



# PHYSICS

## BOOKS - KCET PREVIOUS YEAR PAPERS

### KARNATAKA CET 2006

#### Physics

1. The twinkling effect of star light is due to

A. total internal reflection

B. high dense matter of star

C. constant burning of hydrogen in the  
star

D. the fluctating apparent position of the  
star being slightly different from the  
actual position of the star.

**Answer: C**



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2. The width of the diffraction band varies

A. inversely as the wavelength

B. directly as the width of the slit

C. directly as the distance between the slit  
and the screen

D. inversely as the size of the source from  
which the slit is illuminated.

**Answer: C**



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3. An unpolarised beam of intensity  $I_0$  is incident on a pair of nicols making an angle of  $60^\circ$  with each other. The intensity of light emerging from the pair is

A.  $I_0$

B.  $I_0/2$

C.  $I_0/4$

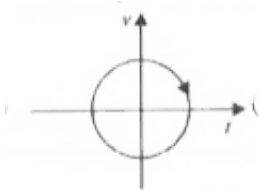
D.  $I_0/8$

**Answer: C**

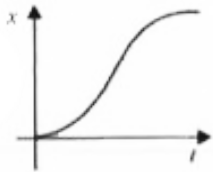


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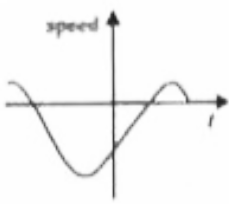
4. Look at the graphs (a) to (d) carefully and indicate which of these possibly represents one dimensional motion of a particle ?



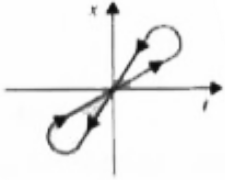
A.



B.



C.



D.

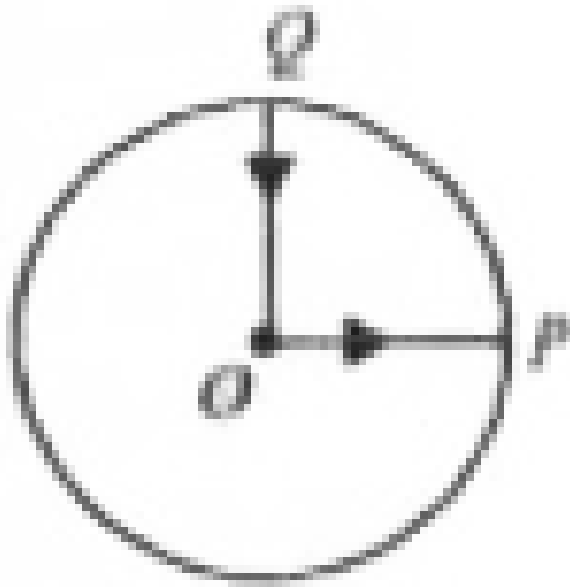
**Answer: B**



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5. A cyclist starts from the centre  $O$  of a circular park of radius one kilometre, reaches the edge  $P$  of the park, then cycles along the

circumference and returns to the centre along QO as shown in the figure. If the round trip takes ten minutes, the net displacement and average speed of the cyclist (in metre and kilometre per hour) is



A. 0, 1

B.  $\frac{\pi + 4}{2}, 0$

C. 21.4,  $\frac{\pi + 4}{2}$

D. 0, 21.4

**Answer: D**



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6. What a low flying aircraft passes over head, we sometimes notice a slight shaking of the picture on our TV screen. This is due to



A. diffraction of the signal received from  
the antenna

B. interference of the direct signal received  
by the antenna with the weak signal  
reflected by the passing aircraft

C. change of magnetic flux occurring due  
to the passage of aircraft

D. vibrations created by the passage of  
aircraft.

**Answer: C**



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7. A beam of light of wavelength 600 nm from a distant source falls on a single slit 1 mm wide and the resulting diffraction pattern is observed on a screen 2m away. The distance between the first dark fringes on either side of the central bright fringe is

A. 1.2 cm

B. 1.2 mm

C. 2.4 cm

D. 2.4 mm

**Answer: D**



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**8.** The physical quantity having the dimensions

$$[M^{-1}L^{-3}T^3A^2] \text{ is}$$

A. resistance

B. resistivity

C. electrical conductivity

D. electromotive force

**Answer: C**



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9. A battery of emf 10 V and internal resistance 3 ohm is connected to a resistor. The current in the circuit is 0.5 A. The terminal voltage of the battery when the circuit is closed is

A. 10 V

B. 0 V

C. 1.5 V

D. 8.5 V

**Answer: D**



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**10.** A galvanometer coil has a resistance of 15 ohm and gives full scale deflection for a current of 4 mA. To convert it to an ammeter of range 0 to 6 A,

- A.  $10m\Omega$  resistance is to be connected in parallel to the galvanometer
- B.  $10m\Omega$  resistance is to be connected in series with the galvanometer
- C.  $0.1\Omega$  resistance is to be connected in parallel to the galvanometer
- D.  $0.1\Omega$  resistance is to be connected in series with the galvanometer.

**Answer: A**



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**11.** The electron drift speed is small and the charge of the electron is also small but still, we obtain large current in a conductor. This is due to

A. the conducting property of the conductor

B. the resistance of the conductor is small

C. the electron number density of the conductor is small

D. the electron number density of the conductor is enormous.

**Answer: D**



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**12.** A straight wire of mass 200 g and length 1.5 m carries a current of 2 A. It is suspended in mid - air by a uniform horizontal magnetic field B. The magnitude of B (in tesla) is (assume  $g = 9.9ms^{-2}$ )



A. 2

B. 1.5

C. 0.55

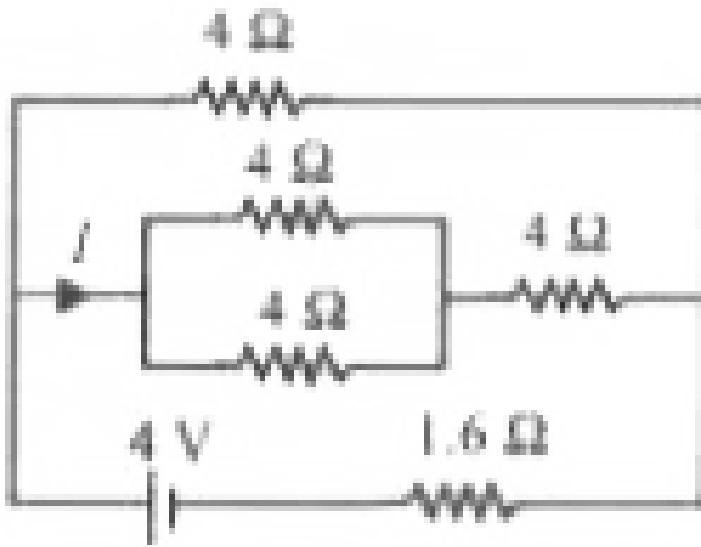
D. 0.66

**Answer: D**



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**13.** If the circuit shown the value of  $I$  in ampere is



- A. 1
- B. 0.60
- C. 0.4
- D. 1.5

**Answer: C**



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14. A gaussian sphere encloses an electric dipole within it. The total flux across the sphere is

A. zero

B. half that due to a single charge

C. double that due to a single charge

D. dependent on the position of the dipole

**Answer: A**



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15. A parallel plate air capacitor has a capacitance  $C$ . When it is half filled with a dielectric of dielectric constant 5, the percentage increase in the capacitance will be

A. 400 %

B. 66.6 %

C. 33.3 %

D. 200 %

**Answer: B**



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**16.** A comb run through one's dry hair attracts small bits of paper. This is due to

A. comb is a good conductor

B. paper is a good conductor

C. the atoms in the paper get polarised by the charged comb

D. the comb possesses magnetic properties.

**Answer: C**



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**17.** The top of the atmosphere is about 400 kV with respect to the surface of earth, corresponding to an electric field that decreases with altitude. Near the surface of earth the field is about  $100 \text{ V m}^{-1}$ , but still

don't get an electric shock, as we set out of  
out houses in to open because (assume the  
house is free from electric field)

A. there is a potential difference between  
our body and the ground

B.  $100V m^{-1}$  is not a high electric field so  
that we do not feel the shock

C. our body and the ground forms an  
equipotential surface

D. the atmosphere is not a conductor.

**Answer: D**



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**18.** The specific charge of a proton is  $9.6 \times 10^7 C/kg$ . The specific charge of an alpha particle will be

A.  $9.6 \times 10^7 Ckg^{-1}$

B.  $19.2 \times 10^7 Ckg^{-1}$

C.  $4.8 \times 10^7 Ckg^{-1}$

D.  $2.4 \times 10^7 Ckg^{-1}$



**Answer: C**



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**19.** When light of wavelength 300 nm falls on a photoelectric emitter, photoelectrons are liberated. For another emitter, light of wavelength 600 nm is sufficient for liberating photoelectrons. The ratio of the work function of the two emitters is

A. 1 : 2

B. 2: 1

C. 4: 1

D. 1: 4

**Answer: B**



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20. White light is passed through a dilute solution of potassium permanganate. The spectrum produced by the emergent light is

- A. band emission spectrum
- B. line emission spectrum
- C. band absorption spectrum
- D. line absorption spectrum

**Answer: A**



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**21.** If  $\lambda_1$  and  $\lambda_2$  are the wavelengths of the first members of the Lyman and Paschen series respectively, then  $\lambda_1 : \lambda_2$  is

A. 1 : 3

B. 1 : 30

C. 7 : 50

D. 7 : 108

**Answer: D**



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**22.** Activity of a radioactive sample decreases to  $(1/3)^{rd}$  of its original value in 3 days. Then, in 9 days its activity will become

A.  $(1/27)$  of the original value

B.  $(1/9)$  of the original value

C.  $(1/18)$  of the original value

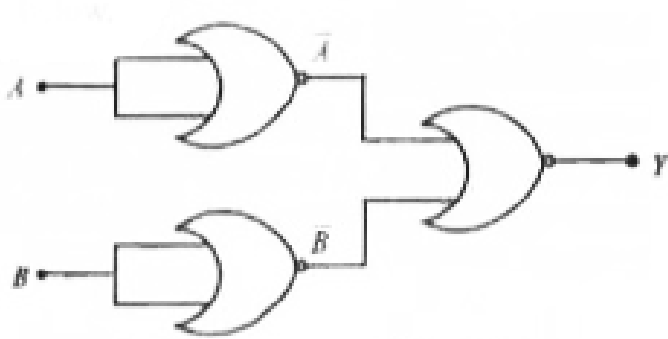
D.  $(1/3)$  of the original value

**Answer: B**



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**23.** Identify the operation performed by the circuit given below.



A. NOT

B. AND

C. OR

D. NAND

**Answer: B**



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24. The working of which of the following is similar to that of a slide projector ?

A. electron microscope

B. scanning electron microscope

C. transmission electron microscope

D. atomic force microscope

**Answer: C**



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25. In a transistor, the collector current is always less than the emitter current because

-

A. collector side is reverse biased and the emitter side is forward biased

B. a few electrons are lost in the base and only remaining ones reach the collector

C. collector being reverse biased, attracts less electrons



D. collector side is forward biased and emitter side is reverse biased.

**Answer: A**



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**26.** A transparent cube of 0.21 m edge contains a small air bubble. Its apparent distance when viewed through one face of the cube is 0.10 m and when viewed from the opposite face is

0.04 m. The actual distance of the bubble from the second face of the cube is

A. 0.06 m

B. 0.17 m

C. 0.05 m

D. 0.04 m

**Answer: B**



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27. White light is incident on one of the refracting surface of a prism of angle  $5^\circ$ . If the refractive indices for red and blue colours are 1.641 and 1.659 respectively, the angular separation between these two colours when they emerge out of the prism is

A.  $0.9^\circ$

B.  $0.09^\circ$

C.  $1.8^\circ$

D.  $1.2^\circ$

**Answer: C**



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**28.** For a given lens, the magnification was found to be twice as large when the object was 0.15 m distance from it as when the distance was 0.2 m. The focal length of the lens is

A. 0.15 m

B. 0.20 m

C. 0.10 m

D. 0.05 m

**Answer: A**



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**29.** To fish under water, viewing obliquely a fisherman standing on bank of a lake the man looks.

A. taller than what he actually is

B. shorter than whatt he actually is

C. the same height as he actually is

D. depends on the obliquity

**Answer: C**



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**30.** A thin prism  $P_1$  with angle  $4^\circ$  and made from a glass of refractive index 1.54 is comined with another thin prism  $P_2$  made from glass of

refractive index 1.72 to produce dispersion without deviation. The angle of the prism  $P_2$  is

A.  $5.33^\circ$

B.  $4^\circ$

C.  $3^\circ$

D.  $2.6^\circ$

**Answer: C**



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**31.** If white light is used in the Newton's rings experiment, the colour observed in the reflected light is complementary to that observed in the transmitted light through the same point. This is due to

A.  $90^\circ$  change of phase in one of the reflected waves

B.  $180^\circ$  change of phase in one of the reflected waves



C.  $145^\circ$  change of phase in one of the reflected waves

D.  $45^\circ$  change of phase in one of the reflected waves.

**Answer: A**



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**32.** Specific rotation of sugar solution is  $0.5 \text{ deg } m^2 / kg.200kgm^{-3}$  of impure sugar solution is taken in a sample polarimeter tube

of length 20 cm and optical rotation is found to be  $19^\circ$ . The percentage of purity of sugar is

A. 20 %

B. 80 %

C. 95 %

D. 89 %

**Answer: A**



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**33.** A simple pendulum has a length  $l$  and the mass of the bob is  $m$ . The bob is given a charge  $q$  coulomb. The pendulum is suspended between the vertical plate of a charged parallel plate capacitor. If  $E$  is the electric field strength between the plates, the time period of the pendulum is given by

A.  $2\pi \sqrt{\frac{l}{g}}$

B.  $2\pi \sqrt{\frac{l}{\sqrt{g + \frac{qE}{m}}}}$

C.  $2\pi \sqrt{\frac{l}{\sqrt{g - \frac{qE}{m}}}}$

$$D. \pi \sqrt{\frac{l}{\sqrt{g^2 + \left(\frac{qE}{m}\right)^2}}}$$

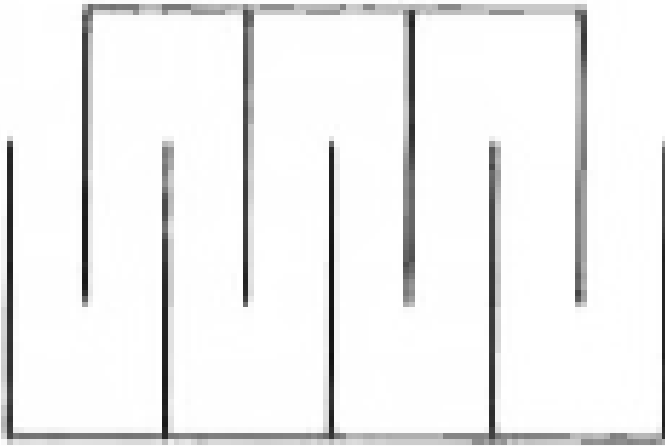
**Answer: D**



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**34.** A gang capacitor is formed by interlocking a number of plates as shown in figure. The distance between the consecutive plates is 0.885 cm and the overlapping area of the

plates is  $5\text{cm}^2$ . The capacity of the unit is



A.  $1.06\text{pF}$

B.  $4\text{pF}$

C.  $6.36\text{pF}$

D.  $12.72\text{pF}$

**Answer: B**



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**35.** A satellite in a circular orbit of radius  $R$  has a period of 4 hours. Another satellite with orbital radius  $3R$  around the same planet will have a period (in hours)

A. 16

B. 4

C.  $4\sqrt{27}$

D.  $4\sqrt{8}$

**Answer: C**



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**36.** The freezer in a refrigerator is located at the top section so that

A. the entire chamber of the refrigerator is cooled quickly due to convection

B. the motor is not heated

C. the heat gained from the environment is

high

D. the heat gained from the environment is

low

**Answer: A**



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**37. Unit of Stefan's constant is**

A.  $W m^{-2} K^{-1}$



B.  $WmK^{-1}$

C.  $Wm^{-2}K^{-4}$

D.  $Nm^{-2}K^4$

**Answer: C**



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**38.** A monoatomic gas is suddenly compressed to  $(1/8)^{th}$  of its initial volume adiabatically. The ratio of its final pressure to the initial

pressure is given the ratio of the specific heat of the given gas to be  $5/3$ ).

A. 32

B.  $40/3$

C.  $24/5$

D. 8

**Answer: A**



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39. A Carnot engine takes heat from a reservoir at  $627^{\circ}C$  and rejects heat to sink at  $27^{\circ}C$ . Its efficiency will be

A.  $3/5$

B.  $1/3$

C.  $2/3$

D.  $200/209$

**Answer: C**



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40. A 30 V, 90 W lamp is to be operated on a 120 V D.C. line. For proper glow, a resistor of ..... ohm should be connected in series with the lamp.

A. 40

B. 10

C. 20

D. 30

**Answer: D**



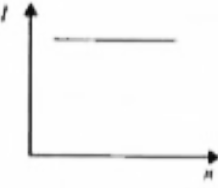
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41. A battery consists of a variable number ( $n$ ) of identical cells, each having an internal resistance  $r$  connected in series. The terminals of the battery are short - circuited. A graph of current ( $I$ ) in the circuit verses the number of cells will be as shown in figure.

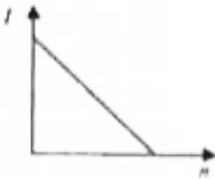




B.



C.



D.

**Answer: C**



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42. A tuning fork A produces 4 beats per second with another tuning fork B of frequency 320 Hz. On filing one of the prongs of A, 4 beats per second are again heard when sounded with the same fork B. Then the frequency of the fork A before filing is

A. 328 Hz

B. 316 Hz

C. 324 Hz

D. 320 Hz

**Answer: B**



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**43.** When the length of the vibrating segment of a sonometer wire is increased by 1%, the percentage change in its frequency is

A.  $\frac{100}{101}$

B.  $\frac{99}{100}$

C. 1

D. 2



**Answer: C**



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**44.** The sprinkling of water reduces slightly the temperature of a closed room because

A. temperature of water is less than that of the room

B. specific heat of water is high

C. water has large latent heat of vaporisation

D. water is a bad conductor of heat

**Answer: C**



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**45.** The equation of a simple harmonic wave is given by  $y = 5\sin\frac{\pi}{2}(100t - x)$  where  $x$  and  $y$  are in metre and time is in second. The period of the wave in second will be

A. 0.04

B. 0.01

C. 1

D. 5

**Answer: A**



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**46.** The loudness and the pitch of a sound depends on

A. intensity and frequency

B. frequency and number of harmonics

C. intensity and velocity

D. frequency and velocity

**Answer: A**



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**47.** For ordinary terrestrial experiments, the observer is an inertial frame in the following cases is

A. a child revolving in a giant wheel

B. a driver in a sports car moving with a constant high speed of  $200 \text{ kmh}^{-1}$  on a straight road

C. the pilot of an aeroplane which is taking off

D. a cyclist negotiating a sharp curve

**Answer: B**



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**48.** A rectangular vessel when full of water takes 10 minutes to be emptied through an orifice in its bottom. How much time will it take to be emptied when half filled with water

A. 9 minutes

B. 7 minutes

C. 5 minutes

D. 3 minutes

**Answer: B**



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**49.** If there were no gravity, which of the following will not be there for a fluid ?

A. viscosity

B. surface tension

C. pressure

D. Archimedes's upward thrust

**Answer: D**



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**50.** In a LCR series circuit, the potential difference between the terminals of the inductance is 60 V, between the terminals of the capacitor is 30 V and that across the resistance is 40 V. Then, the supply voltage will be equal to

A. 50 V

B. 70 V

C. 130 V

D. 10 V



**Answer: A**



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51. A proton and helium nucleus are shot into a magnetic field at right angles to the field with same kinetic energy. Then the ratio of their radii is

- A. both acquire same energy
- B. deuterium accelerates faster
- C. helium accelerates faster

D. neither of them is accelerated

**Answer: D**



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**52.** A solenoid 1.5 m long and 0.4 cm in diameter possesses 10 turns per cm length. A current of 5 A flows through it. The magnetic field at the axis inside the solenoid is

A.  $2\pi \times 10^{-3} T$

B.  $2\pi \times 10^{-5}T$

C.  $4\pi \times 10^{-2}T$

D.  $4\pi \times 10^{-3}T$

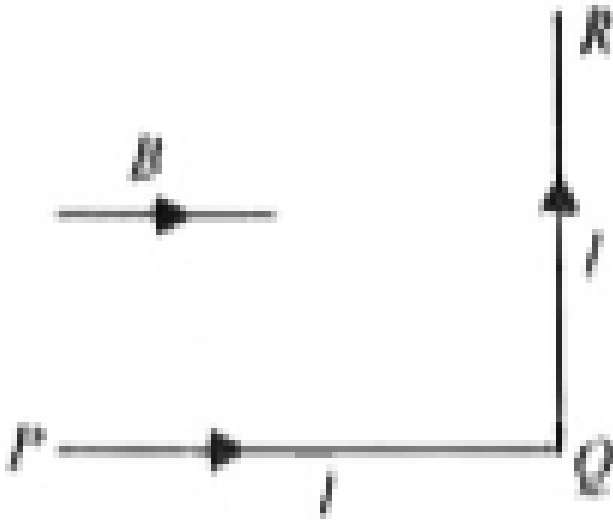
**Answer: A**



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**53.** A wire PQR is bent as shown in figure and is placed in a region of uniform magnetic field B. The length of PQ = QR = l. A current I ampere flows through the wire as shown. The

magnitude of the force on PQ and QR will be



- A.  $Bil, 0$
- B.  $2Bil, 0$
- C.  $0, Bil$
- D.  $0, 0$

**Answer: C**



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**54.** A choke is preferred to a resistance for limiting current in AC circuit because

- A. choke is cheap
- B. there is no wastage of power
- C. choke is compact in size
- D. choke is a good absorber of heat

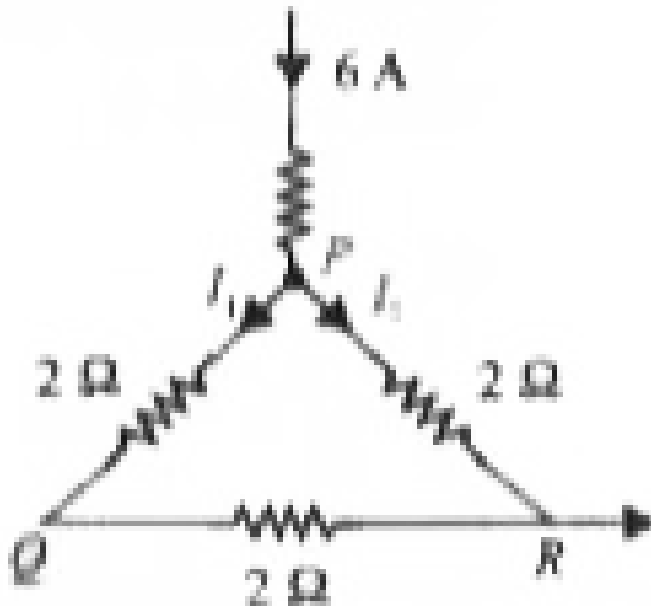
**Answer: B**



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**55.** A current of  $A$  enters one corner  $P$  of an equilateral triangle  $PQR$  having 3 wires of resistances  $2\Omega$  each and leaves by the corner

R. Then the current  $I_1$  and  $I_2$  are



A. 2 A, 4 A

B. 4 A, 2 A

C. 1 A, 2 A

D. 2 A, 3 A

**Answer: A**



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**56.** To a germanium crystal equal number of aluminum and indium are added. Then,

- A. it remains as intrinsic semiconductor
- B. it becomes a n-type semiconductor
- C. it becomes a p-type semiconductor
- D. it becomes an insulator.



**Answer: C**



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57. Maximum velocity of the photoelectrons emitted by a metal surface  $1.2 \times 10^6 \text{ms}^{-1}$ .

Assuming the specific charge of the electron to be  $1.8 \times 10^{11} \text{Ckg}^{-1}$ , the value of the stopping potential in volt will be

A. 2

B. 3

C. 4

D. 6

**Answer: C**



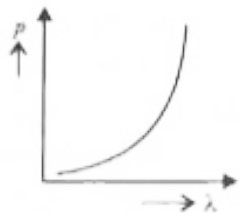
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**58.** Which of the following figure represents the variation of particle momentum and the associated de - Broglie wavelength ?

A.



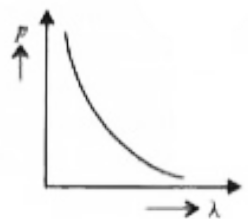
B.



C.



D.



**Answer: D**



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59. Coliform refers to a

A. crystalline solid and amorphous liquid

B. crystalline solid and vapour

C. amorphous liquid and its vapour

D. a crystal immersed in a liquid

**Answer: A**



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60. If  $r_1$  and  $r_2$  are the radii of the atomic nuclei of mass numbers 64 and 125 respectively, then the ratio  $(r_1 / r_2)$  is

A.  $\frac{64}{125}$

B.  $\sqrt{\frac{64}{125}}$

C.  $\frac{5}{4}$

D.  $\frac{4}{5}$

**Answer: D**



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