



36. A rope is wound around a hollow cylinder of mass 3 kg and radius 40 cm. What is the angular acceleration of the cylinder if the rope is pulled with a force of 30 N ?

- (1) 0.25 rad/s^2 (2) 25 rad/s^2
(3) 5 m/s^2 (4) 25 m/s^2

Ans. (2)

37. Two discs of same moment of inertia rotating about their regular axis passing through centre and perpendicular to the plane of disc with angular velocities ω_1 and ω_2 . They are brought into contact face to face coinciding the axis of rotation. The expression for loss of energy during this process is:-

- (1) $\frac{1}{4}I(\omega_1 - \omega_2)^2$ (2) $I(\omega_1 - \omega_2)^2$
(3) $\frac{1}{8}I(\omega_1 - \omega_2)^2$ (4) $\frac{1}{2}I(\omega_1 + \omega_2)^2$

Ans. (1)

38. The photoelectric threshold wavelength of silver is $3250 \times 10^{-10} \text{ m}$. The velocity of the electron ejected from a silver surface by ultraviolet light of wavelength $2536 \times 10^{-10} \text{ m}$ is :-

- (Given $h = 4.14 \times 10^{-15} \text{ eVs}$ and $c = 3 \times 10^8 \text{ ms}^{-1}$)
(1) $\approx 0.6 \times 10^6 \text{ ms}^{-1}$ (2) $\approx 61 \times 10^3 \text{ ms}^{-1}$
(3) $\approx 0.3 \times 10^6 \text{ ms}^{-1}$ (4) $\approx 6 \times 10^5 \text{ ms}^{-1}$

Ans. (1 or 4)

39. A 250-Turn rectangular coil of length 24 cm and width 1.25 cm carries a current of 85 μA and is subjected to magnetic field of strength 0.85 T. Work done for rotating the coil by 180° against the torque is:-

- (1) $4.55 \mu\text{J}$ (2) $2.3 \mu\text{J}$
(3) $1.15 \mu\text{J}$ (4) $0.1 \mu\text{J}$

Ans. (4)

40. The ratio of wavelengths of the last line of Balmer series and the last line of Lyman series is :-

- (1) 1 (2) 4 (3) 0.5 (4) 2

Ans. (2)

41. A Carnot engine having an efficiency of $\frac{1}{10}$ as heat

engine, is used as a refrigerator. If the work done on the system is 10 J, the amount of energy absorbed from the reservoir at lower temperature is :-

- (1) 90 J (2) 99 J (3) 100 J (4) 1 J

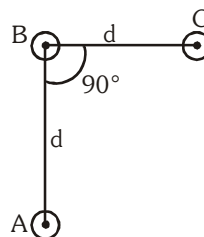
Ans. (1)

42. A gas mixture consists of 2 moles of O_2 and 4 moles of Ar at temperature T. Neglecting all vibrational modes, the total internal energy of the system is :-

- (1) 15 RT (2) 9 RT (3) 11 RT (4) 4 RT

Ans. (3)

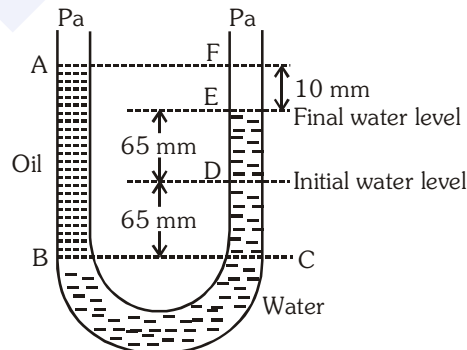
43. An arrangement of three parallel straight wires placed perpendicular to plane of paper carrying same current 'I' along the same direction is shown in fig. Magnitude of force per unit length on the middle wire 'B' is given by :-



- (1) $\frac{2\mu_0 i^2}{\pi d}$ (2) $\frac{\sqrt{2}\mu_0 i^2}{\pi d}$ (3) $\frac{\mu_0 i^2}{\sqrt{2}\pi d}$ (4) $\frac{\mu_0 i^2}{2\pi d}$

Ans. (3)

44. A U tube with both ends open to the atmosphere, is partially filled with water. Oil, which is immiscible with water, is poured into one side until it stands at a distance of 10 mm above the water level on the other side. Meanwhile the water rises by 65 mm from its original level (see diagram). The density of the oil is :-



- (1) 425 kg m^{-3} (2) 800 kg m^{-3}
(3) 928 kg m^{-3} (4) 650 kg m^{-3}

Ans. (3)

45. Which of the following statements are **correct** ?

- (a) Centre of mass of a body always coincides with the centre of gravity of the body
(b) Central of mass of a body is the point at which the total gravitational torque on the body is zero
(c) A couple on a body produce both translational and rotation motion in a body
(d) Mechanical advantage greater than one means that small effort can be used to lift a large load

- (1) (a) and (b) (2) (b) and (c)
(3) (c) and (d) (4) (b) and (d)

Ans. (4)