



# PHYSICS

## BOOKS - AIIMS PREVIOUS YEAR PAPERS

### AIIMS 2001

#### Physics

1. Two coherent monochromatic light beams of amplitude 3 and 5 units are superposed . The

maximum and minimum possible intensities in the resulting beams are in the ratio

A. 4: 2

B. 16: 1

C. 8: 2

D. 4: 2

**Answer: B**



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2. Two masses are attached to a rod end to end . If torque is applied they rotate with angular acceleration  $\alpha$ . If their distances are doubled and same torque is applied, then they move with angular acceleration.

A.  $4\alpha$

B.  $\alpha$

C.  $3\alpha$

D.  $\alpha / 4$

**Answer: D**



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3. A particle is revolving in a circle of radius  $R$ . If the force acting on it is inversely proportional to  $R$ , then the time period is proportional to

A.  $R$

B.  $R^2$

C.  $1/R$

D.  $1/R^2$

**Answer: A**



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4. At a place earth's magnetic field,  $5 \times 10^5$   $Wb/m^2$  is acting perpendicular to a coil of radius  $R=5cm$  . If  $\mu_0/4\pi = 10^{-7}$  , then how much current is induced in circular loop ?

A. 0.2 A

B. 0A

C. 4A

D. 40 A

**Answer: B**



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5. An engine is working . It takes 100 calories of heat from source and leaves 80 calories of heat to sink . If the temperature of source is  $127^{\circ} \text{C}$ , then temperature of sink is

A.  $147^{\circ} \text{C}$

B.  $47^{\circ}C$

C.  $100^{\circ}C$

D.  $47K$

**Answer: B**



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**6.** Speed in kilometer per hour in S.I. unit is represented as

A. KMPH

B.  $Kmhr^{-1}$

C.  $Kmh^{-1}$

D. kilometer/hour

**Answer: B**



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7. Colour of a star depends upon

A. luminosity

B. temperature



C. brightness

D. all of these

**Answer: B**



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**8. Dimension of resistivity is**

A.  $ML^2T^{-2}I^{-1}$

B.  $ML^3T^{-3}I^{-2}$

C.  $ML^3T^{-2}I^{-1}$

D.  $ML^2T^{-2}I^{-2}$

**Answer: C**



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9. If mass of an atom is  $M$  moving with speed  $v$ , what will be its speed after the emission of an  $\alpha$ -particle if speed of  $\alpha$ -particle is zero ?

A.  $\frac{Mv}{M + 2}$

B.  $\frac{Mv}{M - 4}$

C.  $\frac{Mv}{M + 4}$

D.  $\frac{M - 4}{Mv}$

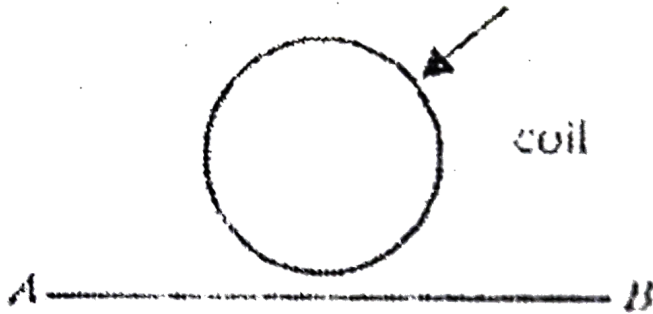
**Answer: B**



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**10.** If electron is moving from A to B in wire AB, then current AB, then current induced in the

coil is



- A. anticlockwise
- B. clockwise
- C. arbitrary direction
- D. no current will be induced.

**Answer: D**



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11. A wire of length  $l$  carries a steady current. It is bent first to form a circular plane loop of one turn. The magnetic field at the centre of the loop is  $B$ . The same length is now bent more sharply to give a double loop of smaller radius. The magnetic field at the centre caused by the same is

A.  $B$

B.  $B/4$

C.  $4B$

D.  $B/2$

**Answer: C**



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**12.** A metal rod consumes power  $P$  on passing current. If it is cut into two halves and joined in parallel, it will consume power

A.  $P$

B.  $2P$

C.  $4P$

D.  $p/4$

**Answer: C**



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**13.** A body of mass  $M$  moving with velocity  $V$  explodes into two equal parts. If one comes to rest and the other body moves with velocity  $v$ , what would be the value of  $v$  ?

A.  $V$

B.  $V / \sqrt{2}$

C.  $4V$

D.  $2V$

**Answer: D**



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**14.** Which of the following physical quantities do not have same dimensions ?



A. pressure and stress

B. tension and surface tension

C. strain and angle

D. energy and work

**Answer: B**



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**15.** A solid sphere and a hollow sphere are heated the same temperature . Point out the true statement.

A. hollow sphere cools more quickly

B. both hollow and solid sphere cools  
equally

C. solid sphere cools more quickly .

D. none of the statement is true.

**Answer: C**



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16. The orbital velocity of an artificial satellite in a circular orbit above the earth's surface at a distance equal to radius of earth is  $v$ . For a satellite orbiting at an altitude half of earth's radius, orbital velocity is

A.  $\frac{3}{2}v$

B.  $\sqrt{3/2}v$

C.  $2/\sqrt{3}v$

D.  $\frac{2}{3}v$

**Answer: C**



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17. The time period of a simple pendulum is  $T$  remaining at rest inside a lift. Find the time period of pendulum when lift starts to move up with an acceleration of  $g/4$

A.  $T$

B.  $T/2$

C.  $2T/5$

D.  $2T / \sqrt{5}$

**Answer: D**



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**18.** 1 kcal of heat flowing through a rod of iron. When the rod is cut down to 4 pieces then what will be the heat flowing through each piece having same differential temperature ?

A.  $\frac{1}{2}$  Kcal

B.  $\frac{1}{4}$  kcal

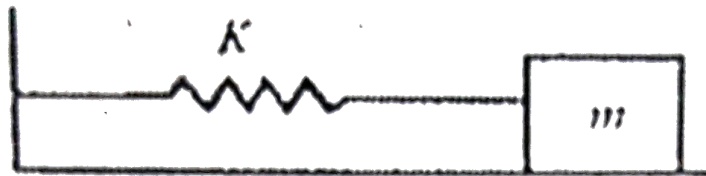
C. 1 Kcal

D.  $\frac{1}{15}$  Kcal

**Answer: C**

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**19.** From the given figure find the frequency of oscillation of the mass  $m$



$$\text{A. } n = \frac{1}{2\pi} \sqrt{\frac{K}{m}}$$

$$\text{B. } n = \frac{1}{2\pi} \sqrt{\frac{K^2}{2m}}$$

$$\text{C. } n = 2\pi \sqrt{\frac{m}{2K}}$$

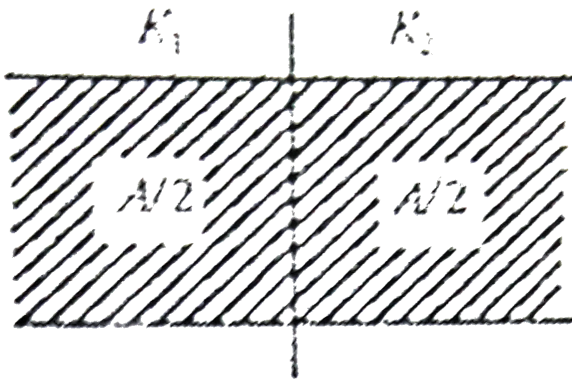
$$\text{D. } n = \frac{1}{2n} \sqrt{\frac{K}{2m}}$$

**Answer: A**



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**20.** From the figure find the capacitance of the capacitor ?



A.  $C = \frac{\epsilon_0 A}{d} \left( \frac{K_1 + K_2}{2} \right)$

B.  $C = \frac{\epsilon_0 A}{2d} \left( \frac{K_1 K_2}{K_2 + K_2} \right)$

C.  $C = \frac{\epsilon_0 A}{d} \left( \frac{K_1}{K_2} \right)$

D.  $C = \frac{\epsilon_0 A}{d} \left( \frac{2K_1 K_2}{K_1 + K_2} \right)$

**Answer: B**



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21. S.I. unit of velocity is

A. m/s

B.  $m \text{ sec}^{-1}$

C.  $mhr^{-1}$

D. m/hr

**Answer: B**



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22. Mass of the proton is 1840 times that of electron. It is accelerated through a potential difference of 1 V. Find its kinetic energy.

A. 6 eV

B. 2 eV

C. 10 eV

D. 1 eV

**Answer: D**



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23. Two spheres of same metal have radii  $a$  and  $b$ . They have been connected to a conducting wire. Find the ratio of the electric field intensity upon them.

A.  $a/b$

B.  $b/a$

C.  $b^2/a$

D.  $b^2/a^2$

**Answer: D**



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24. The work function of a metal is 3.4 eV. If the frequency of incident radiation is increased to twice, then the work function of the metal becomes.

A. 3.4 eV

B. 7.2 eV

C. 6.8 eV

D. 1.7 eV

**Answer: A**



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25. If red light is replaced by white light then width of diffraction pattern will

A. increase

B. decrease

C. a central white band is obtained

D. no effect.

**Answer: C**



26. Maximum energy transfer for an elastic collision will occur if one body is at rest when

A.  $m_1 = m_2$

B.  $m_2 = \frac{1}{2}m_1$

C.  $m_1 > m_2$

D.  $m_2 > m_1$

**Answer: A**



27. Which of the following is path dependent

A. U

B. PdV

C. P

D. V

**Answer: B**



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28. If fundamental frequency is 50 and next successive frequencies are 150 and 250 then it its

- A. a pipe closed at both end
- B. a pipe closed at one end
- C. an open pipe
- D. a stretched pipe

**Answer: B**



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29. If in a circuit lags behind EMF by  $\pi/2$  .

Then it is a/an

A. resistor circuit

B. capacitor

C. inductor circuit

D. CR circuit

**Answer: C**



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30. In Planck's oscillator energy is given as

$$E = \frac{hv}{\exp\left(\frac{hv}{Kt} - 1\right)}$$

If  $K=0$  , then energy would be

A.  $hv$

B. 0

C.  $Kt$

D.  $\infty$

**Answer: B**



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31. Temperature of the star is determined by

A. distance

B. colour

C. size

D. none of these

**Answer: B**



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32. If hot water is mixed with cold water

A. temperature first increases then

becomes constant

B. temperature first decreases then

become constant

C. increases continuously

D. first it is uncertain then become

constant .

**Answer: B**

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33. For liquid to rise in a capillary tube , the angle of contact should be

A. acute

B. obtuse

C. right

D. none of these

**Answer: A**



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34. Escape velocity of a rocket is 11.2 km/sec. It is released at an angle of  $45^\circ$ . Its escape velocity is

- A. 11.2 m/sec
- B.  $11.2\sqrt{2}$  km/sec
- C. 11.2 km/sec
- D. 22.3 km/sec

**Answer: C**



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**35.** X-ray beams are affected by

- A. electric field
- B. magnetic field
- C. both (a) and (b)
- D. none of these

**Answer: D**



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**36.** The heat produced in a long wire is characterised by resistance , current and time through which the current passes. If the errors in measuring these quantities are respectively 1%, 2% and 1% then total error in calculating the energy produced is

A. 4 %

B. 6 %

C.  $4/3$  %

D. 8 %



**Answer: B**



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**37.** If a unit positive charge is taken from one point to another over an equipotential surface ,then

- A. work is done on the charge
- B. work is done by the charge
- C. work done is constant
- D. no work is done

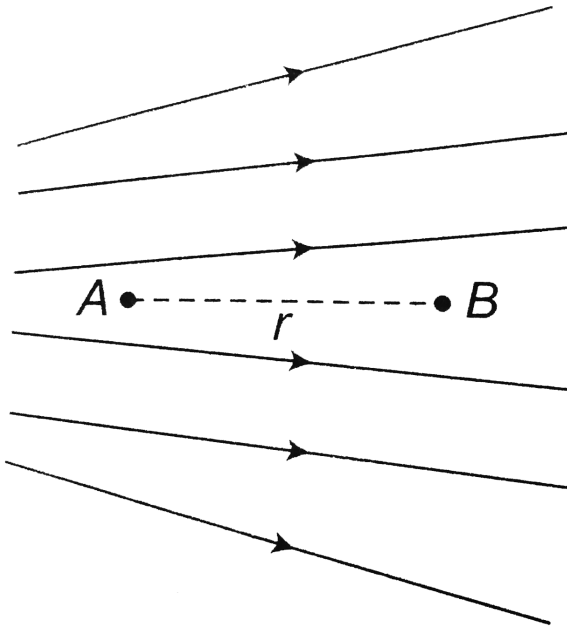
**Answer: D**



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**38.** Figure shows the electric lines of force emerging from a charged body. If the electric field at  $A$  and  $B$  are  $E_A$  and  $E_B$  respectively and if the displacement between  $A$  and  $B$  is  $r$

then



A.  $E_A > E_B$

B.  $E_A < E_B$

C.  $E_A = E_B / r$

D.  $E_A = E_B / r^2$

**Answer: A**



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**39.** A charge is placed at the centre of cube of side  $a$  then flux linked with one of its given faces will be

A.  $\frac{Q}{\epsilon_0}$

B.  $\frac{Q}{6\epsilon_0}$

C.  $\frac{Q}{\epsilon_0 a^2}$

D.  $\frac{Q}{4\pi\epsilon_0 a^2}$

**Answer: B**



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**40.** A small piece of metal wire is dragged across the gap between the pole pieces of a magnet in 10 s. The magnetic flux between the pole pieces is  $8 \times 10^{-4}$  Wb. Find the magnitude of induced e.m.f.

A.  $4 \times 10^{-3}$  V

B.  $8 \times 10^{-3}$  V

C.  $2 \times 10^{-3} V$

D.  $6 \times 10^{-3} V$

**Answer: C**



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**41.** if the earth is treated as a sphere of radius  $R$  and mass  $M$ , Its angular momentum about the axis of its rotation with period  $T$ , is

A.  $\frac{MR^2T}{2\pi}$

B.  $\frac{4\pi MR^2}{5T}$

C.  $\frac{\pi MR^2}{T}$

D.  $\frac{2\pi MR^2}{T}$

**Answer: B**



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**42.** Antimony and bismuth are usually used in a thermocouple, because

A. a constant thermo e.m.f. is produced

B. higher thermo e.m.f. is produced

C. a negative thermo e.m.f. is produced

D. lower thermo e.m.f. is produced

**Answer: B**



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**43.** A constant pressure air thermometer gave a reading of 47.5 units of volume when immersed in ice cold water, and 67 units in a



boiling liquid. The boiling point of the liquid will be

A.  $125^{\circ} C$

B.  $100^{\circ} C$

C.  $135^{\circ} C$

D.  $112^{\circ} C$

**Answer: D**



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**44.** Two particles are seen to collide and move jointly together after the collision . During such a collision, for the total system,

A. both the mechanical energy and the linear momentum are conserved

B. linear momentum is conserved but not the mechanical energy

C. neither the mechanical energy nor the linear momentum is conserved

D. mechanical energy is conserved but not the linear momentum

**Answer: B**



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**45.** Assuming the earth to be a sphere of uniform mass density, how much would a body weigh half way down to the centre of the earth if it weighed 250 N on the surface ?

A. 195 N

B. 240 N

C. 125 N

D. 210 N

**Answer: C**



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**46.** For an enclosure maintained at 2000K, the maximum radiation occurs at wavelength  $\lambda_m$ .

If the temperature is raised to 3000K, the peak will shift to

A.  $\frac{5}{2}\lambda_m$

B.  $\frac{1}{2}\lambda_m$

C.  $\frac{7}{2}\lambda_m$

D.  $\frac{3}{2}\lambda_m$

**Answer: B**



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47. A certain radioactive element has a half-life of 20 years . If we have a block with 10 g of the element in it, after how

A. 80 years

B. 40 years

C. 100 years

D. 60 years

**Answer: B**



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48. What is the dimensional formula of gravitational constant ?

A.  $[M^{-1}L^3T^{-2}]$

B.  $[M^{-1}L^3T^{-1}]$

C.  $[M^{-2}L^3T^{-2}]$

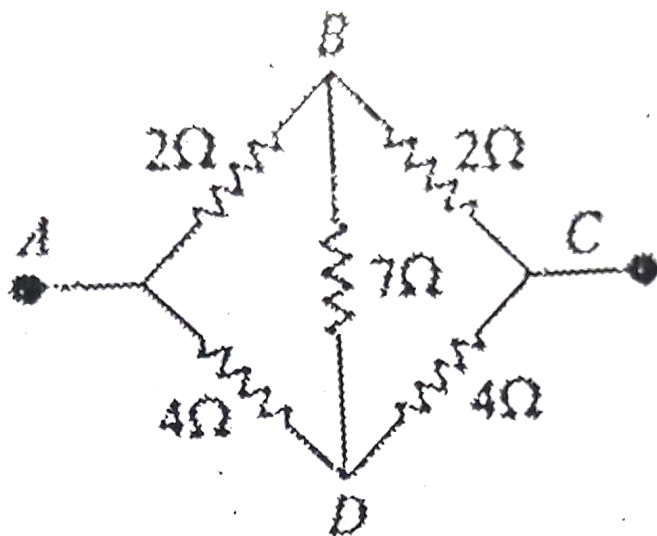
D.  $[M^{-2}L^{-1}T^3]$

**Answer: A**



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49. The equivalent resistance between A and C of the given circuit, is



- A.  $8\Omega$
- B.  $\frac{32}{12}\Omega$
- C.  $\frac{4}{3}\Omega$
- D.  $\frac{8}{3}\Omega$



**Answer: B::D**



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**50.** A source is moving towards an observer with a speed of  $20 \text{ m / s}$  and having frequency of  $240 \text{ Hz}$  . The observer is now moving towards the source with a speed of  $20 \text{ m / s}$  . Apparent frequency heard by observer, if velocity of sound is  $340 \text{ m / s}$  , is

A.  $268 \text{ Hz}$

B. 270 Hz

C. 360 Hz

D. 240 Hz

**Answer: B**



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**51. Assertion (A):** Centripetal force does no work .

**Reason (R) :** Force and displacement are perpendicular to each other

A. If both A and R are true and R is the correct explanation of A.

B. If both A and R are true but R is not the correct explanation of A.

C. If A is true but R is false

D. If A is false but R is true.

**Answer: A**



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**52.** Assertion (A): Skiers uses air glasses.

Reason(R) : Light reflected by snow is partially polarised.

A. If both A and R are true and R is the correct explanation of A.

B. If both A and R are true but R is not the correct explanation of A.

C. If A is true but R is false

D. If A is false but R is true.

**Answer: A**



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**53.** Assertion (A) : LASER is used to measure distant object as moon.

Reason (R) : They are highly coherent source of light.

A. If both A and R are true and R is the correct explanation of A.

B. If both A and R are true but R is not the correct explanation of A.

C. If A is true but R is false

D. If A is false but R is true.

**Answer: A**



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**54.** Assertion (A) : Work done in uniform circular motion is zero.

Reason (R) : Force is always directed along displacement .

A. If both A and R are true and R is the correct explanation of A.

B. If both A and R are true but R is not the correct explanation of A.

C. If A is true but R is false

D. If A is false but R is true.

**Answer: C**



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**55.** Assertion (A): At pole value of acceleration due to gravity ( $g$ ) is greater than that of equator.

Reason (R) : Earth rotates on its axis in addition to revolving round the sun.

A. If both A and R are true and R is the correct explanation of A.

B. If both A and R are true but R is not the correct explanation of A.



C. If A is true but R is false

D. If A is false but R is true.

**Answer: A**



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**56.** Assertion (A): During reverse, biasing a diode doesn't conduct current.

Reason (R) : It narrows the depletion layer.

A. If both A and R are true and R is the correct explanation of A.

B. If both A and R are true but R is not the correct explanation of A.

C. If A is true but R is false

D. If A is false but R is true.

**Answer: C**



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**57. Assertion (A) :** On increasing the frequency of light larger number of photoelectrons are emitted .

**Reason (R) :** The number of electrons emitted depends on the intensity of incident light.

A. If both A and R are true and R is the correct explanation of A.

B. If both A and R are true but R is not the correct explanation of A.

C. If A is true but R is false

D. If A is false but R is true.

**Answer: D**



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**58.** Assertion: soldiers are asked to break steps while crossing the bridge.

Reason: The frequency of marching may be equal to the natural frequency of bridge and may lead to resonance which can break the bridge.

A. If both A and R are true and R is the correct explanation of A.

B. If both A and R are true but R is not the correct explanation of A.

C. If A is true but R is false

D. If A is false but R is true.

**Answer: A**



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**59.** Assertion (A) : The time period of revolution of a satellite around a planet is directly proportional to the radius of the orbit of the satellite.

Reason (R) : Artificial satellite do not follow Kepler's laws of planetary motion.

A. If both A and R are true and R is the correct explanation of A.

B. If both A and R are true but R is not the correct explanation of A.

C. If A is true but R is false

D. If A is false but R is true.

**Answer: C**



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**60.** Assertion : Electric appliances with metallic body, e.g. heaters, presses etc, have three pin connections, whereas an electric bulb has a two pin connection.

Reason : Three pin connection reduce heating of connecting cables.

A. If both A and R are true and R is the correct explanation of A.

B. If both A and R are true but R is not the correct explanation of A.

C. If A is true but R is false

D. If A is false but R is true.

**Answer: C**



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