



PHYSICS

BOOKS - MHTCET PREVIOUS YEAR PAPERS AND PRACTICE PAPERS

PRACTICE SET 21

Paper 1 Physics Chemistry

1. A laser beam of pulse power 10^{12} watt is focussed on an object are 10^{-4} cm^2 . The

energy flux in wa / cm^2 at the point of focus is

A. 10^{20}

B. 10^{16}

C. 10^8

D. 10^4

Answer: B



Watch Video Solution

2. A weightless thread can bear tension upto $3.7kg$ wt A stone of mass $500g$ is tied to it and revolves in a verticle circle of radius $4m$ What will be the maximum angular velocity of the stone if $g = 10m / s^2$.

A. 2 rad/s

B. 4 rad/s

C. 16 rad/s

D. $\sqrt{21}$ rad/s

Answer: B



Watch Video Solution

3. In a carnival ride the passengers travel in a circle of radius 5.0 m, making one complete circle in 4.0 s. What is the acceleration ?

A. $24.6m / s^2$

B. $12.3m / s^2$

C. $6.15m / s^2$

D. $49.2m / s^2$

Answer: B



Watch Video Solution

4. A road is 8 m wide. Its radius of curvature is 40 m. The outer edge is above the lower edge by a distance of 1.2 m. This road is most suited for a velocity of

A. $5.7m / s$

B. $7.4m / s$

C. $36.1m / s$

D. $9.7m / s$

Answer: B



Watch Video Solution

5. A 0.5 kg ball moves in a circle of radius 0.4 m at a velocity of 4 m/s. The centripetal force on the ball is

A. 10 N

B. 20 N

C. 40 N

D. 80 N

Answer: B



Watch Video Solution

6. Two wires of equal length are made of the same material. Wire A has a diameter that is twice as that of wire B. If identical weights are suspended from the ends of these wires, the increase in length is

A. four times for wire A as for wire B

B. twice for wire A as for wire B

C. half for wire A as for wire B

D. one-fourth for wire A as for wire B

Answer: D



Watch Video Solution

7. The equation of a transverse travelling on a rope is given by $y = 10 \sin \pi(0.01x - 2.00t)$ where y and x are in cm and t in seconds. The maximum transverse speed of a particle in the rope is about

A. $63\text{cm} / \text{s}$

B. $75\text{cm} / \text{s}$

C. $100\text{cm} / \text{s}$

D. $121\text{cm} / \text{s}$

Answer: A



Watch Video Solution

8. Two bodies with moment of inertia I_1 and I_2 ($I_1 > I_2$) have equal angular momentum. If E_1

and E_2 are the rotational kinetic energies,
then

A. $KE_1 > KE_2$

B. $KE_1 = KE_2$

C. $KE_1 < KE_2$

D. cannot be said

Answer: C



Watch Video Solution

9. A satellite moves around the earth in a circular orbit with speed v . If m is the mass of the satellite, its total energy is

A. $\frac{1}{2}mv^2$

B. $-\frac{1}{2}mv^2$

C. $-mv^2$

D. $\frac{3}{2}mv^2$

Answer: B



Watch Video Solution

10. A particle moves in the xy plane under the influence of a force such that its linear momentum is

$$\vec{P}(t) = A \left[\hat{i} \cos(kt) - \hat{j} \sin(kt) \right], \text{ where } A$$

and k are constants. The angle between the force and momentum is

A. 0°

B. 30°

C. 45°

D. 90°

Answer: D



Watch Video Solution

11. A body of mass m is taken from earth surface to the height h equal to radius of earth, the increase in potential energy will be

A. $2mgR$

B. mgR

C. $\frac{1}{2}mgR$

D. $\frac{1}{4}mgR$

Answer: C



Watch Video Solution

12. At which of the following temperatures, the value of surface tension of water is minimum

A. $4^{\circ} C$

B. $25^{\circ} C$

C. $50^{\circ} C$

D. $75^{\circ} C$

Answer: D



Watch Video Solution

13. Work done in splitting a drop of water of 1 mm radius into 64 droplets is (surface tension of water = $72 \times 10^{-3} \text{ J m}^{-2}$)

A. $2.0 \times 10^{-6} \text{ J}$

B. $2.7 \times 10^{-6} \text{ J}$

C. $4 \times 10^{-6} \text{ J}$

D. $5.4 \times 10^{-6} \text{ J}$

Answer: B



Watch Video Solution

14. Under which of the following conditions is the law $PV=RT$ obeyed most closely by a real gas?

- A. high pressure and high temperature
- B. low pressure and low temperature
- C. low pressure and high temperature
- D. high pressure and low temperature

Answer: C



Watch Video Solution

15. Show that the moon would depart for ever if its speed were increased by 42% .

A. 100%

B. 140.4%

C. 41.4%

D. None of these

Answer: C



Watch Video Solution

16. Relation between emissivity e and absorptive power a is (for black body)

A. $e = a$

B. $e = \frac{1}{a}$

C. $e = a^2$

D. $a = e^2$

Answer: A



Watch Video Solution

17. In Young's double slit experiment, angular width of fringes is 0.20° for sodium light of wavelength 5890\AA . If complete system is dipped in water, then angular width of fringes becomes

A. 0.11°

B. 0.15°

C. 0.22°

D. 0.30°

Answer: B



Watch Video Solution

18. A black body at $227^\circ C$ radiates heat at the rate of $7 \text{ cal cm}^{-2} \text{ s}^{-1}$. At a temperature of $727^\circ C$, the rate of heat radiated in the same unit will be

A. 80

B. 60

C. 50

D. 112

Answer: D



Watch Video Solution

19. The component of vector $A = 2\hat{i} + 3\hat{j}$ along the vector $\hat{i} + \hat{j}$ is

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

B. $\frac{3}{\sqrt{2}}$

C. $\frac{5}{\sqrt{2}}$

D. $\frac{7}{\sqrt{2}}$

Answer: C



Watch Video Solution

20. A particle of mass 10 gm is describing S.H.M. along a straight line with period of 2 sec and amplitude of 10 cm . Its kinetic energy

when it is at 5 cm from its equilibrium position
is

A. $3.75\pi^2 \text{ erg}$

B. $375\pi^2 \text{ erg}$

C. $0.375\pi^2 \text{ erg}$

D. $37.5\pi^2 \text{ erg}$

Answer: B



Watch Video Solution

21. The string of pendulum of length l is displaced through 90° from the vertical and released. Then the minimum strength of the string in order to withstand the tension, as the pendulum passes through the mean position is

A. mg

B. $3mg$

C. $5mg$

D. $6mg$

Answer: B



Watch Video Solution

22. The velocity of sound in air at NTP is 330 m/s. What will be its value when temperature is doubled and pressure is halved ?

A. 330 m/s

B. 165 m/s

C. $330\sqrt{2}$ m/s

D. $330 / \sqrt{2}$ m/s

Answer: C



Watch Video Solution

23. When light is incident on a doubly refracting crystal, two refracted rays-ordinary ray (O -ray) and extra ordinary ray (E -ray) are produced. Then

A. Both O-ray and E-ray are polarised perpendicular to the plane of incidence

B. Both O-ray and R-ray are polarised in the plane of incidence

C. E-ray is polarised perpendicular to the plane of incidence and O-ray in the plane of incidence

D. E-ray is polarised in the plane of incidence and O -ray perpendicular to the plane of incidence

Answer: D



Watch Video Solution

24. A bullet of mass 0.05 kg moving with a speed of 80 m/s enters a wooden block and is stopped after a distance of 0.40 m . The average resistive force exerted by the block on the bullet is:

A. 300 N

B. 20 N

C. 400 N

D. 40 N

Answer: B



Watch Video Solution

25. Doppler's effect is sound in addition of relative velocity between source and observer, also depends while source and abserver or both are moving. Doppler effect in light depend only on the relative velocity of source and observed. The reason of this is

A. Einstein mass-energy relation

B. Einstein theory of relativity

C. Photoelectric effect

D. none of the above

Answer: C



View Text Solution

26. An e.m.f. $E = 4 \cos(1000t)$ volt is applied to an LR circuit of inductance $3mH$ and resistance $4ohm$. The amplitude of current in the circuit is

A. $\frac{4}{\sqrt{7}} A$

B. $1.0A$

C. $\frac{4}{7} A$

D. $0.8A$

Answer: D



Watch Video Solution

27. Consider telecommunication through optical fibres. Which of the following statements is not true?

A. Optical fibers may have homogeneous core with a suitable cladding

B. Optical fibers can be of graded refractive index

C. Optical fibers are subject to electromagnetic interference from outside

D. Optical fibres have extremely low transmission loss

Answer: C



Watch Video Solution

28. The expression for thermo emf in a thermocouple given by the relation $E = 40\theta - \frac{\theta^2}{20}$, where θ is the temperature difference of two junctions. For this, the neutral temperature will be

A. $400^\circ C$

B. $300^\circ C$

C. $200^\circ C$

D. $100^{\circ}C$

Answer: A



Watch Video Solution

29. Minimum number of capacitors of $2\mu F$ capacitance each required to obtain a capacitor of $5\mu F$ will be

A. 3

B. 4

C. 5

D. 6

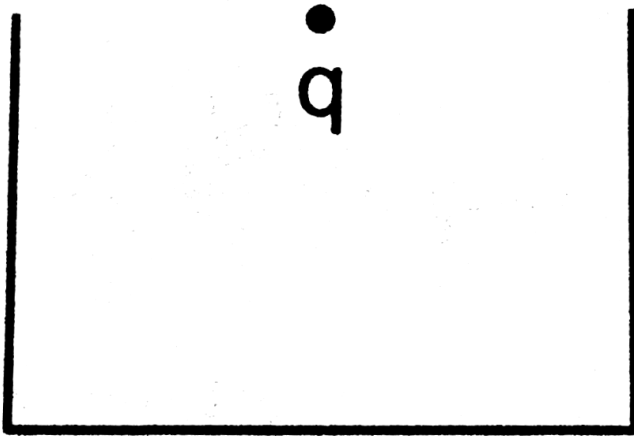
Answer: B



Watch Video Solution

30. A charge q is placed at the centre of the open end of a cylindrical vessel . The flux of the electric field through the surface of the vessel

is



A. zero

B. $\frac{q}{\epsilon_0}$

C. $\frac{q}{2\epsilon_0}$

D. $\frac{2q}{\epsilon_0}$

Answer: C



Watch Video Solution

31. The distance of two points on the axis of a magnet from its centre is 10cm and 20cm respectively. The ratio of magnetic intensity at these points is $12.5:1$. The length of the magnet will be

A. 5 cm

B. 25 cm

C. 10 cm

D. 20 cm

Answer: D



Watch Video Solution

32. Two masses m_1 and m_2 ($m_1 > m_2$) are connected by massless flexible and inextensible string passed over massless and frictionless pulley. The acceleration of centre of mass is

A. $\left(\frac{m_1 - m_2}{m_1 + m_2} \right)^2 g$

B. $\frac{m_1 - m_2}{m_1 + m_2}g$

C. $\frac{m_1 + m_2}{m_1 - m_2}g$

D. zero

Answer: A



Watch Video Solution

33. When a ferromagnetic material is heated to temperature above its Curie temperature, the material

- A. it gets demagnetised
- B. it becomes diamagnetic
- C. it behaves like a paramagnetic substance
- D. it remains unaffected

Answer: C



Watch Video Solution

34. 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 min

B. 7 min

C. 5 min

D. 3 min

Answer: B



Watch Video Solution

35. A layer of glycerine of thickness 1 mm is present between a large surface and small surface of area $0.1m^2$. With what force the small surface is to be pulled, so that it can move with a velocity of 1 m/s ?

(coefficient of viscosity = $0.07g - m^{-1}s^{-1}$)

A. 70 N

B. 7 N

C. 700 N

D. 0.70 N

Answer: B



Watch Video Solution

36. Two coils of self-inductance L_1 and L_2 are placed closed to each other so that total flux in one coil is completely linked with other. If M is mutual inductance between them, then

A. $M = L_1 L_2$

B. $M = L_1 / L_2$

C. $M = L_2 / L_1$

$$D. M = \sqrt{L_1 L_2}$$

Answer: D



Watch Video Solution

37. A new flashlight cell of e.m.f. 1.5 volts given a current of 15 amps. When connected directly to an ammeter of resistance 0.04Ω . The internal resistance of cell is

A. 0.04Ω

B. 0.06Ω

C. 0.10Ω

D. 10Ω

Answer: B



Watch Video Solution

38. In a transformer, the number of turns in primary coil and secondary coil are 5 and 4 respectively. If 240 V is applied on the primary

coil, then the ratio of current in primary and secondary coil is

A. 4:5

B. 5:4

C. 5:9

D. 9:5

Answer: A



Watch Video Solution

39. Two coherent monochromatic light beams of intensities I and $4I$ are superposed. The maximum and minimum possible intensities in the resulting beam are

A. $5I$ and I

B. $5I$ and $3I$

C. $3I$ and I

D. $9I$ and I

Answer: D



Watch Video Solution

40. In the relation $x = \cos(\omega t + kx)$, the dimension(s) of ω is/are

- A. $[M^0 LT]$
- B. $[M^0 LT^0]$
- C. $[M^0 L^0 T^{-1}]$
- D. $[M^0 LT^{-1}]$

Answer: C



Watch Video Solution

41. For the stationary wave

$$y = 4 \sin\left(\frac{\pi x}{15}\right) \cos(96\pi t),$$
 the distance

between a node and the next antinode is

A. 7.5

B. 15

C. 22.5

D. 30

Answer: A



Watch Video Solution

42. When monochromatic light is replaced by white light in Fresnel's biprism arrangement, the central fringe is

- A. coloured
- B. white
- C. dark
- D. None of these

Answer: B



Watch Video Solution

43. Wavelength of a $1keV$ photon is $1.24 \times 10^{-9}m$. What is the frequency of $1MeV$ photon ?

A. 1.24×10^{15}

B. 2.4×10^{20}

C. 1.24×10^{18}

D. 2×10^{23}

Answer: B



44. A physical quantity Q is found to depend on observables x , y and z obeying relation

$$Q = \frac{x^3 y^2}{z}. \text{ The percentage error in the}$$

measurements of x , y and z are

1%, 2% and 4% respectively. What is

percentage error in the quantity Q ?

A. 4%

B. 3%

C. 11%

D. 1 %

Answer: C



Watch Video Solution

45. Why is refractive index in a transparent medium greater than one ?

A. Because the speed of light in vacuum is
medium

B. Because the speed of light in vacuum is always greater than speed in a transparent medium

C. Frequency of wave changes when it crosses medium

D. none of the above

Answer: B



Watch Video Solution

46. A disc is rotating with angular velocity ω . If a child sits on it, what is conserved?

- A. kinetic energy
- B. Potential energy
- C. Linear momentum
- D. Angular momentum

Answer: D



Watch Video Solution

47. A voltmeter having resistance of 50×10^3 ohm is used to measure the voltage in a circuit. To increase the range of measurement 3 times the additional series resistance required is

A. $10^5 \Omega$

B. $150k\Omega$

C. $900k\Omega$

D. $9 \times 10^6 \Omega$

Answer: A





48. Ground state energy of H-atom is -13.6 eV.

The energy needed to ionise H-atom from its second excited state is

A. 1.51 eV

B. 3.4 eV

C. 13.6 eV

D. 12.1 eV

Answer: A



Watch Video Solution

49. A plano convex lens of refractive index 1.5 and radius of curvature 30cm. Is silvered at the curved surface. Now this lens has been used to form the image of an object. At what distance from this lens an object be placed in order to have a real image of size of the object.

A. 20 cm

B. 30 cm

C. 60 cm

D. 80 cm

Answer: A



Watch Video Solution

50. The energy gap between conduction band and valence band is of the order of 0.07 eV. It is a/an

A. insulator

B. conductor

C. semiconductor

D. alloy

Answer: B



Watch Video Solution