

MOCK-CET PHYSICS PAPER-1

1. Rotational kinetic energy of a body is given by the equation $E = \frac{I\omega^2}{2}$ where I is moment of inertia and ω angular velocity of the body. The dimensional formula of I using the above equation is
1). ML^2T^0 2). ML^2T^1 3). $M^2L^1T^1$ 4). MLT
2. If L , C and R represent inductance, capacitance and resistance respectively, then which of the following does not have the dimension of the frequency?
1). $\frac{1}{RC}$ 2). $\frac{1}{\sqrt{LC}}$ 3). $\frac{C}{L}$ 4). $\frac{R}{L}$
3. A truck of mass 0.5 Ton is moving with a speed of 6 ms^{-1} . Sand is poured at the rate of 10 Kg per minute. How much force is needed to keep it moving with the same speed?
1) 1N 2) 50N 3) 500 N 4) 3 N
4. A horizontal force F is applied on a block of weight W to hold against a vertical wall. The minimum value of force needed to hold the block if the coefficient of friction of the surface is μ
1) $\frac{W}{\mu}$ 2) $\frac{\mu}{W}$ 3) μW 4) W
5. A bird is inside a wire cage hung from a spring balance. The spring balance reading is R_1 when the bird is flying and R_2 when it is at rest inside the cage. Which of the following is correct?
1) $R_1 \gg R_2$ 2) $R_1 > R_2$ 3) $R_1 < R_2$ 4) $R_1 = R_2$
6. An ideal heat engine gives out heat at 77°C to have a 30% of efficiency. The temperature of the source is
1) 269°C 2) 773°C 3) 673°C 4) 227°C
7. In an auditorium absorption co-efficient of an open window is
1) zero 2) infinity 3) unity 4) 0.5

15. The core of the transformer is laminated to avoid loss of energy due to

- 1) heating 2) hysteresis 3) eddy current 4) flux leakage

16. A binary full adder circuit consists of

- 1) two half adders
2) two half adders and one AND gate
3) two NAND gates
4) two half adders and one OR gate

17. In a transistor emitter-base junction and collector-base junctions are respectively

- 1) forward and reverse biased 2) reverse and forward biased
3) forward and forward biased 4) reverse and reverse biased

18. When both the source of sound and observer approach each other with a speed equal to half the velocity of sound, the change in frequency of sound as detected by the observer is

- 1) zero 2) 50% 3) 200% 4) 25%

19. Mass number A of a nucleus whose radius is 3.9 fermi is

- 1) 10 2) 39 3) 17 4) 27

20. A ball of mass 0.2 Kg falls under gravity from a height of 10 m with an initial velocity. It collides with the floor and loses 50% of its energy and then rises back to the same height. The value of its initial velocity is

- 1) 14 ms^{-1} 2) 7 ms^{-1} 3) 24 ms^{-1} 4) 2.5 ms^{-1}

21. An object is kept on the table. The angle between the action of the object on the table and the weight of the object is

- 1) 270° 2) 0° 3) 90° 4) 180°

22. Water rises up to a height 'h' in a capillary tube of certain diameter. When this is replaced by a tube of half the diameter, then water will rise to a height of

- 1) 3h 2) 4h 3) h 4) 2h

23. In the pressure cooker the cooking is faster because of the increase of vapour pressure

- 1) increases latent heat 2) decreases latent heat
3) increases boiling point 4) decreases boiling point

24. A water fall is 84 m high. Assuming that half of the kinetic energy of the falling water is converted into heat, the rise in temperature of water is (assume $g = 10\text{ms}^{-2}$)

- 1) 0.1°C 2) 10°C 3) 0.2°C 4) 0.3°C

25. $y = 0.5 \sin 2\pi(0.01x - 3t)$ represents a wave equation, where x & y are in meter and t in seconds. The speed of the wave in ms^{-1} is given by

- 1) 300 2) 33.3 3) 330.3 4) 30

26. In simple harmonic motion the particle is

- 1) always accelerated 3) alternately accelerated or retarded
2) always retarded 4) neither accelerated nor retarded

27. A ray of light undergoes a deviation of 30° when incident on an equilateral prism of refractive index $\sqrt{2}$. The angle made by the ray inside the prism with the base of the prism is

- 1) 30° 2) 0° 3) 60° 4) 45°

28. Two lenses of power +12 and -2 dioptre are placed in contact. The effective focal length of the combination is

- 1) 0.1 m 2) 0.125 m 3) 0.083 m 4) 0.166 m

29. Laser diode is

- 1) Forward biased p-n junction LED in which energy of the emitted photon is more than the energy gap
- 2) Forward biased p-n junction LED in which the energy of the emitted photon is equal to the energy gap
- 3) Reverse biased p-n junction LED in which the energy of the emitted photon is equal to the energy gap
- 4) Reverse biased p-n junction LED in which the energy of the emitted photon is more than the energy gap

30. A radio-active element has a decay constant of $1.1 \times 10^{-9} \text{ s}^{-1}$, then its half life in seconds is

- 1) 0.63×10^8 2) 6.3×10^8 3) 6.3×10^{-8} 4) 5.5×10^8

31. The electrons emitted from nucleus during β - decay originates from

- 1) inner orbit of atom 2) free electrons existing in nucleus
3) photon escaping from the nucleus 4) decay of a neutron in a nucleus.

32. A beam of light strikes a piece of glass at an angle of incidence 60° . The reflected beam is completely plane polarised. The refractive index of glass is

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

33. The transverse nature of light is shown by

- 1) interference 2) diffraction 3) refraction 4) polarisation

34. In young's double slit experiment the separation between the slits is halved and the distance between the slit and the screen is doubled. The fringe width

- 1) decreases by one fourth 2) increases four times
3) doubled 4) halved

35. Which of the following phenomena cannot produce colours with white light?

- 1) dispersion
2) interference
3) diffraction
4) polarisation

36. Electric lines of force about a positive point charge are

- 1) circular and clockwise
2) circular and anti clockwise
3) radially inwards
4) radially out wards

37. A given charge is situated at a certain distance from an electric dipole in the end-on position experiences a force 'F'. If the distance of the charge is doubled the force acting on the charge will be

- 1) 2F
2) F/2
3) F/8
4) F/4

38. In order to obtain a time constant of 10 seconds in an RC circuit containing a resistance of 500Ω , the capacity of the capacitor should be

- 1) $2\mu F$
2) $5\mu F$
3) 2mF
4) 5mF

39. If n , e , τ , & m represents electron density, charge, relaxation time and mass of the electron respectively then the resistance of the wire of length and area of cross section A is given by

- 1) $\frac{2ml}{nA\tau e^2}$
2) $\frac{2m\tau A}{nle^2}$
3) $\frac{nA\tau e^2}{2ml}$
4) $\frac{nAe^2}{2ml\tau}$

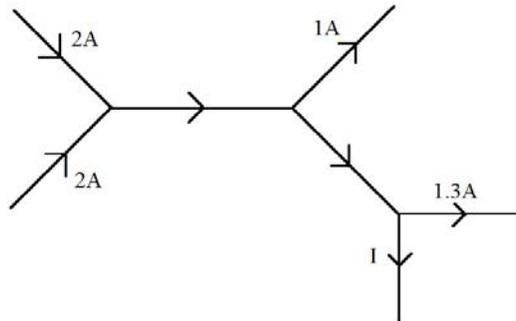
40. A 50 V battery is connected across 10Ω resistor. If the current in the circuit is 4.5 A the net resistance of the battery is

- 1) zero
2) 0.5Ω
3) 1.1Ω
4) 5Ω

41. A magnetic dipole is placed in two perpendicular magnetic fields \vec{B} & \vec{B}_0 is in equilibrium making an angle θ with \vec{B} , then

- 1) $B = B_0$
2) $B \cos \theta = B_0 \sin \theta$
3) $B = B_0 \tan \theta$
4) $B \sin \theta = B_0 \cos \theta$

58. The current in the following circuit is



- 1) 3.7 A 2) 1.7 A
- 3) 1.3 A 4) 1 A

59. If 10% of the main current is to be passed through the moving coil galvanometer of resistance 99 ohm then the required shunt resistance is

- 1) 9.9 Ω 2) 10 Ω 3) 11 Ω 4) 9 Ω

60. 100 gram of ice is mixed with 100 gram of water at 100°C . The final temperature of the mixture is

- 1) 30°C 2) 40°C 3) 20°C 4) 10°C
