

MHT CET 2025 Memory Based Question Paper PDF (April 23, 2025) (Shift 1)

1. A car accelerates uniformly from rest to a velocity of 25 m/s in 10 seconds. What is the acceleration of the car?
 - (A) 2.5 m/s^2
 - (B) 5 m/s^2
 - (C) 10 m/s^2
 - (D) 15 m/s^2
2. A block of mass 5 kg is placed on a horizontal surface. The coefficient of friction between the block and the surface is 0.4. What is the force of friction acting on the block?
 - (A) 10 N
 - (B) 15 N
 - (C) 20 N
 - (D) 25 N
3. In a Young's double-slit experiment, the distance between the slits is 0.2 mm and the distance between the screen and the slits is 2 m. If the wavelength of the light used is 600 nm, calculate the distance between the two adjacent bright fringes.
 - (A) 0.3 mm
 - (B) 0.6 mm
 - (C) 1.2 mm
 - (D) 1.5 mm
4. In an LC circuit, the inductance L is 2 H and the capacitance C is $4 \mu\text{F}$. What is the frequency of oscillation of the circuit?
 - (A) 100 Hz
 - (B) 50 Hz
 - (C) 25 Hz
 - (D) 200 Hz
5. A thin spherical shell of radius 0.5 m and mass 2 kg is rotating about its axis of symmetry with an angular velocity of 10 rad/s. What is its moment of inertia?
 - (A) $0.5 \text{ kg}\cdot\text{m}^2$
 - (B) $1.0 \text{ kg}\cdot\text{m}^2$
 - (C) $2.0 \text{ kg}\cdot\text{m}^2$
 - (D) $4.0 \text{ kg}\cdot\text{m}^2$

6. A particle is moving with a constant velocity of 5 m/s in a circular path of radius 2 m. What is the centripetal acceleration of the particle?
- (A) 1.25 m/s^2
(B) 2.5 m/s^2
(C) 5 m/s^2
(D) 10 m/s^2
7. A body of mass 5 kg is placed on a frictionless inclined plane of angle 30° . What is the component of the weight of the body along the plane?
- (A) 25 N
(B) 50 N
(C) 45 N
(D) 75 N
8. The electric field at a point in space is $2 \times 10^3 \text{ N/C}$ and the potential at the same point is 100 V. What is the potential energy of a charge of $5 \mu\text{C}$ placed at that point?
- (A) 0.5 mJ
(B) 1.0 mJ
(C) 2.0 mJ
(D) 5.0 mJ
9. A 0.5 m long solenoid has 400 turns and carries a current of 3 A. What is the magnetic field at the center of the solenoid?
- (A) $2 \times 10^{-2} \text{ T}$
(B) $4 \times 10^{-2} \text{ T}$
(C) $6 \times 10^{-2} \text{ T}$
(D) $8 \times 10^{-2} \text{ T}$
10. A photon has an energy of $3.2 \times 10^{-19} \text{ J}$. What is the frequency of the photon?
- (A) $5.0 \times 10^{14} \text{ Hz}$
(B) $4.0 \times 10^{14} \text{ Hz}$
(C) $3.0 \times 10^{14} \text{ Hz}$
(D) $6.0 \times 10^{14} \text{ Hz}$
11. A satellite is orbiting the Earth at a height of 10^4 km above the Earth's surface. If the radius of the Earth is $6.4 \times 10^6 \text{ m}$, calculate the orbital speed of the satellite. (Gravitational constant $G = 6.67 \times 10^{-11} \text{ N}\cdot\text{m}^2/\text{kg}^2$ and Earth's mass $M = 6 \times 10^{24} \text{ kg}$)
- (A) 7.0 km/s
(B) 8.0 km/s

- (C) 9.0 km/s
(D) 10.0 km/s
12. A coil of 100 turns, carrying a current of 5 A, is placed in a magnetic field of 2 T. The area of each turn is 0.01 m^2 . What is the magnetic moment of the coil?
- (A) $0.5 \text{ A}\cdot\text{m}^2$
(B) $1.0 \text{ A}\cdot\text{m}^2$
(C) $2.0 \text{ A}\cdot\text{m}^2$
(D) $5.0 \text{ A}\cdot\text{m}^2$
13. The pH of a solution is 3. What is the concentration of H^+ ions in the solution?
- (A) $1 \times 10^{-3} \text{ mol/L}$
(B) $3 \times 10^{-3} \text{ mol/L}$
(C) $1 \times 10^{-6} \text{ mol/L}$
(D) $3 \times 10^{-6} \text{ mol/L}$
14. What is the oxidation state of chromium in $\text{K}_2\text{Cr}_2\text{O}_7$?
- (A) +2
(B) +3
(C) +6
(D) +7
15. What is the molecular geometry of SO_3 ?
- (A) Linear
(B) Trigonal planar
(C) Tetrahedral
(D) Octahedral
16. What is the mass of sodium chloride (NaCl) formed when 0.5 moles of sodium (Na) reacts with excess chlorine (Cl_2)?
- (A) 29 g
(B) 35.5 g
(C) 58 g
(D) 70 g
17. Calculate the oxidation number of sulfur in H_2SO_4 .
- (A) +4
(B) +6
(C) +2
(D) 0

18. A sample of an ideal gas occupies 10 liters at a pressure of 2 atm and a temperature of 300 K. What is the volume of the gas at 1 atm pressure and 300 K temperature?
- (A) 5 L
(B) 10 L
(C) 20 L
(D) 40 L
19. What is the total number of orbitals in the third energy level ($n = 3$)?
- (A) 9
(B) 16
(C) 4
(D) 3
20. What is the value of the ionization energy of hydrogen in joules? (Given that the ionization energy of hydrogen is 13.6 eV)
- (A) 2.18×10^{-18} J
(B) 1.6×10^{-18} J
(C) 3.2×10^{-19} J
(D) 1.0×10^{-19} J
21. What is the empirical formula of a compound containing 40% sulfur and 60% oxygen by mass?
- (A) SO_2
(B) SO_3
(C) S_2O_3
(D) SO
22. What is the standard electrode potential for the half-reaction $\text{Cu}^{2+} + 2\text{e}^- \rightarrow \text{Cu}$?
- (A) +0.34 V
(B) -0.34 V
(C) +1.10 V
(D) 0 V
23. What is the percentage composition of nitrogen in ammonium nitrate (NH_4NO_3)?
- (A) 18.5
(B) 28.0
(C) 35.0
(D) 42.5
24. What is the total number of moles of gas in a 5 L container at 300 K and 2 atm pressure (Use the ideal gas law)?

- (A) 0.4 mol
(B) 0.6 mol
(C) 1.0 mol
(D) 2.0 mol
25. A solution contains 10 g of NaOH dissolved in 500 mL of water. What is the molarity of the NaOH solution?
- (A) 0.25 M
(B) 0.5 M
(C) 1.0 M
(D) 2.0 M
26. The enthalpy change for the reaction $\text{C} + \text{O}_2 \longrightarrow \text{CO}_2$ is -393.5 kJ/mol. What is the heat released when 2 moles of carbon react with excess oxygen?
- (A) -393.5 kJ
(B) -787 kJ
(C) -196.75 kJ
(D) 0 kJ
27. Find the roots of the quadratic equation $2x^2 - 4x - 6 = 0$.
- (A) $x = 1$ or $x = -3$
(B) $x = -1$ or $x = 3$
(C) $x = 2$ or $x = -1$
(D) $x = 3$ or $x = -2$
28. Find the area of a triangle with vertices $A(2, 3)$, $B(5, 11)$, and $C(8, 7)$.
- (A) 15
(B) 18
(C) 20
(D) 25
29. Solve for x : $\log_2(x - 1) = 3$.
- (A) $x = 9$
(B) $x = 7$
(C) $x = 8$
(D) $x = 6$
30. Find the derivative of the function $f(x) = 3x^2 - 5x + 7$.
- (A) $6x - 5$
(B) $6x + 5$

(C) $3x^2 + 5$

(D) $3x^2 - 5$

31. Find the value of the determinant $\begin{vmatrix} 2 & 3 \\ 4 & 5 \end{vmatrix}$.

(A) 2

(B) 1

(C) 0

(D) -1

32. Solve the system of equations:

$$x + y = 5$$

$$2x - y = 4$$

(A) $x = 3, y = 2$

(B) $x = 2, y = 3$

(C) $x = 4, y = 1$

(D) $x = 1, y = 4$

33. If $\log_2 x = 5$, what is the value of x ?

(A) $x = 32$

(B) $x = 25$

(C) $x = 20$

(D) $x = 16$

34. Find the length of the diagonal of a rectangle with length 6 cm and breadth 8 cm.

(A) 10 cm

(B) 12 cm

(C) 14 cm

(D) 8 cm

35. Solve the system of equations:

$$x + y = 10$$

$$3x - y = 5$$

(A) $x = 5, y = 5$

(B) $x = 4, y = 6$

(C) $x = 3, y = 7$

(D) $x = 6, y = 4$

36. Find the sum of the first 20 terms of the arithmetic progression: 2, 5, 8, 11, ...

(A) 400

(B) 420

(C) 440

(D) 460

37. Find the value of x if $\sin(2x) = 1$.

(A) $\pi/2$

(B) $\pi/4$

(C) $\pi/6$

(D) $\pi/3$

38. Find the value of $\log_3 81$.

(A) 3

(B) 4

(C) 2

(D) 1

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