

JEE MAIN Sample Paper Physics

Duration: 1 Hour

Maximum Marks: 100

Instructions

1. This paper contains TWO sections: Section A and Section B.
2. Section A contains 20 Multiple Choice Questions (MCQs).
3. Section B contains 5 Numerical Value Questions.
4. All questions are compulsory.
5. Each correct answer carries **+4 marks**.
6. Each incorrect answer carries **-1 mark**.
7. No negative marking for unattempted questions.

Section A — Multiple Choice Questions

- Q1.** Bullet of mass m , loses $1/3$ velocity after distance s . Further penetration: [2024]
- (A) $s/3$
(B) $4s/5$
(C) $s/8$
(D) $s/2$
- Q2.** Distance between object and real image d , magnification m , focal length: [2023]
- (A) $md/(1+m)^2$
(B) $d/(1+m)^2$
(C) $m^2d/(1+m)$
(D) d/m
- Q3.** Body cools $60^\circ\text{C} \rightarrow 50^\circ\text{C}$ in 10 min, room temp 25°C . Temperature after next 10 min: [2022]
- (A) 40°C
(B) 42.8°C
(C) 45°C
(D) 38.5°C
- Q4.** Two spheres radii R_1, R_2 , charges Q_1, Q_2 . Ratio E_1/E_2 : [2025]
- (A) R_2/R_1
(B) R_1/R_2
(C) R_1^2/R_2^2
(D) 1
- Q5.** Electron accelerated through 10,000 V. de-Broglie wavelength: [2021]
- (A) 12.2 pm
(B) 1.22 nm
(C) 0.122 Å
(D) 122 pm
- Q6.** Circular disc mass M , radius R , rotating about diameter. Moment of inertia: [2024]
- (A) $MR^2/2$
(B) $MR^2/4$
(C) $2MR^2/5$
(D) $MR^2/12$

- Q7.** Magnetic field at center of equilateral triangular loop side a , current I : [2023]
 (A) $9\mu_0 I / (2\pi a)$
 (B) $3\mu_0 I / (2\pi a)$
 (C) $2\sqrt{3}\mu_0 I / (\pi a)$
 (D) $18\mu_0 I / (\pi a)$
- Q8.** Capacitor C , charge Q , energy W . Charge increased to $2Q$, energy: [2022]
 (A) $2W$
 (B) $W/2$
 (C) $4W$
 (D) $W/4$
- Q9.** Wavelength of first Lyman line, H: 1215 Å. For Na^{10+} : [2025]
 (A) 121.5 Å
 (B) 12.15 Å
 (C) 10 Å
 (D) 12150 Å
- Q10.** LC circuit, max charge Q . Charge when energy equally divided: [2024]
 (A) $Q/2$
 (B) $Q/\sqrt{2}$
 (C) $Q/\sqrt{3}$
 (D) $Q/4$
- Q11.** Wire resistance 10 bent to circle. Resistance between diametrically opposite points: [2021]
 (A) 10
 (B) 5
 (C) 2.5
 (D) 1.25
- Q12.** Reversible engine, $1/6$ heat to work, sink temp decreases 62°C , efficiency doubles. Source sink temp: [2023]
 (A) 372 K, 310 K
 (B) 99°C , 37°C
 (C) 472 K, 410 K
 (D) 620 K, 520 K
- Q13.** Work to blow soap bubble radius R : W . Work to blow bubble radius $2R$: [2022]
 (A) $2W$
 (B) $4W$
 (C) $8W$
 (D) $\sqrt{2}W$
- Q14.** Vectors \vec{A} , \vec{B} , $|\vec{A} + \vec{B}| = |\vec{A} - \vec{B}|$. Angle between them: [2025]
 (A) 0°
 (B) 90°
 (C) 60°
 (D) 180°
- Q15.** Orbital velocity satellite near earth v , at altitude half earth radius: [2021]
 (A) $3v/2$
 (B) $\sqrt{3/2}v$
 (C) $\sqrt{2/3}v$
 (D) $2v/3$
- Q16.** Transparent cube side 15 cm, air bubble. Apparent depth front 6 cm, back 4 cm. Refractive index: [2024]
 (A) 1.5
 (B) 1.6
 (C) 1.4
 (D) 1.33

Q17. SHM, amplitude A , speed half maximum. Distance from mean: [2023]

- (A) $A/2$
- (B) $\sqrt{3}A/2$
- (C) $A/\sqrt{2}$
- (D) $3A/4$

Q18. Transistor CE mode, signal 20 mV, $I_b = 20$ A, $I_c = 2$ mA. Transconductance: [2022]

- (A) 0.1^{-1}
- (B) 0.01^{-1}
- (C) 100^{-1}
- (D) 10^{-1}

Q19. Radioactive sample 1.6 Ci, half-life 2.5 days. Activity after 10 days: [2025]

- (A) 0.4 Ci
- (B) 0.8 Ci
- (C) 0.1 Ci
- (D) 0.16 Ci

Q20. Square frame side L dipped in soap solution, force on one side due to surface tension T : [2024]

- (A) TL
- (B) $2TL$
- (C) $4TL$
- (D) $TL/2$

Section B — Numerical Value Questions

Q21. Mass 5 kg, force $\vec{F} = (10\hat{i} + 20\hat{j})$ N. Acceleration magnitude $X\sqrt{5}$ m/s²: [2024]

Q22. Capacitors 2 F and 3 F, charged 100 V and 200 V, connected in parallel. Common potential X V: [2023]

Q23. Young's double slit, $d = 1$ mm, $L = 1$ m, 10th bright fringe 5 mm. Wavelength $X \times 10^{-7}$ m: [2025]

Q24. Long solenoid 500 turns/m, current 2 A. B at end $X\pi \times 10^{-4}$ T: [2022]

Q25. Diatomic gas $\gamma = 1.4$, work 200 J in isobaric expansion. Heat given X J: [2024]

Answer Key

Section A

1.(B)	2.(A)	3.(B)	4.(A)	5.(C)
6.(B)	7.(A)	8.(C)	9.(C)	10.(B)
11.(C)	12.(B)	13.(B)	14.(B)	15.(C)
16.(A)	17.(B)	18.(A)	19.(C)	20.(B)

Section B

21. 2	22. 160	23. 5	24. 2	25. 700
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