

Aga Khan University

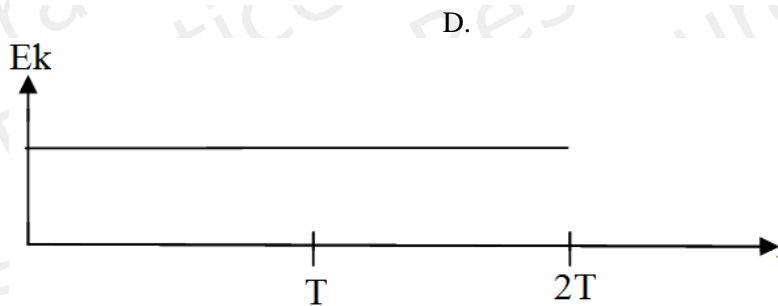
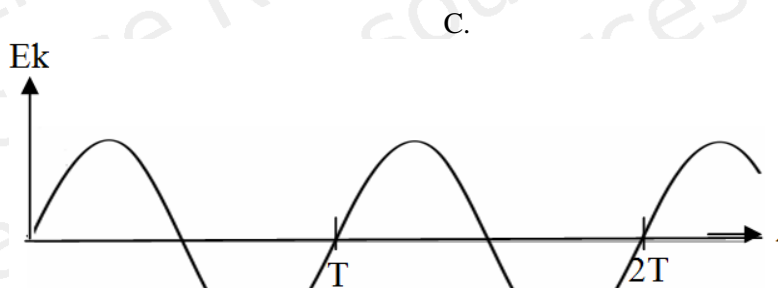
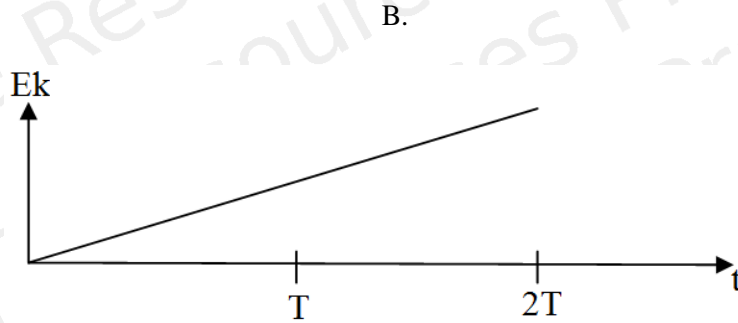
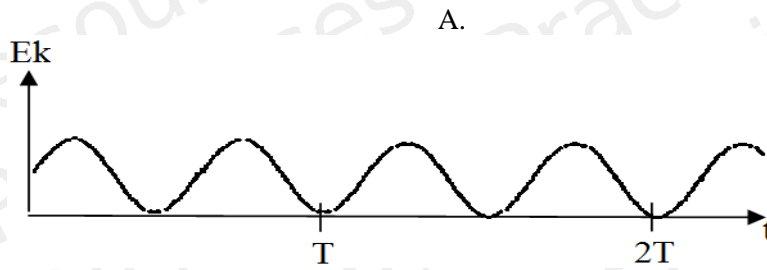
Resource: Physics Practice Questions

MBBS Programme

Note:

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1. The kinetic energy of a simple harmonic oscillator is represented by:



2. A simple harmonic oscillator has maximum acceleration when its displacement from its mean position is

- A. zero.
- B. a minimum.
- C. a maximum.
- D. half of extreme position.

3. A simple pendulum completes one vibration in 1.5 sec. Its length will be

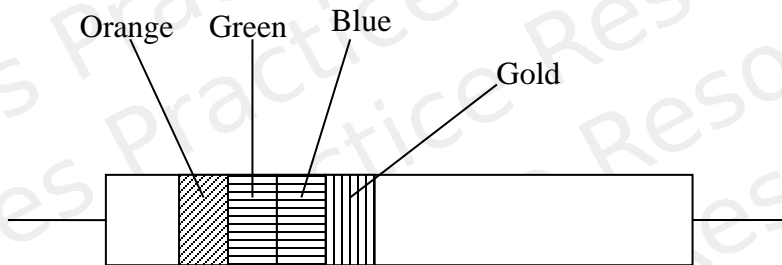
- A. 0.423 m
- B. 0.559 m
- C. 0.780 m
- D. 0.995 m

4. When 2 kg of water is heated from 30°C to 50°C, it gains

- A. 126 J
- B. 168 J
- C. 126 kJ
- D. 168 kJ

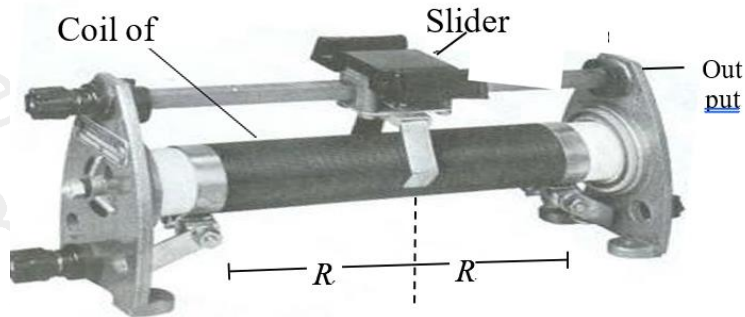
5. Calculate the value of carbon resistance by using the given table of the colour code

Colour	Value	Tolerance
Black	0	Red = $\pm 2\%$
Brown	1	Gold = $\pm 5\%$
Red	2	Silver = $\pm 10\%$
Orange	3	
Yellow	4	
Green	5	
Blue	6	
Violet	7	



- A. 3000000 $\Omega \pm 5\%$
- B. 33000000 $\Omega \pm 2\%$
- C. 34000000 $\Omega \pm 2\%$
- D. 35000000 $\Omega \pm 5\%$

6. The total resistance of the coil of the rheostat is divided into R_1 and R_2 by slider A.p.d of V is applied across them and output is taken from the point P at opposite end of R_2 . The p.d across R_2 is V_2 where



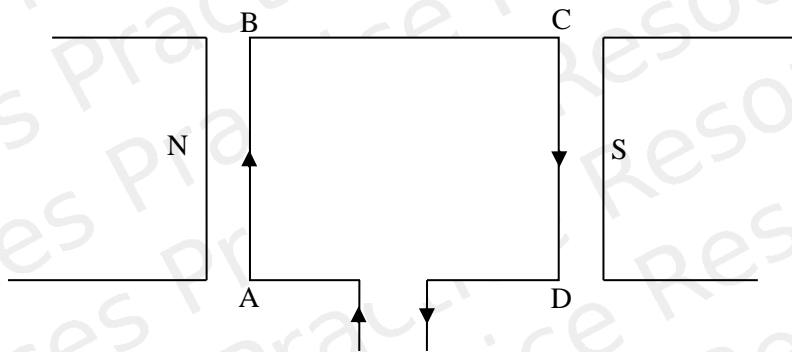
A. $V_2 = \left(\frac{R_1}{R_1 + R_2} \right) V$

B. $V_2 = \left(\frac{R_1 + R_2}{R_1} \right) V$

C. $V_2 = \left(\frac{R_2}{R_1 + R_2} \right) V$

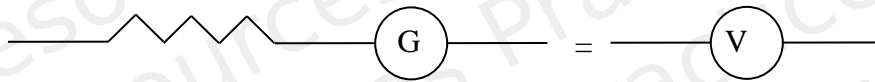
D. $V_2 = \left(\frac{R_1 + R_2}{R_2} \right) V$

7. A direct current carrying is lying between the poles of a strong magnet. State the direction of force acting on the side AB.



- A. towards north pole
 B. towards south pole
 C. perpendicular to the magnetic field and into the page
 D. perpendicular to the magnetic field and out of the page

8. To convert a galvanometer into a voltmeter a resistance in series is connected to it. State the name and magnitude of the resistance.

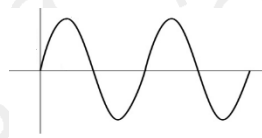


	Name	Magnitude of resistance
A.	Shunt	High
B.	Shunt	Low
C.	Multiplier	High
D.	Multiplier	Low

9. A particle moves with simple harmonic motion in a straight line with amplitude 0.5 m and period 6 seconds. State its maximum speed in terms of π .

- A. $\frac{\pi}{3} m/sec$
 B. $\frac{\pi}{4} m/sec$
 C. $\frac{\pi}{5} m/sec$
 D. $\frac{\pi}{6} m/sec$

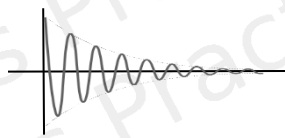
10. Which of the following graphs illustrates damped oscillation?



A



C

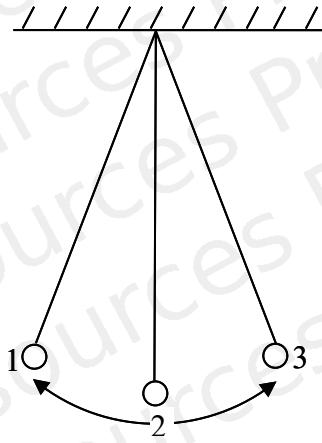


B



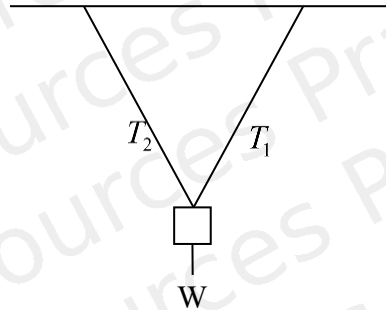
D

11. The simple pendulum oscillates between the points 1 and 3. State at which point the total energy is maximum?

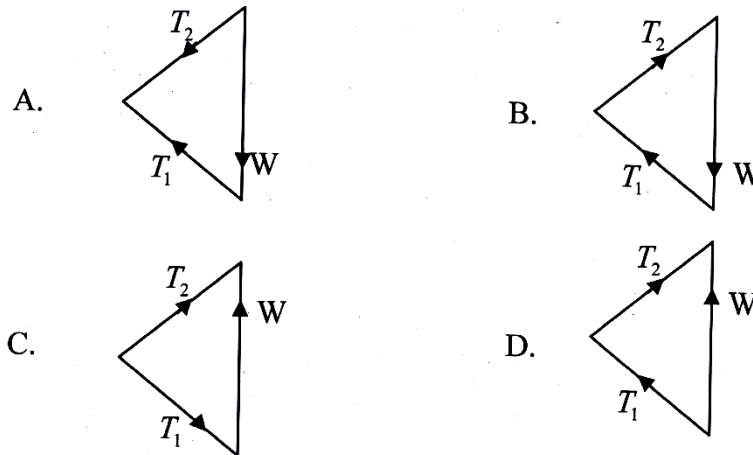


- A. At point 1
B. At point 2
C. At point 3
D. Everywhere remains same
12. When the length of a simple pendulum is doubled, the ratio of the new time period to the old time period is
- A. 2 : 1
B. 1 : 2
C. $\sqrt{2} : 1$
D. $1 : \sqrt{2}$
13. A body executing simple harmonic motion has maximum velocity, when it is
- A. at mean position.
B. at extreme position.
C. halfway to extreme position.
D. one third way to extreme position.

14. An object of weight W is hung with the help of two strings. Tension T_1 and T_2 act along the strings and all the forces act in their usual directions.

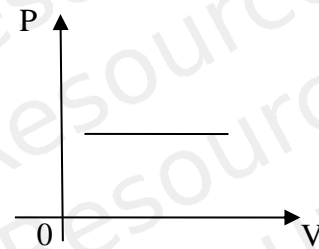


Which of the vector addition diagram is correct?

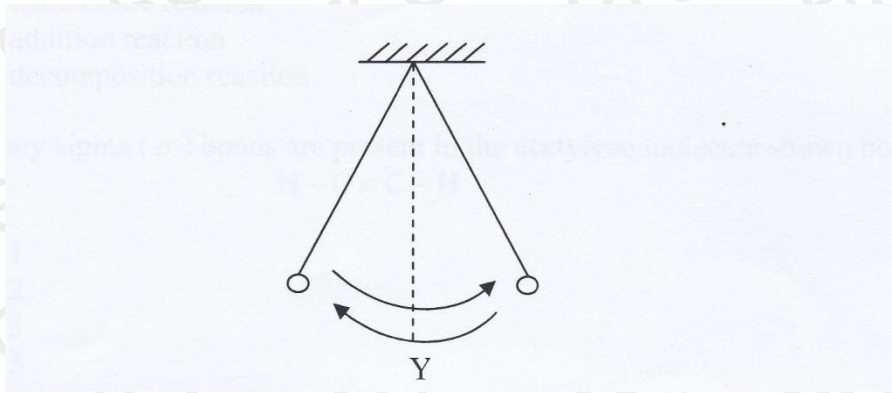


15. The line parallel to the volume axis in the given PV – graph will represent

- A. isobaric process.
- B. adiabatic process.
- C. isochoric process.
- D. isothermal process.

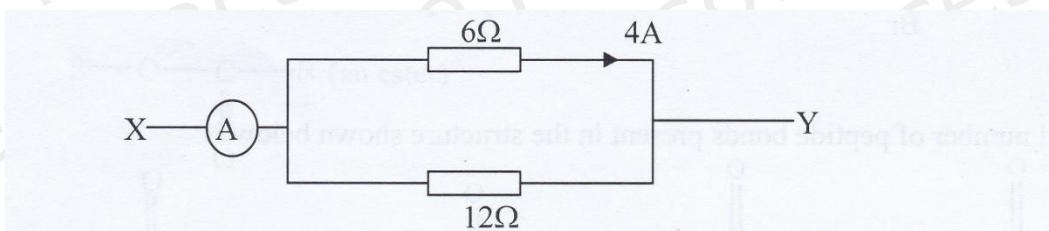


16. A pendulum swings backward and forward passing through Y . At a certain time when pendulum passes through Y a stop watch is started. The twenty first time from the start the pendulum passes through Y the stop watch is stopped. The reading is T .



What is period of the pendulum?

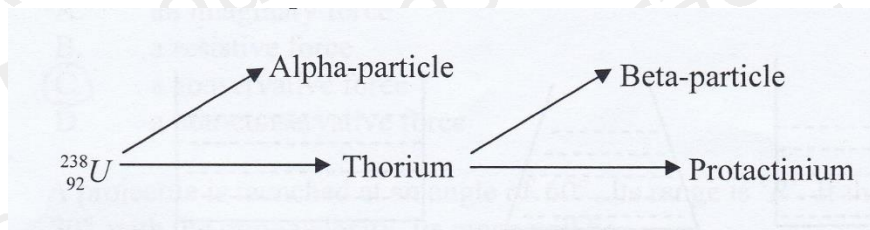
- A. $\frac{T}{40}$
B. $\frac{T}{20}$
C. $\frac{T}{21}$
D. $\frac{T}{10}$
17. Two resistors of 6Ω and 12Ω are arranged in parallel. A potential difference is applied across the terminals X and Y . the current through the 6Ω resistor is $4A$.



What is the current in the ammeter?

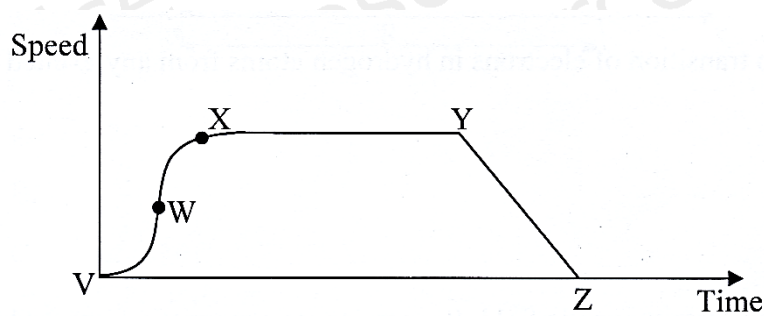
- A. $4A$
B. $6A$
C. $8A$
D. $12A$

18. The uranium nucleus ${}^{238}_{92}\text{U}$ emits an alpha-particle to become thorium, which then emits a beta particle to become protactinium.



What is the proton number (atomic number) of protactinium?

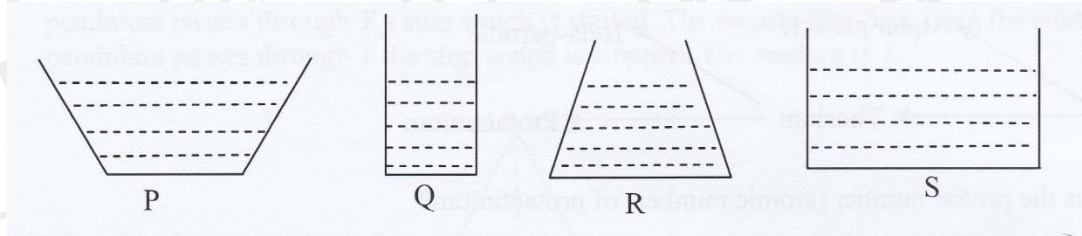
- A. 95
 - B. 91
 - C. 90
 - D. 89
19. The diagram shows a speed-time graph.



In which region is the acceleration decreasing?

- A. V to W
- B. W to X
- C. Y to Y
- D. Y to Z

20. The diagram to the same scale shows, the vertical sections of a circular vessels, each containing the same depth of water.



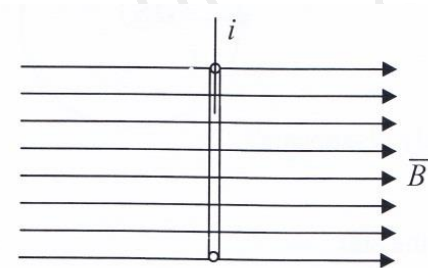
Which of the following statement is correct?

- A. The water exerts the greatest pressure on the base of vessels P.
 B. The water exerts the greatest pressure on the base of vessels S.
 C. The water exerts the same force on the base of each vessel.
 D. The water exerts the same pressure on the base of each vessel.
21. A particle with charge q moving with velocity \vec{V} in a uniform magnetic field \vec{B} experiences a magnetic force given by

A. $\vec{F}_m = q(\vec{V} \times \vec{B})$
 B. $\vec{F}_m = q(\vec{V} \cdot \vec{B})$
 C. $\vec{F}_m = \frac{\vec{V} \times \vec{B}}{q}$
 D. $\vec{F}_m = \frac{\vec{V} \cdot \vec{B}}{q}$

22. What is the value of current in a wire of 10cm long placed at right angle to a uniform magnetic field of 0.5 tesla, when the force acting on the wire is 5N?

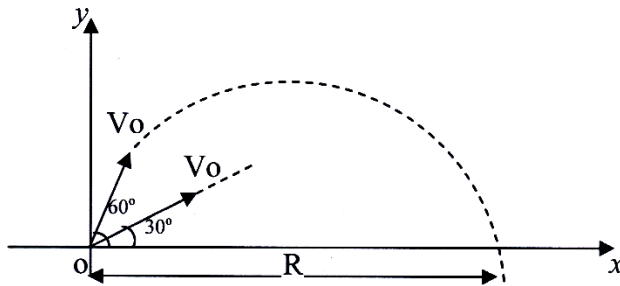
- A. 10A
 B. 100A
 C. 50A
 D. 1000A



23. Gravitational force is

- A. an imaginary force
- B. a resistive force
- C. a conservative force
- D. a non-conservative force

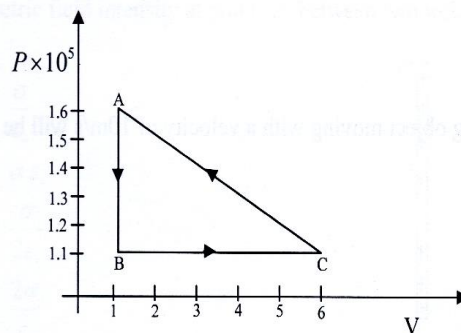
24. A projectile is launched at an angle of 60° . Its range is 'R'. if the same projectile is launched at 30° with the same velocity, its range will be



- A. $2R$
- B. $R/2$
- C. R
- D. $\frac{\sqrt{3}V_0^2}{2g}$

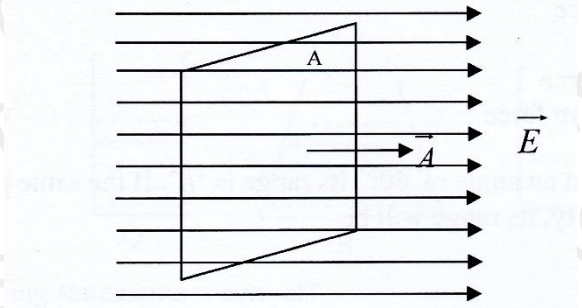
25. In the given PV-diagram calculate the work done for Isobaric process (assume SI units for all quantities involved)

- A. 110,000J
- B. 250,000J
- C. 550,000J
- D. 660,000J



26. In the given figure the maximum flux is passing through the given area. At what angle will the flux be half of maximum?

- A. 30°
- B. 45°
- C. 60°
- D. 90°

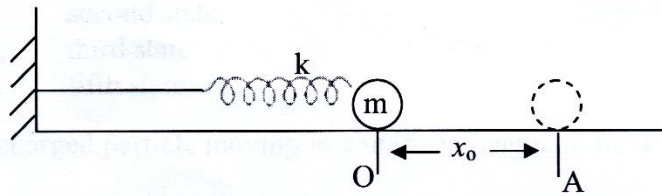


27. An object connected by an elastic spring executes simple harmonic motion with equation

$$x = (3.2 \times 10^{-3} \text{ m}) \cos\left(\frac{3\pi}{2}t + \frac{\pi}{2}\right)$$

The amplitude of motion will be

- A. 1.36cm
- B. 3.2cm
- C. 3.2mm
- D. 6.4mm

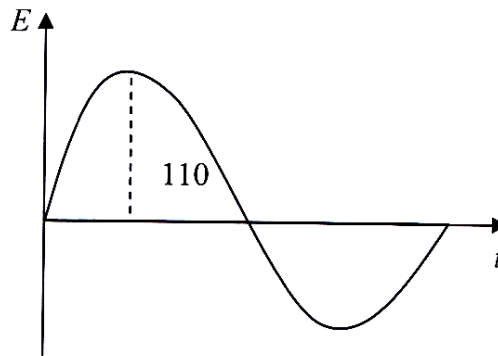


28. The de-Broglie wave length of a 1kg object moving with a velocity of 10m/s will be

- A. $6.63 \times 10^{-34} \text{ m}$
- B. $6.63 \times 10^{-35} \text{ m}$
- C. $6.63 \times 10^{-33} \text{ m}$
- D. $6.63 \times 10^{-36} \text{ m}$

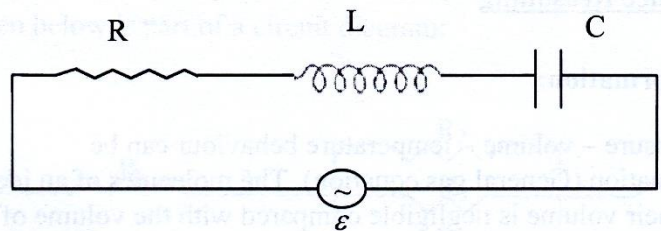
29. The peak value of alternating voltage is 110 volts. The r.m.s value of voltage will be

- A. 110 volts
- B. 220 volts
- C. 77.77 volts
- D. 141.77 volts



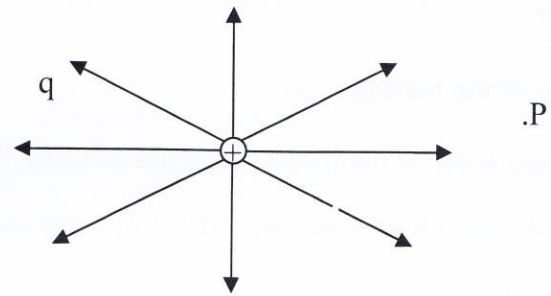
30. At resonance the capacitive and inductive reactance X_C and X_L are

- A. $X_L > X_C$
- B. $X_C > X_L$
- C. $X_C \neq X_L$
- D. $X_C = X_L$



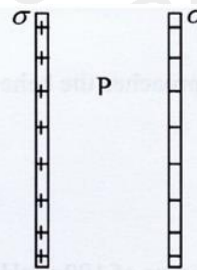
31. The potential at a point situated at a distance of 50cm from a charge of $5\mu\text{C}$ is

- A. 9×10^4 volts
- B. 9×10^2 volts
- C. 9×10^4 volts
- D. 9×10^2 volts



32. The electric field intensity at point 'P' between two infinite sheets of same charge density will be

- A. $\frac{\sigma}{\epsilon_0}$
- B. $\sigma \epsilon_0$
- C. $\frac{\sigma}{2\epsilon_0}$
- D. $\frac{2\sigma}{\epsilon_0}$



33. The SI unit of magnetic permeability is

- A. $\frac{\text{Weber}}{\text{m}^2}$
- B. Weber
- C. $\frac{\text{Weber}}{\text{A.m}}$
- D. $\frac{\text{Weber.A}}{\text{m}}$

34. Which of the following shows the dimensions of force, velocity and acceleration respectively?

- A. $MLT^{-2}, LT^{-1}, LT^{-2}$
- B. MLT^{-2}, LT^{-1}, LT^2
- C. ML^2T, LT^{-1}, LT^{-2}
- D. MLT^{-2}, LT^2, LT

35. If R_x and R_y , components of a vector, are both negative, then the resultant lies in the

- A. Third quadrant and its direction is $\theta = 180^\circ - \theta$
- B. Third quadrant and its direction is $\theta = 180^\circ + \theta$
- C. Second quadrant and its direction is $\theta = 180^\circ - \theta$
- D. Second quadrant and its direction is $\theta = 180^\circ + \theta$

36. If a moon's radius is 1600 km and 'g' on its surface is 1.6 ms^{-2} , then the escape velocity on the moon is

- A. 1882 ms^{-2}
- B. 2000 ms^{-2}
- C. 2263 ms^{-2}
- D. 2600 ms^{-2}

37. The formula for pressure exerted by a gas on the walls of a container is

- A. $\frac{1}{3} m \bar{v}^2$
- B. $\frac{1}{3} m N_o \bar{v}^2$
- C. $\frac{2}{3} m N_o \bar{v}$
- D. $\frac{2}{3} m N_o \bar{v}^2$

38. Molar specific heat at constant volume is the application of

- A. Isobaric process
- B. Isochoric process
- C. Adiabatic process
- D. Isothermal process

39. The equation for adiabatic process of 1st law of thermodynamics is

- A. $\Delta Q = \Delta U + \Delta w$
- B. $\Delta U = -\Delta w$
- C. $\Delta W = \Delta Q$
- D. $\Delta Q = \Delta U$

40. According to 2nd law of thermodynamics, heat can be converted into mechanical work if the system contains

- A. Two heat reservoirs at different temperatures.
- B. Engine and heat reservoir at zero temperature.
- C. Engine and heat reservoir at the same temperature.
- D. Engine and two heat reservoirs at different temperatures.

41. Interference of light can be observed by using light of

- A. Different intensities
- B. The same wave length
- C. The same intensity but from different sources.
- D. The same wave length but different frequencies.

42. Radio receivers are also known as

- A. R-C circuits.
- B. R-L circuits.
- C. L-C circuits.
- D. C-R circuits.

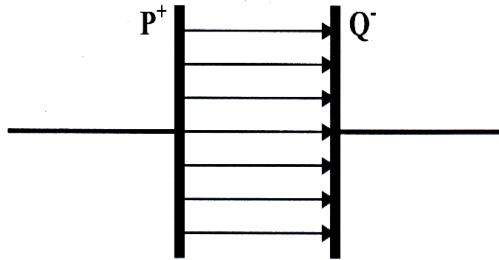
43. A semi-conductor possesses resistivity of the order of

- A. 0
- B. 10^{-8} ohm-cm
- C. 10^2 ohm-cm
- D. 10^8 ohm-cm

44. If 30 g of oil at 90°C is mixed with 20 g of the same oil at 20°C , the final temperature of the oil will be

- A. 85°C
- B. 65°C
- C. 62°C
- D. 50°C

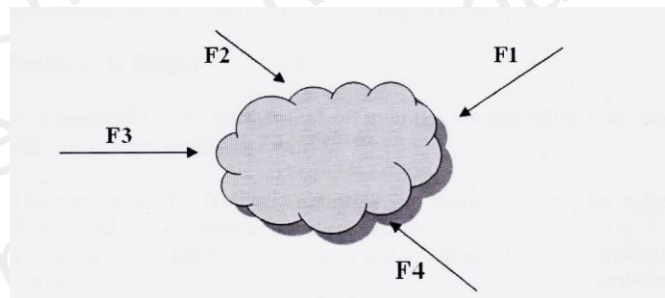
45. In the given figure electric lines of forces are drawn between two parallel plates. The intensity of the electric field is



- A. Stronger near the plate P.
- B. Stronger near the plate Q.
- C. Zero in the middle of the region between the plates.
- D. The same everywhere between the plates.

46. The body is in equilibrium under the action of four forces shown below. State the shape of their head to tail diagram.

- A. Square
- B. Rectangle
- C. Quadrilateral
- D. Parallelogram



47. In a hydrogen spectrum, the Balmer series, is in the

- A. Visible region
- B. Infra-red region
- C. Ultra-violet region
- D. Radio region

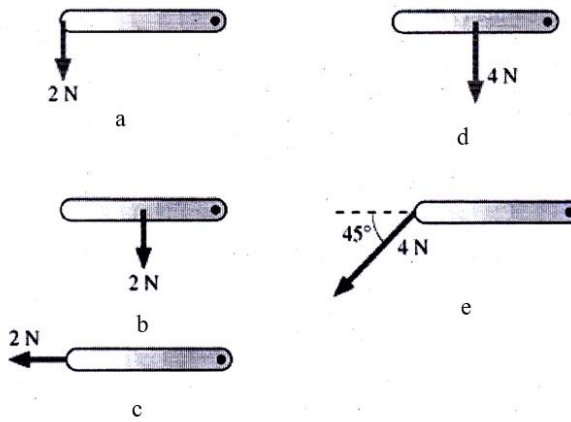
48. In diffraction Grating's formula 'd' is used for distance between

- A. Two slits.
- B. Slits and screen
- C. Two dark fringes.
- D. The centre and the nth fringe.

49. Polarization of light confirms the

- A. Wave nature of light.
- B. Particle nature of light.
- C. Transverse nature of light.
- D. Longitudinal nature of light.

50. Which of the following represents decreasing order of torque in five rods of the same length pivoted at the dot?



- A. $\tau_e > \tau_a = \tau_d > \tau_b > \tau_c$
- B. $\tau_d = \tau_e > \tau_a = \tau_b = \tau_c$
- C. $\tau_d > \tau_e > \tau_a = \tau_b > \tau_c$
- D. $\tau_d = \tau_e > \tau_d = \tau_b > \tau_c$