MHT CET 2026 Physics Sample Paper 1

Question Booklet Version	MH-CET-2026 Roll No.	Question Booklet Sr. No.
1		
(Write this number on your Answer Sheet)	Answer Sheet No.	(Write this number on your Answer Sheet)

Day and Date :

Duration: 3.00 hours
Total Marks : 200

This is to certify that, the entries of MH-CET Roll No. and Answer Sheet No. have been correctly written and verified.

Candidate's Signature *Invigilator's Signature*

Instructions to Candidates

1. The test contains **50 Multiple Choice Questions (MCQs)** in the **Physics** section.
2. The total time allotted for the examination is **60 minutes**. The countdown timer on the top right of the screen will display the remaining time.
3. Candidates can navigate between questions in the Physics section at any time during the exam.
4. **Login Procedure:** Enter your Roll No. and Password as provided. Verify your name and photograph appearing on the screen. If there is a mismatch, report it to the invigilator immediately.
5. **Navigating Questions:** To select a question, click on the question number in the Question Palette on the right side of the screen.
6. **Answering:** To select your answer, click on the button of one of the options. To deselect, click on the chosen option again or click the **'Clear Response'** button.
7. **Saving:** You **MUST** click the **'Save Next'** button to save your answer for any question. Clicking 'Mark for Review' will not save the answer for final evaluation unless it is specifically answered and saved.
8. **Marking Scheme:**
   - Each correct response is awarded **one (1) mark**.
   - There is **no negative marking** for incorrect answers.
9. Status of questions will be shown by color codes: Green (Answered), Red (Not Answered), White (Not Visited), and Violet (Marked for Review).
10. Candidates are not allowed to open any other software or browser tabs. Doing so will result in the automated locking of the terminal.
11. **Rough Work:** All calculations must be done on the **Scribble Pad** provided. Candidates must write their Roll No. on the pad and return it to the invigilator before leaving the hall.
12. A digital Log Table/Calculator (if applicable) will be accessible via a button on the exam interface.
13. The test will automatically submit once the timer reaches zero. Candidates cannot submit the exam before the first 90 minutes.
14. Use of mobile phones, smartwatches, or any electronic gadgets is strictly prohibited.
15. No marks will be deducted for questions that are left unattempted.

1. Consider the following logic circuit. The circuit consists of three gates: an AND gate, an OR gate, and a NOT gate. The inputs to the AND gate are $A = 1$ and $B = 0$. The output of the AND gate is fed into the input of the OR gate, which has another input $C = 1$. The output of the OR gate is then passed through a NOT gate. What is the final output of the circuit?

A) 0 **B)** 1

C) Undefined **D)** 2

2. The speed of a wave is $30\,\mathrm{m/s}$. If the distance between 11 crests is $1\,\mathrm{m}$, what is the frequency (in Hz)?

A) $300\,\mathrm{Hz}$ **B)** $330\,\mathrm{Hz}$

C) $350\,\mathrm{Hz}$ **D)** $360\,\mathrm{Hz}$

3. Given the voltage equation $V = 100\sqrt{2}\sin(\omega t)$ and capacitance $C = 2\,\mu\mathrm{F}$, calculate the RMS current.

A) $10\,\mathrm{A}$ **B)** $20\,\mathrm{A}$

C) $50\,\mathrm{A}$ **D)** $100\,\mathrm{A}$

4. Point charge of $10\,\mu C$ is placed at the origin. At what location on the X-axis should a point charge of $40\,\mu C$ be placed so that the net electric field is zero at $x = 2\,\mathrm{cm}$ on the X-axis?

A) $6\,\mathrm{cm}$ **B)** $4\,\mathrm{cm}$

C) $8\,\mathrm{cm}$ **D)** $-4\,\mathrm{cm}$

5. A light ray is passing from air (refractive index $\mu_1 = 1.0$) into water (refractive index $\mu_2 = 1.33$). If the angle of incidence in air is 30°, what is the angle of refraction in water?

A) 22.5° **B)** 19.5°

C) 25.0° **D)** 20.0°

6. A body of mass 2 kg is moving in a circular path of radius 3 m with a constant speed of 6 m/s. What is the centripetal force acting on the body?

A) 4 N

B) 24 N

C) 8 N

D) 12 N

7. The longest wavelength associated with the Paschen series is:

$$(\text{Given } R_H = 1.097 \times 10^7 \text{ SI unit}).$$

A) $1.094 \times 10^{-6}\,\text{m}$

B) $2.973 \times 10^{-6}\,\text{m}$

C) $3.646 \times 10^{-6}\,\text{m}$

D) $1.876 \times 10^{-6}\,\text{m}$

8. The electrostatic potential due to an electric dipole at a distance r varies as:

A) r

B) $\frac{1}{r^2}$

C) $\frac{1}{r^3}$

D) $\frac{1}{r}$

9. What is the ratio of the wavelength of the Lyman series limit to that of the Paschen series limit in the hydrogen spectrum?

A) $\frac{9}{9}$

B) $\frac{1}{4}$

C) $\frac{9}{3}$

D) $\frac{2}{2}$

10. In an LC circuit, the inductance L is $2\,\text{H}$ and the capacitance C is $4\,\mu\text{F}$. What is the frequency of oscillation of the circuit?

A) $100\,\text{Hz}$

B) $50\,\text{Hz}$

C) $25\,\text{Hz}$

D) $200\,\text{Hz}$

11. A 1.5 kg block is placed on a frictionless surface and attached to a spring with a spring constant of 100 N/m. If the block is displaced by 0.2 m from its equilibrium position, what is the potential energy stored in the spring?

A) $2.0\,\text{J}$

B) $1.0\,\text{J}$

C) $0.5\,\text{J}$

D) $3.0\,\text{J}$

12. A water tank is open at the top and has a hole of area $10^{-4}\,\mathrm{m}^2$ at the bottom. The height of the water column is 5 m. What is the speed of the water flowing out of the hole? (Take $g = 10\,\mathrm{m/s}^2$)

A) 5 m/s

B) 10 m/s

C) 15 m/s

D) 20 m/s

13. Evaluate the integral: ∫ log((2 + x)$^{2 + x}$) dx

A) $(2+x)^{2+x} + C$

B) $(2+x)\log((2+x)^{2+x}) + C$

C) $(2+x)\cdot(2+x)^{x} + C$

D) $(2+x)(2+x)^{x}(\log(2+x)+1) + C$

14. A capacitor has a capacitance of $5\,\mu\mathrm{F}$ and a potential difference of $10\,\mathrm{V}$ is applied across it. What is the charge on the capacitor?

A) $5 \times 10^{-6}\,\mathrm{C}$

B) $5 \times 10^{-5}\,\mathrm{C}$

C) $5 \times 10^{-7}\,\mathrm{C}$

D) $5 \times 10^{-8}\,\mathrm{C}$

15. \(
Evaluate the definite integral:

$$\int_0^{\frac{\pi}{2}} \frac{dx}{1+(\cot x)^{101}} = ?$$

\)

A) $\frac{\pi}{4}$

B) $\frac{\pi}{2}$

C) $\frac{1}{2}$

D) 1

16. The electric field at a point in space is $2 \times 10^3\,\mathrm{N/C}$ and the potential at the same point is 100 V. What is the potential energy of a charge of 5 Î¼C placed at that point?

A) 0.5 mJ

B) 1.0 mJ

C) 2.0 mJ

D) 5.0 mJ

17. A thin spherical shell of radius $0.5\,\mathrm{m}$ and mass $2\,\mathrm{kg}$ is rotating about its axis of symmetry with an angular velocity of $10\,\mathrm{rad/s}$. What is its moment of inertia?

A) $1\,\mathrm{kg \cdot m^2}$ **B)** $0.5\,\mathrm{kg \cdot m^2}$

C) $2.0\,\mathrm{kg \cdot m^2}$ **D)** $4.0\,\mathrm{kg \cdot m^2}$

18. Find the ratio of K.E. and P.E. when a particle performs SHM and is at $\frac{1}{n}$ times its amplitude from the mean position.

A) $n^2 - 1 : 1$ **B)** $1 : n^2 - 1$

C) $1 : n$ **D)** $n : 1$

19. Energy stored in a capacitor is given by the equation

$$E = \frac{1}{2}CV^2$$

where: - C is the capacitance, - V is the voltage, - E is the energy stored. Given the values of C, V, and E, determine the energy stored.}

A) $E = \frac{1}{2}CV^2$ **B)** $E = CV$

C) $E = CV^3$ **D)** $E = \frac{1}{2}CV$

20. A particle is moving in a circle of radius 2 m with a constant speed of 4 m/s. What is the centripetal acceleration?

A) \(2 m/s^{2}\) **B)** \(4 m/s^{2}\)

C) \(8 m/s^{2}\) **D)** \(16 m/s^{2}\)

21. What is the expression for the time period of a satellite orbiting Earth at a height h above the Earth's surface?

A) $T = 2\pi\sqrt{\frac{R^3}{GM}}$ **B)** $T = 2\pi\sqrt{\frac{(R+h)^3}{GM}}$

C) $T = \frac{1}{2\pi}\sqrt{\frac{GM}{(R+h)^3}}$ **D)** $T = 2\pi\sqrt{\frac{(R^2+h^2)}{GM}}$

22. A steel wire with mass per unit length $7.0 \times 10^{-3}\,\text{kg/m}$ is under a tension of $70\,\text{N}$. The speed of transverse waves in the wire will be:

A) $100\,\text{m/s}$ **B)** $50\,\text{m/s}$

C) $10\,\text{m/s}$ **D)** $200\pi\,\text{m/s}$

23. An object of mass $0.5\,\text{kg}$ is moving with a velocity of $10\,\text{m/s}$. What is the momentum of the object?

A) $5\,\text{kg}\cdot\text{m/s}$ **B)** $10\,\text{kg}\cdot\text{m/s}$

C) $50\,\text{kg}\cdot\text{m/s}$ **D)** $0.5\,\text{kg}\cdot\text{m/s}$

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

A) $5.33 \times 10^{-10}\,\text{N}$ **B)** $2.67 \times 10^{-9}\,\text{N}$

C) $4.67 \times 10^{-9}\,\text{N}$ **D)** $1.33 \times 10^{-9}\,\text{N}$

25. A 2 kg object is in a gravitational field where the acceleration due to gravity is $9.8\,\text{m/s}^2$. What is the gravitational potential energy of the object at a height of $5\,\text{m}$?

A) $49\,\text{J}$ **B)** $98\,\text{J}$

C) $196\,\text{J}$ **D)** $10\,\text{J}$

26. A simple pendulum of length $1\,\text{m}$ is oscillating with a small amplitude. If the acceleration due to gravity is $9.8\,\text{m/s}^2$, what is the time period of the pendulum?

A) $1.0\,\text{s}$ **B)** $2.0\,\text{s}$

C) $3.0\,\text{s}$ **D)** $4.0\,\text{s}$

27. A wire has a resistance of $10\,\Omega$ at 20°C. If the temperature coefficient of resistance of the material is $0.004\,\text{per}^\circ\text{C}$, what is the resistance of the wire at 50°C?

A) $12\,\Omega$ **B)** $10.6\,\Omega$

C) $15\,\Omega$ **D)** $20\,\Omega$

28. Rate of cooling of a body is 0.2°C/min when excess temperature is 20°C. The proportionality constant k is:

A) $0.005\,\text{min}^{-1}$ **B)** $0.01\,\text{min}^{-1}$

C) $0.05\,\text{min}^{-1}$ **D)** $0.2\,\text{min}^{-1}$

29. A battery of 6 V is connected to the circuit as shown below. The current I drawn from the battery is:

A) $1\,\text{A}$ **B)** $2\,\text{A}$

C) $\frac{6}{11}\,\text{A}$ **D)** $\frac{4}{3}\,\text{A}$

30. Force between two point charges q_1 and q_2 placed in vacuum at a distance $r\,\text{cm}$ apart is F. Force between them when placed in a medium having dielectric $K = 5$ at $r/5\,\text{cm}$ apart will be:

A) $F/25$ **B)** $5F$

C) $F/5$ **D)** $25F$

31. The mass of proton, neutron, and helium nucleus are respectively $1.0073\,\text{u}, 1.0087\,\text{u}, 4.0015\,\text{u}$. The binding energy of the helium nucleus is:

A) $14.2\,\text{MeV}$ **B)** $56.8\,\text{MeV}$

C) $28.4\,\text{MeV}$ **D)** $7.1\,\text{MeV}$

32. A thin circular disc of mass M and radius R is rotating in a horizontal plane about an axis passing through its center and perpendicular to its plane with angular velocity ω. If another disc of the same dimensions but of mass $M/2$ is placed gently on the first disc co-axially, then the new angular velocity of the system is:

A) $\frac{4}{5}\omega$ **B)** $\frac{5}{4}\omega$

C) $\frac{2}{3}\omega$ **D)** $\frac{3}{2}\omega$

33. A 5-ohm resistor is connected to a 10 V battery. Calculate the current flowing through the resistor.

A) 1.0 A **B)** 2.0 A

C) 0.5 A **D)** 0.2 A

34. The clarity of the image formed on the retina of the eye depends on the ____

A) visual angle

B) environmental condition

C) distance of eye-lens from retina

D) material of the object whose image is observed

35. A photon and an electron have the same energy E. If λ_p is the wavelength of the photon and λ_e is the de Broglie wavelength of the electron, then the ratio $\frac{\lambda_p}{\lambda_e}$ is:

A) $\frac{E}{mc^2}$

B) $\frac{\sqrt{2mE}}{c^2}$

C) $\frac{\sqrt{2mE}}{c}$

D) $\frac{\sqrt{2mE}}{R}$

36. A block of mass $5\,\text{kg}$ 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) $20\,\text{N}$

B) $15\,\text{N}$

C) $10\,\text{N}$

D) $25\,\text{N}$

37. A wire of length 2 m and resistance $8\,\Omega$ is stretched to double its original length, keeping the volume constant. What is the new resistance of the wire?

A) $16\,\Omega$

B) $32\,\Omega$

C) $8\,\Omega$

D) $4\,\Omega$

38. A gas expands from a volume of 2 mÂ³ to 4 mÂ³ against a constant pressure of 5 atm. How much work is done by the gas during expansion? (1 atm = $1.01 \times 10^5\,\text{Pa}$)

A) $2.02 \times 10^5\,\text{J}$

B) $1.01 \times 10^5\,\text{J}$

C) $5.02 \times 10^5\,\text{J}$

D) $1.02 \times 10^5\,\text{J}$

39. Two resistors, 4 ohm and 6 ohm, are connected in parallel, and this combination is connected in series with a 2 ohm resistor to a 12V battery. What is the total power dissipated?

A) 32.7 W

B) 28.8 W

C) 24.0 W

D) 36.0 W

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

A) $10\,\mathrm{m/s}$

B) $20\,\mathrm{m/s}$

C) $5\,\mathrm{m/s}$

D) $40\,\mathrm{m/s}$

41. A real gas within a closed chamber at $27^\circ\mathrm{C}$ undergoes the cyclic process as shown in the figure. The gas obeys the equation $PV^3 = RT$ for the path A to B. The net work done in the complete cycle is (assuming $R = 8\,\mathrm{J/molK}$):

A) 225 J

B) 205 J

C) 20 J

D) $-20\,\mathrm{J}$

42. A cylindrical pipe has a radius of $0.1\,\mathrm{m}$. If the speed of water flowing through the pipe is $2\,\mathrm{m/s}$, calculate the volume flow rate of water through the pipe.

A) $0.0628\,\mathrm{m^3/s}$

B) $0.0314\,\mathrm{m^3/s}$

C) $0.1256\,\mathrm{m^3/s}$

D) $0.02\,\mathrm{m^3/s}$

43. A satellite is orbiting the Earth at a height of $10^4\,\mathrm{km}$ above the Earth's surface. If the radius of the Earth is $6.4 \times 10^6\,\mathrm{m}$, calculate the orbital speed of the satellite. (Gravitational constant $G = 6.67 \times 10^{-11}\,\mathrm{N \cdot m^2/kg^2}$ and Earth's mass $M = 6 \times 10^{24}\,\mathrm{kg}$)

A) $7.0\,\mathrm{km/s}$

B) $8.0\,\mathrm{km/s}$

C) $9.0\,\mathrm{km/s}$

D) $10.0\,\mathrm{km/s}$

44. A 10 μC charge is placed in an electric field of $5 \times 10^3 \mathrm{N/C}$. What is the force experienced by the charge?

A) $5 \times 10^{-2}\,\mathrm{N}$

B) $5 \times 10^{-3}\,\mathrm{N}$

C) $5 \times 10^{2}\,\mathrm{N}$

D) $5 \times 10^{4}\,\mathrm{N}$

45. \(
The particular solution of the differential equation,

$$xy\frac{dy}{dx} = x^2 + 2y^2 \quad \text{when} \quad y(1) = 0 \quad \text{is:}$$

\)

A) $\frac{x^2+y^2}{x^3} = 1$

B) $x^2 + y^2 = x$

C) $x^2 + 2y^2 = x^4$

D) $x^2 + y^2 = x^4$

46. A solid cylinder and a hollow cylinder, each of mass M and radius R, are rotating with the same angular velocity ω. What is the ratio of their rotational kinetic energies $\left(\frac{K_{\text{hollow}}}{K_{\text{solid}}}\right)$?

A) 1

B) 2

C) 3

D) 3/2

47. At a height h above the Earth's surface, the acceleration due to gravity becomes $\frac{g}{\sqrt{3}}$. What is the value of h in terms of the Earth's radius R?

A) R

B) $\sqrt{2}R$

C) $2R$

D) $\frac{R}{2}$

48. If a(4 + x^2) = x + y - x^3 = a^3 * (dy/dx) at x = 1, then the value of (dy/dx) is:

A) 5

B) 4

C) 3

D) 2

49. A particle is executing Simple Harmonic Motion (SHM). The ratio of potential energy and kinetic energy of the particle when its displacement is half of its amplitude will be:

A) 1 : 1

B) 2 : 1

C) 1 : 4

D) 1 : 3

50. The equation for the RMS velocity is given as

$$v_{\text{rms}} = \sqrt{\frac{3RT}{M_0}}$$

where R is the gas constant, T is the temperature, and M_0 is the molecular mass. If the temperature is increased, find the new RMS velocity v_{rms} when the temperature is doubled.}

A) $\sqrt{3}v_{\text{rms}}$

B) $2v_{\text{rms}}$

C) $\sqrt{2}v_{\text{rms}}$

D) $\frac{v_{\text{rms}}}{\sqrt{2}}$

PHYSICS ANSWER KEY

1. (A)	**2. (A)**	**3. (A)**	**4. (A)**	**5. (A)**
6. (B)	**7. (D)**	**8. (B)**	**9. (A)**	**10. (B)**
11. (A)	**12. (A)**	**13. (D)**	**14. (B)**	**15. (A)**
16. (B)	**17. (A)**	**18. (A)**	**19. (A)**	**20. (C)**
21. (B)	**22. (A)**	**23. (A)**	**24. (A)**	**25. (B)**
26. (B)	**27. (A)**	**28. (B)**	**29. (A)**	**30. (B)**
31. (C)	**32. (C)**	**33. (B)**	**34. (C)**	**35. (C)**
36. (A)	**37. (B)**	**38. (A)**	**39. (A)**	**40. (A)**
41. (B)	**42. (A)**	**43. (A)**	**44. (A)**	**45. (D)**
46. (B)	**47. (A)**	**48. (B)**	**49. (D)**	**50. (B)**