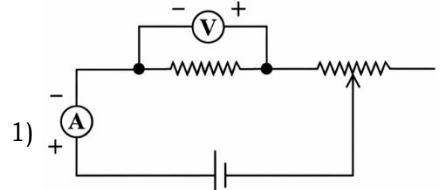
**Ans. 3**

**Sol.** 
$$\mu = \frac{\sin \left[ \frac{A + \delta_m}{2} \right]}{\sin \frac{A}{2}}$$

$$\mu = \frac{\sin \left[ \frac{60 + 60}{2} \right]}{\sin 30}$$

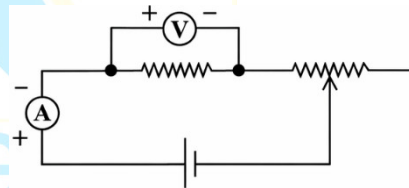
$$\mu = \frac{\sqrt{3}}{\frac{1}{2}} = \sqrt{3}$$

32. Which of the following circuits is correct for verification of Ohm's law?



**Ans. 2**

**Sol.** Voltmeter should be in parallel and ammeter should be in series



33. Match the physical quantities given in List-I with dimensions expressed in terms of mass (M), length (L), time (T) and electric current (A) given in List-II.

List-I	List-II
(a) Torque	(i) $[M^{-1}L^{-2}T^4A^2]$
(b) Gravitational constant	(ii) $[M^1 L^2 T^{-1}]$
(c) Capacitance	(iii) $[M^{-1}L^3T^{-2}]$
(d) Planck's constant	(iv) $[M^1 L^2 T^{-2}]$

Codes:

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

**Ans. 2**

**Sol.** Torque = Force  $\times$  Perpendicular distance  
 $= MLT^{-2} \times L = ML^2T^{-2}$

$$\text{Gravitational constant } G = \frac{Fr^2}{m_1m_2} = \frac{MLT^{-2}L^2}{M^2} = M^{-1}L^3T^{-2}$$

$$\text{Capacitance } C = \frac{Q}{V} = \frac{Q^2}{W} = \frac{(AT)^2}{W} = \frac{A^2T^2}{ML^2T^{-2}} = M^{-1}L^{-2}T^{-4}A^2$$

$$\text{Planck's constant } h = \frac{E}{\nu} = \frac{ML^2T^{-2}}{1/T} = ML^2T^{-1}$$

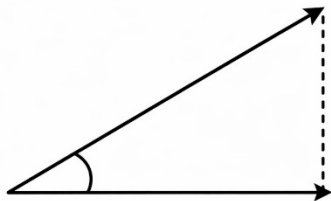
**34.** A car covers the first half of the distance between two places at 40 km/h and another half at 50 km/h. The average speed of the car is

- 1) 45.00 km/h                      2) 44.44 km/h  
 3) 43.14 km/h                      4) 42.04 km/h

**Ans. 2**

$$\text{Sol. } V_{\text{avg}} = \frac{2V_1V_2}{V_1 + V_2} = \frac{2 \times 40 \times 50}{40 + 50} = \frac{2 \times 40 \times 50}{90} = 44.44 \text{ kmph}$$

**35.** Two bodies are projected with the same velocity. If one is projected at an angle of  $30^\circ$  and the other at  $45^\circ$  to the horizontal, then the ratio of maximum heights attained is



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

**Ans. 2**

$$\text{Sol. } H_{\text{max}} = \frac{u^2 \sin^2 \theta}{2g}$$

$$\frac{H_1}{H_2} = \frac{\sin^2 \theta_1}{\sin^2 \theta_2} = \frac{\sin^2 30^\circ}{\sin^2 45^\circ} = \frac{1}{2} = 1:2$$

**36.** The velocity of a particle moving along x-axis is given as  $V = x^2 - 5x + 4$  (in m/s) where x denotes the x-coordinate of the particle in metres. The magnitude of the acceleration of the particle when the velocity of the particle zero is

- 1) 2 m/s<sup>2</sup>    2) 3 m/s<sup>2</sup>    3) Zero                      4) 1 m/s<sup>2</sup>

**Ans. 3**

$$\text{Sol. } V = x^2 - 5x + 4$$

$$a = \frac{dv}{dt} = 2x \frac{dx}{dt} - \frac{5dx}{dt} = 2xv - 5v = 0 \quad (\because v = 0)$$

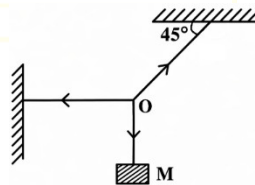
**37.** A man weighs 80 kg. He stands on a weighing scale in a lift which is moving upwards with a uniform acceleration of 6 m/s<sup>2</sup>. What would be his weight in kg? ( $g = 10 \text{ m/s}^2$ )

- 1) Zero                      2) 48 kg                      3) 120 kg                      4) 128 kg

**Ans. 4**

$$\text{Sol. } R = m(g + a) = mg \left( 1 + \frac{a}{g} \right) = 80 \left( 1 + \frac{6}{10} \right) = 128 \text{ kg wt}$$

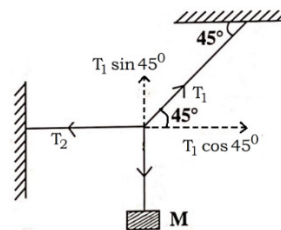
**38.** A mass M is hung with a light inextensible string as shown in figure. Find the tension of the horizontal string.



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

**Ans. 3**

**Sol.**



$$T_1 \sin 45^\circ = Mg \dots (i)$$

$$T_1 \cos 45^\circ = T_2 \dots (ii)$$

$$\frac{(i)}{(ii)} \Rightarrow T_2 = Mg$$

39. Two bodies with kinetic energies in the ratio of 3 : 1 are moving with equal linear momentum. The ratio of their masses is  
 1) 1:4    2) 1:3    3) 1:2    4) 1:1

Ans. 2

Sol.  $K = \frac{p^2}{2m}$   
 $m \propto \frac{1}{k} \Rightarrow \frac{m_1}{m_2} = \frac{k_2}{k_1} = \frac{1}{3}$

40. A horizontal force of 5N is applied on a stationary body of mass 5 kg, which is initially at rest on a frictionless table. The change in kinetic energy of the body in 10s is  
 1) 25 J    2) Zero    3) 125 J    4) 250 J

Ans. 4

Sol.  $F=ma$   
 $a = \frac{F}{m} = \frac{5}{5} = 1 \text{ m/s}^2$   
 $v = u + at = 0 + 1 \times 10$   
 $v = 10 \text{ m/s}$   
 $w = \Delta k = \frac{1}{2}mv^2 - \frac{1}{2}mu^2$   
 $\Delta k = \frac{1}{2} \times 5 \times 10^2 - 0$   
 $\Delta k = 250 \text{ J}$

41. The angular momentum of a moving body remains constant, if  
 1) net external force is applied  
 2) net pressure is applied  
 3) net external torque is applied  
 4) net external torque is not applied

Ans. 4

Sol.  $\tau_{\text{ext}} = \frac{dL}{dt}$   
 If  $\tau_{\text{ext}} = 0$   
 $L = \text{Constant}$

42. If the earth were to suddenly contract to half of its present radius, what would be the duration of the day?  
 1) 6 h    2) 18 h    3) 24 h    4) 30 h

Ans. 1

Sol.  $R' = \frac{R_E}{2}$   
 According to conservation of angular momentum  
 $I\omega = \text{constant}$   
 $I \propto R^2, \omega \propto \frac{1}{T}$   
 $\therefore T \propto R^2 \Rightarrow T' = 6h$

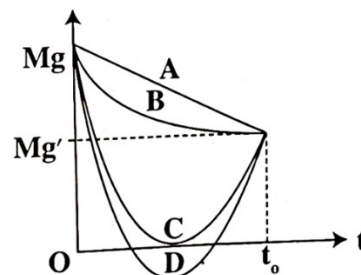
43. Imagine a new planet having the same density as that of the earth, but it is two times bigger than the earth in size. If the acceleration due to gravity on the surface of the earth is  $g$  and that on the surface of the new planet is  $g'$ , then

1)  $g' = \frac{g}{4}$     2)  $g' = 8g$     3)  $g' = 2g$     4)  $g' = 4g$

Ans. 3

Sol.  $R_P = 2R_E$   
 $\rho_P = \rho_E$   
 $g = G\rho \frac{4}{3}\pi R$   
 $g \propto R$   
 $g_P = 2g_E$

44. Suppose the acceleration due to gravity at the earth's surface is  $g \text{ m/s}^2$  and at the surface of moon it is  $g' \text{ m/s}^2$ . An  $M \text{ kg}$  passenger goes from the earth to the moon in a spaceship moving with a constant velocity (Neglect all other objects in the sky). Which curve best represents the weight (net gravitational force) as a function of time?



- 1) A    2) B    3) C    4) D

Ans. 3

Sol. While moving from earth surface to moon at neutral point net gravitational force is zero and reach to moon surface  
 At point C weight of the passenger = 0



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45. Instrument fitted in the carburetor of the automobile to provide the correct mixture of air and fuel necessary for combustion works on

- 1) Pascal's Law
- 2) Bernoulli's Principle
- 3) Newton's Law of Cooling
- 4) Archimede's Principle

**Ans. 2**

**Sol.** Conceptual

46. There are two wires of same material and same length while the diameter of second wire is two times the diameter of the first wire. Then the ratio of extensions produced in the wires by applying same load will be

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

**Ans. 4**

**Sol.**  $Y = \frac{F}{A} \cdot \frac{L}{\Delta L}$

$$e = \Delta L = \frac{F L}{\pi r^2 Y}$$

$$\frac{e_1}{e_2} = \frac{r_2^2}{r_1^2} = \frac{(2r_1)^2}{r_1^2} = 4$$

47. In a capillary tube experiment, a vertical 30 cm long capillary tube is dipped in water, water rises upto a height of 10 cm due to capillarity. If this experiment is conducted in a freely falling water in an elevator, then the length of the water column becomes

- 1) 10 cm
- 2) 20 cm
- 3) 30 cm
- 4) Zero

**Ans. 3**

**Sol.**  $T = \frac{r \cdot h \cdot d \cdot g}{2 \cos \theta}$

$$h \cdot g = \text{constant}$$

$$h_1 g_1 = h_2 \cdot g_2$$

$$30 \cdot g = h_2 (g - g)$$

$$h_2 = \infty$$

So, liquid rises to the full length of capillary tube i.e 30 cm.

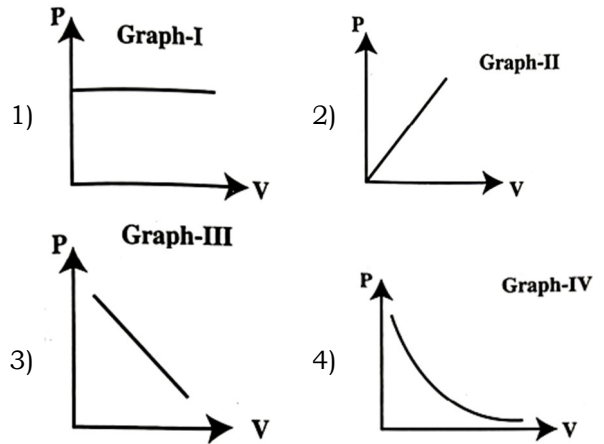
48. In thermodynamic processes, which of the following statements is not true?

- 1) In an isothermal process, the temperature remains constant
- 2) In an isobaric process, the volume remains constant
- 3) In an adiabatic process, the system is insulated from the surroundings
- 4) In an adiabatic process,  $PV^\gamma = a$  constant

**Ans. 2**

**Sol.** In isobaric process pressure remains constant.

49. The graph of pressure P and volume V of 1 mole of an ideal gas at constant temperature is



**Ans. 4**

**Sol.** From Boyles law  $P \propto \frac{1}{V}$

P-V graph is rectangular hyperbola

50. A mass of 1 kg is executing SHM. Its displacement is given by  $x = 6.0 \cos(100t + \pi/4)$  cm. What is the maximum kinetic energy?

- 1) 3 J
- 2) 6 J
- 3) 9 J
- 4) 18 J

**Ans. 4**

**Sol.** Given  $m = 1$  kg  $x = 6 \cos\left(100t + \frac{\pi}{4}\right)$  cm

We have Amplitude  $A = 6$  cm

Angular frequency  $\omega = 100$  rad / s

Maximum kinetic energy  $KE_{\max} = \frac{1}{2} m \omega^2 A^2$

$$KE_{\max} = \frac{1}{2} \times 1 \times (100)^2 \times (6 \times 10^{-2})^2$$

$$= \frac{1}{2} \times 10^4 \times 36 \times 10^{-4}$$

$$= 18 \text{ J}$$

51. A source of frequency  $\nu$  gives 6 beats/second when sounded with a source of frequency 200 Hz. The second Harmonic of frequency  $2\nu$  of the source gives 8 beats/second when sounded with a source of frequency 420 Hz. The value of  $\nu$  is

- 1) 205 Hz
- 2) 206 Hz
- 3) 195 Hz
- 4) 210 Hz

**Ans. 2**



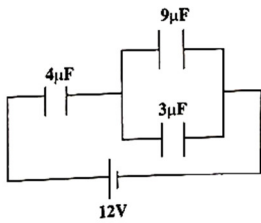
56. A parallel plate capacitor has a uniform electric field 'E' in the space between the plates. If the distance between the plates is 'd' and area of each plate is 'A', the energy stored in the capacitor is

- 1)  $\frac{1}{2} \epsilon_0 E^2$                       2)  $\epsilon_0 Ead$   
 3)  $\frac{1}{2} \epsilon_0 E^2 Ad$                       4)  $\frac{E^2 Ad}{\epsilon_0}$

**Ans. 3**

**Sol.**  $\frac{U}{V} = \frac{1}{2} \epsilon_0 E^2$   
 $U = \frac{1}{2} \epsilon_0 E^2 V = \frac{1}{2} \epsilon_0 E^2 Ad$

57. In the circuit shown in the figure, the potential difference across the  $4\mu F$  capacitor is



- 1) 3 V      2) 4 V      3) 9 V      4) 12 V

**Ans. 3**

**Sol.**  $9\mu F$  and  $3\mu F$  are parallel  
 Their effective capacity =  $9 + 3 = 12\mu F$   
 Now  $4\mu F$  and  $12\mu F$  are in series  
 Effective capacitance of circuit  
 $C_{\text{effective}} = \frac{4 \times 12}{4 + 12} = 3\mu F$   
 Total charge flowing through  $4\mu F$   
 $Q = C_{\text{effective}} \times V_{\text{total}}$   
 $= 3 \times 12 = 36\mu C$   
 Potential difference across  $4\mu F$  is  
 $V = \frac{Q}{C} = \frac{36}{4} = 9V$

58. An electric dipole of dipole moment  $\vec{P}$  is placed in the uniform electric field  $\vec{E}$ . Then which of the following statements are correct?

- Statement-I:** The torque on the dipole is  $\vec{P} \times \vec{E}$   
**Statement-II:** The potential energy of the dipole is  $-\vec{P} \cdot \vec{E}$   
**Statement-III:** The net force on the dipole is non-zero.

- 1) I, II and III                      2) I and II only  
 3) II and III only                      4) I and III only

**Ans. 2**

**Sol.** Dipole placed in uniform field  
 Torque on dipole  $\vec{\tau} = \vec{p} \times \vec{E}$   
 Potential energy of dipole  $U = -\vec{p} \cdot \vec{E}$   
 Net force on dipole  $F_{\text{net}} = 0$

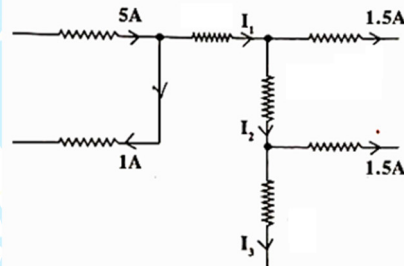
59. A 200 J of work is done in moving a charge 5 C from a point A where the potential is -20 V to another point B where potential is V volt. The value of V at B is

- 1) 10 V      2) 20 V      3) 40 V      4) 60 V

**Ans. 2**

**Sol.**  $V_A = -20V$                        $V_B = V$   
 $W_{AB} = q[V_B - V_A]$   
 $200 = 5[V_B - (-20)]$   
 $200 = 5[V_B + 20]$   
 $V_B + 20 = 40$   
 $\Rightarrow V_B = 40 - 20 = 20V$

60. In the figure, the values of currents  $I_1, I_2$  and  $I_3$  respectively are



- 1) 6 A, 1.5 A and 1 A  
 2) 4 A, 2.5 A and 2 A  
 3) 4 A, 2.5 A and 1 A  
 4) 6A, 4.5 A and 1.5 A

**Ans. 3**

**Sol.** From Kirchhoff's junction law  
 $I_1 = 5 - 1 = 4A$   
 $I_2 = 4 - 1.5 = 2.5A$   
 $I_3 = 2.5 - 1.5 = 1A$

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 <b>98.81</b> TEJAS KENCHAPPA	 <b>98.10</b> REDDY SRIHARI V	 <b>97.75</b> MANOJ H	 <b>97.34</b> PAVAN R	 <b>97.21</b> AKASH J	 <b>96.43</b> P SANJANA SHREE
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## JEE MAIN - 2025 ACHIEVERS

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Cheemasandra, Avalahalli South, Hoskote - 560049  
LTM GIRLS CAMPUS :- 1st Main Road,  
Beside Adithya PU College,  
4th Cross, TG Extension, Hoskote.  
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