MHT CET 2025 Memory Based Question Paper Pdf (April 21, 2025) (Shift 2)

1. What is the energy stored in a capacitor of capacitance $C = 10\ \mu$F when a potential difference of $V = 20$ V is applied across it?

(1) 0.01 J
(2) 2 J
(3) 4 J
(4) 0.1 J

2. What is the frequency of a wave with a wavelength of 2 m and a velocity of 4 m/s?

(1) 2 Hz
(2) 0.5 Hz
(3) 1 Hz
(4) 4 Hz

3. What is the gravitational force between two objects of masses $m_1 = 10$ kg and $m_2 = 20$ kg, separated by a distance of $r = 5$ m? ($G = 6.67 \times 10^{-11}\ \text{N} \cdot \text{m}^2/\text{kg}^2$)

(1) 1.33×10^{-9} N
(2) 2.67×10^{-9} N
(3) 4.67×10^{-9} N
(4) 5.33×10^{-9} N

4. A car travels a distance of 200 meters in 20 seconds. What is the average speed of the car?

(1) 10 m/s
(2) 20 m/s
(3) 5 m/s
(4) 40 m/s

5. A block of mass 5 kg is placed on a frictionless surface. If a force of 10 N is applied, what will be the acceleration?

(1) 2 m/s^2
(2) 5 m/s^2
(3) 0.5 m/s^2
(4) 10 m/s^2

6. A 0.2 kg ball is thrown vertically upwards with $v = 10$ m/s. What is the max height? ($g = 9.8$ m/s^2)

(1) 5 m
(2) 10 m
(3) 20 m
(4) 5.1 m

7. A 1.5 kg object is moving with a velocity of 4 m/s. What is its kinetic energy?

(1) 12 J
(2) 24 J
(3) 6 J
(4) 48 J

8. The resistance of a wire is 10 Ω and the current is 2 A. What is the potential difference?

(1) 20 V
(2) 5 V
(3) 15 V
(4) 10 V

9. What is the gravitational potential energy of a 2 kg object at a height of 5 m? ($g = 9.8$ m/s^2)

(1) 98 J
(2) 49 J
(3) 196 J
(4) 10 J

10. A light ray passes from air ($n_1 = 1$) into water ($n_2 = 1.33$). If the angle of incidence is 30°, what is the angle of refraction?

(1) 22°
(2) 30°
(3) 22.1°
(4) 40°

11. A force of 100 N is applied at an angle of 30° to the horizontal. Work done in moving 5 m is:

(1) 500 J
(2) 250 J
(3) 433 J
(4) 100 J

12. A wire has $R = 10\ \Omega$ at 20°C. If $\alpha = 0.004/°\text{C}$, what is the resistance at 50°C?

(1) 11.2 Ω
(2) 10.6 Ω
(3) 15 Ω
(4) 12.4 Ω

13. What is the molar mass of a gas, if 2.5 g occupies 1.12 L at STP?

(1) 32 g/mol
(2) 22.4 g/mol
(3) 50 g/mol
(4) 28 g/mol

14. Which of the following is the correct electronic configuration for Sulfur ($Z = 16$)?

(1) $1s^2 2s^2 2p^6 3s^2 3p^4$
(2) $1s^2 2s^2 2p^6 3s^2 3p^6$
(3) $1s^2 2s^2 2p^6 3s^2 3p^5$
(4) $1s^2 2s^2 2p^6 3s^2 3p^3$

15. What is the pH of a solution when the concentration $[H^+]$ is 1×10^{-5} mol/L?

(1) 5
(2) 9
(3) 7
(4) 4

16. What is the mass of 0.5 moles of water (H_2O)?

(1) 9 g
(2) 18 g
(3) 36 g
(4) 45 g

17. Which of the following represents the correct IUPAC name for CH_3CH_2OH?

(1) Methanol
(2) Ethanol
(3) Propanol
(4) Butanol

18. Which of the following gases is responsible for the greenhouse effect?

(1) Oxygen
(2) Carbon dioxide
(3) Nitrogen
(4) Hydrogen

19. What is the oxidation state of chlorine in Cl_2O_7?

(1) $+7$
(2) $+5$
(3) -1
(4) $+3$

20. Which of the following is the strongest acid in aqueous solution?

(1) HCl
(2) H_2SO_4
(3) HNO_3
(4) HI

21. Find K_a for acetic acid if conc. is 0.1 M and $[H^+]$ at equilibrium is 1.0×10^{-3} M.

(1) 1×10^{-5}
(2) 1×10^{-4}
(3) 1×10^{-3}
(4) 1×10^{-6}

22. Which of the following compounds is the most soluble in water?

(1) NaCl
(2) $CaSO_4$
(3) $BaSO_4$
(4) AgCl

23. Which of the following represents the correct IUPAC name for $CH_3CH_2CH_2OH$?

(1) Methanol
(2) Ethanol
(3) Propan-1-ol
(4) Butanol

24. What is the pH of a 0.01 M solution of hydrochloric acid (HCl)?

(1) 12
(2) 2
(3) 7
(4) 1

25. Which of the following is the correct hybridization of the central atom in CO_2?

(1) sp^3 (2) sp^2
(3) sp (4) dsp^3

26. What is the molar volume of an ideal gas at STP?

(1) 22.4 L/mol (2) 22.8 L/mol
(3) 24.0 L/mol (4) 20.0 L/mol

27. If the roots of $x^2 - 5x + 6 = 0$ are p and q, then what is the value of $p + q$?

(1) 5 (2) -5
(3) 6 (4) -6

28. Area of a triangle with base 12 cm and height 5 cm is:

(1) 30 cm^2 (2) 60 cm^2
(3) 24 cm^2 (4) 12 cm^2

29. Find the value of $\sin 30^\circ + \cos 60^\circ$.

(1) 1 (2) $\frac{\sqrt{3}}{2}$
(3) $\frac{1}{2}$ (4) 0

30. Find the roots of the quadratic equation $2x^2 - 4x - 6 = 0$.

(1) $x = 1, -3$ (2) $x = 3, -1$
(3) $x = -3, 1$ (4) $x = -1, 3$

31. Father is three times as old as his son. Their sum is 60. Son's age is:

(1) 15 years (2) 20 years
(3) 18 years (4) 25 years

32. Find the area of a circle whose radius is 7 cm.

(1) 49π cm^2 (2) 14π cm^2
(3) 49 cm^2 (4) 154 cm^2

33. Find the value of $\frac{5}{6} + \frac{3}{4}$.

(1) $\frac{19}{12}$ (2) $\frac{14}{12}$
(3) $\frac{13}{12}$ (4) $\frac{8}{12}$

34. Find the value of $\log_2 32$.

(1) 5 (2) 4
(3) 6 (4) 3

35. If $\sin\theta = \frac{3}{5}$, find the value of $\cos\theta$.

(1) $\frac{4}{5}$ (2) $\frac{2}{5}$
(3) $\frac{3}{5}$ (4) $\frac{1}{5}$

36. If $S_n = 3n^2 + 2n$, find the 4th term (a_4) of the AP.

(1) 23 (2) 18
(3) 15 (4) 12

37. Find the value of $\tan 45^\circ$.

(1) 1 (2) $\sqrt{2}$
(3) 0 (4) $\frac{1}{\sqrt{2}}$

38. Find the derivative of $3x^2 + 4x + 5$ with respect to x.

(1) $6x + 4$ (2) $6x + 5$
(3) $3x + 4$ (4) $6x + 3$