



# SRI CHAITANYA STUDENTS BREAK ALL THE RECORDS IN NEET 2024

**11 STUDENTS SCORING 715 MARKS & ABOVE OUT OF 720 MARKS**

ALL INDIA  
RANK

ALL INDIA  
OPEN CATEGORY  
RANK

**720**  
**720**  
MARKS

**AIR**

IRAM QUAZI | Appl. No. 24041319060\*

 <b>715</b> <b>720</b> MARKS AADARSH SINGH MOYAL H.T.No. 24041018555	 <b>715</b> <b>720</b> MARKS ISHA KOTHARI H.T.No. 240410220941	 <b>715</b> <b>720</b> MARKS GATTU BHANUTEJA SAI H.T.No. 240410255320	 <b>715</b> <b>720</b> MARKS KALYAN V H.T.No. 24041031464	 <b>715</b> <b>720</b> MARKS DARSH PAGHDAR H.T.No. 24041025768
 <b>715</b> <b>720</b> MARKS AMINA ARIF KADIWALA H.T.No. 24041032313	 <b>715</b> <b>720</b> MARKS P. PAVAN KUMAR REDDY H.T.No. 24041171922	 <b>715</b> <b>720</b> MARKS V. MUKHESH CHOWDARY H.T.No. 24041131302	 <b>715</b> <b>720</b> MARKS UJJWAL KUMAR H.T.No. 240410577616	 <b>715</b> <b>720</b> MARKS ADI SETHI H.T.No. 24041058688

**32 students scored 710 marks and above out of 720 marks in All India Open Category**

 <b>716</b> <b>720</b> MARKS PRATYUSH MALAV APPL. NO. 240410146718*	 <b>715</b> <b>720</b> MARKS GVENKATA NRIPESH APPL. NO. 24041007107	 <b>715</b> <b>720</b> MARKS Y RESHMA NYSHITHA APPL. NO. 24041019984	 <b>715</b> <b>720</b> MARKS SURYANDEEP P APPL. NO. 240410384546*	 <b>715</b> <b>720</b> MARKS V SNEHA SWARNIMA APPL. NO. 240410043051	 <b>715</b> <b>720</b> MARKS UDAY KIRAR APPL. NO. 240410101720*	 <b>715</b> <b>720</b> MARKS V SNEHA SWARNIMA APPL. NO. 240410043051
 <b>715</b> <b>720</b> MARKS DRON JAIN APPL. NO. 240410107006*	 <b>715</b> <b>720</b> MARKS GORANTLA LAASYA APPL. NO. 240410234696	 <b>715</b> <b>720</b> MARKS M DINESH BAJAJ APPL. NO. 240410568263*	 <b>715</b> <b>720</b> MARKS PRATHAM BUDHWAR APPL. NO. 240410001078*	 <b>715</b> <b>720</b> MARKS CH SAIPRANAV APPL. NO. 240410093134	 <b>715</b> <b>720</b> MARKS SANVI JAIN APPL. NO. 240410422262*	 <b>715</b> <b>720</b> MARKS TOSHIK JAIN APPL. NO. 3902030417715*
 <b>715</b> <b>720</b> MARKS OM VATS APPL. NO. 240410500332	 <b>715</b> <b>720</b> MARKS UJJWAL KUMAR APPL. NO. 240410577616*	 <b>715</b> <b>720</b> MARKS SIRIGIRI MOKSHASRI APPL. NO. 240410626824	 <b>715</b> <b>720</b> MARKS R BHAVITHA APPL. NO. 240410281775	 <b>715</b> <b>720</b> MARKS NEHAL H PRASANNA APPL. NO. 240410344686	 <b>715</b> <b>720</b> MARKS P MEHARBABA ROHITHA APPL. NO. 240410355154	 <b>715</b> <b>720</b> MARKS ANADI SETHI APPL. NO. 240410586888*

We have  
**93**  
Students  
who scored  
**700**  
marks and above

We have  
**664**  
Students  
who scored  
**650**  
marks and above

We have  
**1777**  
Students  
who scored  
**600**  
marks and above

BELOW 100  
ALL INDIA  
RANKS COUNT  
**8**  
RANKS

BELOW 200  
ALL INDIA  
RANKS COUNT  
**16**  
RANKS

BELOW 500  
ALL INDIA  
RANKS COUNT  
**39**  
RANKS

BELOW 1000  
ALL INDIA  
RANKS COUNT  
**62**  
RANKS

Sri Chaitanya  
Ranks in NEET 2024 **22,000<sup>+</sup>**

Sri Chaitanya students  
who can get medical seats **9,512<sup>+</sup>**

# **Sri Chaitanya**

## **ACADEMY**

**NEET – 2025 (Code – 48)**

**Topic wise Distribution**

**Grade – 11\_PHYSICS**

<b>S.No.</b>	<b>Chapter Name</b>	<b>No. of Questions</b>
1	Basic Maths	0
2	Units and Measurements	2
3	Motion in a straight line	2
4	Motion in a Plane	0
5	Laws of Motion	3
6	Work, Energy and Power	3
7	System of Particles and Rotational Motion	1
8	Gravitation	2
9	Mechanical Properties of Solids	0
10	Mechanical Properties of Fluids	1
11	Thermal Properties of Matter	2
12	Thermodynamics	1
13	Kinetic Theory	1
14	Oscillations	2
15	Waves	1

# Sri Chaitanya

## ACADEMY

### Grade – 12\_PHYSICS

S.No.	Chapter Name	No. of Questions
1	Electric Charges & Fields	1
2	Electrostatic Potential & Capacitance	2
3	Current Electricity	3
4	Moving Charges and Magnetism	3
5	Magnetism and Matter	0
6	Electromagnetic Induction	1
7	Alternating Current	1
8	Electromagnetic Waves	2
9	Ray Optics and Optical Instruments	3
10	Wave Optics	2
11	Dual Nature of Radiation and Matter	2
12	Atoms	2
13	Nuclei	0
14	Semiconductor Electronics: Materials, Devices, and Simple Circuits	2
15	Experimental Physics	0



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## ACADEMY

### PHYSICS

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

**Ans: (1)**

2. An electric dipole with dipole moment  $5 \times 10^{-6} \text{ C}\cdot\text{m}$  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  $60^\circ$  with respect to the electric field. The change in the potential energy of the dipole is:

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

**Ans: (4)**

3. A ball of mass 0.5 kg is dropped from a height of 40 m. The ball hits the ground and rises to a height of 10 m. The impulse imparted to the ball during its collision with the ground is

(Take  $g = 9.8 \text{ m/s}^2$ )

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

**Ans: (3)**

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## ACADEMY

4. The intensity of transmitted light when a polaroid sheet, placed between two crossed polaroids at  $22.5^\circ$ , 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)  $\frac{I_0}{8}$
- (2)  $\frac{I_0}{16}$
- (3)  $\frac{I_0}{2}$
- (4)  $\frac{I_0}{4}$

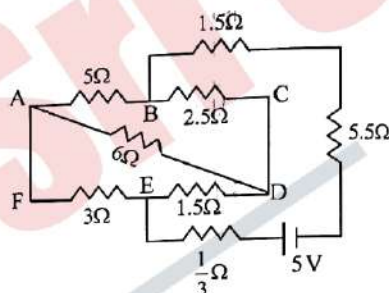
**Ans: (1)**

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 1000 m and car B stops after 1500 m. If  $F_A$  and  $F_R$  are the forces applied by the breaks on cars A and B respectively, then the ratio  $F_A/F_B$  is

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

**Ans: (4)**

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



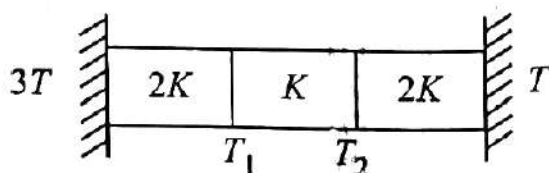
- (1) 2.5 A
- (2) 1.5 A
- (3) 2.0 A
- (4) 0.5 A

**Ans: (4)**

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## ACADEMY

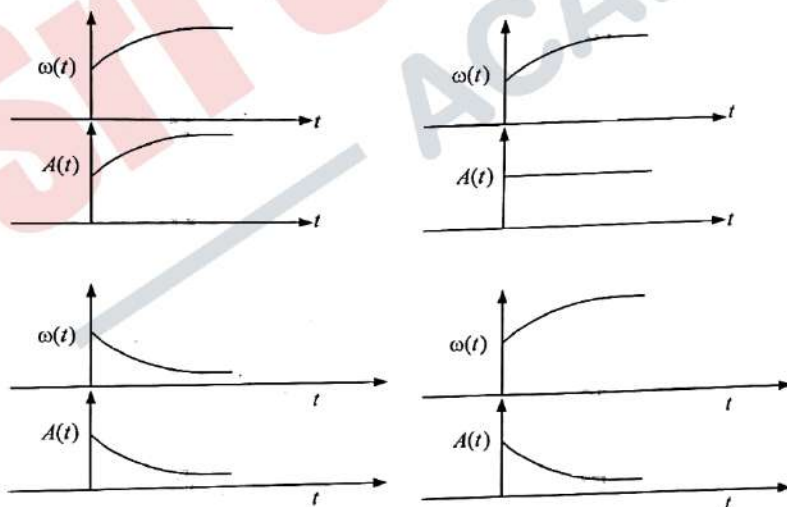
7. Three identical heat conducting rods are connected in series as shown in the figure. The rods on the sides have thermal conductivity  $2K$  while that in the middle has thermal conductivity  $K$ . The left end of the combination is maintained at temperature  $3T$  and the right end at  $T$ . The rods 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  $T_1/T_2$  is



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

**Ans: (1)**

8. 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?



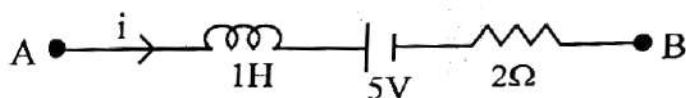
**Ans: (3)**



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## ACADEMY

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



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

**Ans: (2)**

10. 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 of the  $n^{\text{th}}$  orbit and the particle's speed  $v$  in the orbit depend on  $n$  as

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

**Ans: (1)**

11. 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)  $+\frac{2}{(x+1)^3}$
- (2)  $\frac{2}{2x+1}$
- (3)  $-\frac{2}{(x+2)^3}$
- (4)  $\frac{2}{(2x+1)^3}$

**Ans: (4)**

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## ACADEMY

12. 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)  $\frac{heB}{\pi m}$
- (2)  $\frac{heB}{2\pi m}$
- (3)  $\frac{he}{\pi m}$
- (4)  $\frac{he}{2\pi m}$

**Ans: (4)**

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

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

**Ans: (4)**

14. There are two inclined surfaces of equal length ( $L$ ) and same angle of inclination  $45^\circ$  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 ( $\mu_k$ ) between the object and the rough surface is close to

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

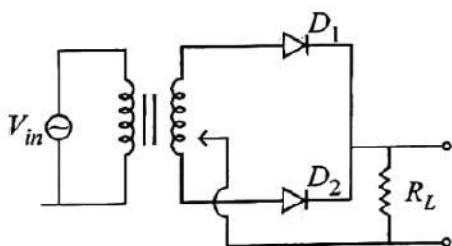
**Ans: (2)**



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## ACADEMY

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



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

**Ans: (4)**

16. A uniform rod of mass 20 kg and length 5 m leans against a smooth vertical wall making an angle of  $60^\circ$  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) 200 N
  - (2)  $200\sqrt{3}$  N
  - (3) 100 N
  - (4)  $100\sqrt{3}$  N

**Ans: (4)**

17. 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)  $\frac{F}{2}$
- (2)  $\frac{3F}{8}$
- (3)  $\frac{3F}{5}$
- (4)  $\frac{2F}{3}$

**Ans: (2)**

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## ACADEMY

18. 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 scooter with a speed of  $60 \text{ km/h}$  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) 10 min,  $90 \text{ km/h}$
- (2) 15 min,  $120 \text{ km/h}$
- (3) 9 min,  $40 \text{ km/h}$
- (4) 25 min,  $100 \text{ km/h}$

**Ans: (2)**

19. A container has two chambers of volumes  $V_1 = 2 \text{ litres}$  and  $V_2 = 3 \text{ litres}$  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  $p_1 = 1 \text{ atm}$  and  $p_2 = 2 \text{ atm}$ , respectively. When the partition is removed, the mixture attains an equilibrium pressure of:

- (1)  $1.4 \text{ atm}$
- (2)  $1.8 \text{ atm}$
- (3)  $1.3 \text{ atm}$
- (4)  $1.6 \text{ atm}$

**Ans: (4)**

20. De Broglie wavelength of an electron orbiting in the  $n = 2$  state of hydrogen atom is close to (Given Bohr radius =  $0.052 \text{ nm}$ )

- (1)  $1.67 \text{ nm}$
- (2)  $2.67 \text{ nm}$
- (3)  $0.067 \text{ nm}$
- (4)  $0.67 \text{ nm}$

**Ans: (4)**

21. To an ac power supply of  $220 \text{ V}$  at  $50 \text{ Hz}$ , a resistor of  $20\Omega$ , a capacitor of reactance  $25\Omega$  and an inductor of reactance  $45\Omega$  are connected in series. The corresponding current in the circuit and the phase angle between the current and the voltage is, respectively –

- (1)  $15.6 \text{ A}$  and  $30^\circ$
- (2)  $15.6 \text{ A}$  and  $45^\circ$

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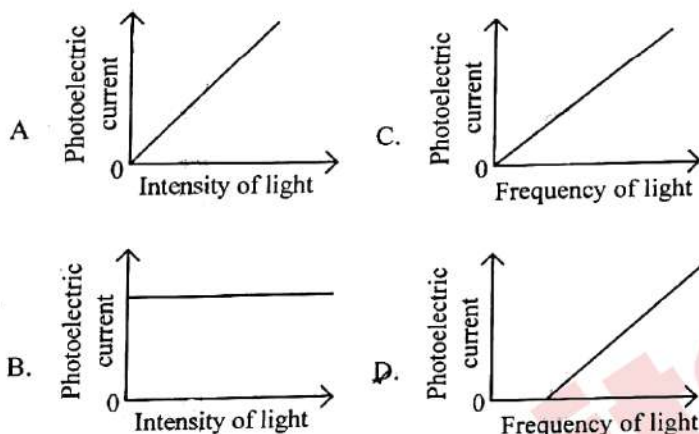
## ACADEMY

(3) 7.8 A and  $30^\circ$

(4) 7.8 A and  $45^\circ$

**Ans: (4)**

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



(1) A and D

(2) B and D

(3) A only

(4) A and C

**Ans: (3)**

23. 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)  $\frac{3f}{2}$

(2)  $2f$

(3)  $\frac{f}{2}$

(4)  $f$

**Ans: (4)**



# Sri Chaitanya

## ACADEMY

24. 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)  $\sqrt{\frac{k_2}{k_1}}$

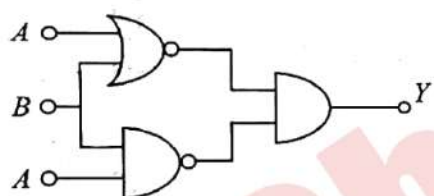
(2)  $\sqrt{\frac{k_1}{k_2}}$

(3)  $\frac{k_2}{k_1}$

(4)  $\frac{k_1}{k_2}$

**Ans: (2)**

25. The output ( $Y$ ) of the given logic implementation is similar to the output of an/a \_\_\_\_\_ gate.



(1) OR

(2) NOR

(3) AND

(4) NAND

**Ans: (2)**

26. 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  $27^\circ\text{C}$ . 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) 0.116 kg

(2) 0.156 kg

(3) 0.125 kg

(4) 0.144 kg

**Ans: (2)**

# Sri Chaitanya

## ACADEMY

27. 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  $m^4$
- (2)  $p^4$  and  $m^4$
- (3)  $4p$  and  $4m$
- (4)  $p^4$  and  $4m$

**Ans: (1)**

28. 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)  $\frac{2}{\sqrt{3}}$
- (2)  $\frac{\sqrt{3}}{2}$
- (3)  $\frac{4}{3}$
- (4)  $\frac{3}{4}$

**Ans: (4)**

29. 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  $\rho$  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  $r^\alpha$  and  $T \propto S^\alpha A^\beta \rho^\gamma R^\delta$  then

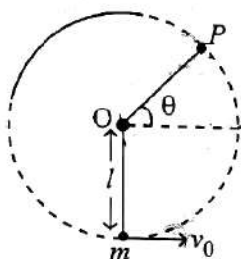
- (1)  $a = -\frac{1}{2}, \alpha = -\frac{1}{2}, \beta = -1, \gamma = \frac{1}{2}, \delta = \frac{7}{2}$
- (2)  $a = \frac{1}{2}, \alpha = \frac{1}{2}, \beta = -\frac{1}{2}, \gamma = \frac{1}{2}, \delta = \frac{7}{2}$
- (3)  $a = \frac{1}{2}, \alpha = \frac{1}{2}, \beta = -1, \gamma = +1, \delta = \frac{3}{2}$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

**Ans: (1)**

# Sri Chaitanya

## ACADEMY

30. 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  $\theta$  from the horizontal the ratio of the speed  $v$  of the bob at point  $P$  to its initial speed ( $v_0$ ) is:



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

(3)  $(\sin \theta)^{1/2}$

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

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

**Ans: (2)**

31. 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%, 2%, 3% and 4% respectively. The percentage error in the quantity  $P$  is

(1) 13%

(2) 15%

(3) 10%

(4) 2%

**Ans: (1)**

32. 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) 115 days

(2) 108 days

(3) 100 days

(4) 105 days

**Ans: (2)**

33. 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 year on Mercury?

(1) 172 earth days



# Sri Chaitanya

## ACADEMY

- (2) 124 earth days  
(3) 88 earth days  
(4) 225 earth days

**Ans: (3)**

34. 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)  $\frac{R}{16}$                       (2)  $\frac{R}{8}$                       (3)  $\frac{R}{64}$                       (4)  $\frac{R}{32}$

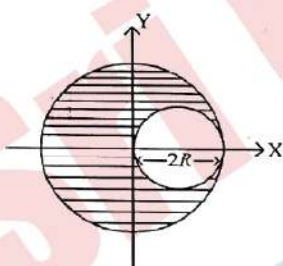
**Ans: (1)**

35. A photon and an 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)  $c\sqrt{\frac{2m}{E}}$                       (2)  $\frac{1}{c}\sqrt{E/2m}$                       (3)  $\sqrt{E/2m}$                       (4)  $c\sqrt{2mE}$

**Ans: (1)**

36. 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)  $\frac{7}{57}$   
(2)  $\frac{7}{64}$   
(3)  $\frac{7}{8}$   
(4)  $\frac{7}{40}$

**Ans: (1)**

# Sri Chaitanya

## ACADEMY

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

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

**Ans: (4)**

38. The electric field in a plane electromagnetic wave is given by  $E_z = 60 \cos(5x + 1.5 \times 10^9 t)$  V/m. Then expression for the corresponding magnetic field is (here subscripts denote the direction of the field) :

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

**Ans: (3)**

39. 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) 32 N
- (2) 36 N
- (3) 16 N
- (4) 27 N

**Ans: (4)**

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

- (1) both reflected and transmitted light are perfectly polarized with angles of reflection and refraction close to  $60^\circ$  and  $30^\circ$ , respectively.
- (2) transmitted light is completely polarized with angle of refraction close to  $30^\circ$
- (3) reflected light is completely polarized and the angle of reflection is close to

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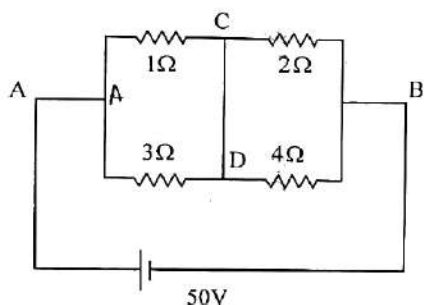
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60°

(4) reflected light is partially polarized and the angle of reflection is close to 30°

**Ans: (3)**

41. 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) 2.5 A  
(2) 3.0 A  
(3) 1.5 A  
(4) 2.0 A

**Ans: (4)**

42. 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 become two times larger than when there is nothing between the plates.

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

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

**Ans: (3)**

43. 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  $x = 0.1$  cm when the jaws of Vernier callipers are closed. If the main scale reading for the diameter is  $M = 5$  cm and the number of coinciding vernier division is 8, the measured diameter after zero error correction, is
- (1) 4.98 cm



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- (2) 5.00 cm
- (3) 5.18 cm
- (4) 5.08 cm

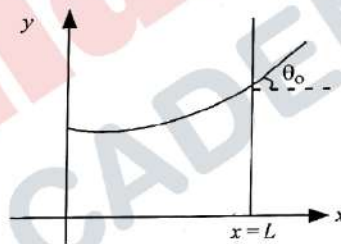
**Ans: (1)**

44. 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) 2 : 1
- (2) 4 : 1
- (3) 1 : 4
- (4) 1 : 2

**Ans: (3)**

45. 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  $\rho$ , the liquid surface makes angle  $\theta_0$  ( $\theta_0 \ll 1$ ) 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)  $\frac{d^2y}{dx^2} = \sqrt{\frac{\rho g}{S}}$
- (2)  $\frac{dy}{dx} = \sqrt{\frac{\rho g}{S}} x$
- (3)  $\frac{d^2y}{dx^2} = \frac{\rho g}{S} x$
- (4)  $\frac{d^2y}{dx^2} = \frac{\rho g}{S} y$

**Ans: (2 or 4)**