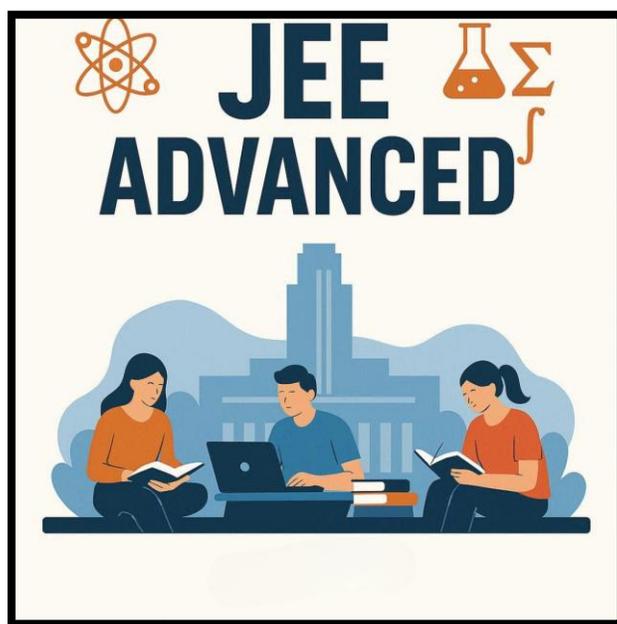


JEE Advanced 10 Years PYQs with Solutions (2016–2025)



Complete Practice Guide for IIT Aspirants

Published by **Swan India Publication**

✦✦ Dedication

This book is dedicated to the IIT Aspirants –

*To the dreamers who aim for excellence,
to the thinkers who challenge themselves every single day,
and to the achievers who know that success comes with perseverance,
discipline, and clarity of thought.*

*Preparing for JEE Advanced is not just about solving questions,
it is about building resilience, sharpening the mind, and unlocking true
potential.*

*May this book be a guiding companion in your journey,
reminding you that with consistent effort and belief in yourself,
your dream IIT is never too far.*

✦✦ To every student chasing the IIT dream – this book is for you.

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Yearwise Solved Papers (2016–2025)

This section provides **complete solved papers** of JEE Advanced for the last 10 years.

Each paper is solved **step-by-step** with detailed explanations, ensuring students learn not just the answers, but also the **best solving techniques**.

Available Yearwise Papers

- JEE Advanced 2016 – Paper 1 & Paper 2 (Solved)
 - JEE Advanced 2017 – Paper 1 & Paper 2 (Solved)
 - JEE Advanced 2018 – Paper 1 & Paper 2 (Solved)
 - JEE Advanced 2019 – Paper 1 & Paper 2 (Solved)
 - JEE Advanced 2020 – Paper 1 & Paper 2 (Solved)
 - JEE Advanced 2021 – Paper 1 & Paper 2 (Solved)
 - JEE Advanced 2022 – Paper 1 & Paper 2 (Solved)
 - JEE Advanced 2023 – Paper 1 & Paper 2 (Solved)
 - JEE Advanced 2024 – Paper 1 & Paper 2 (Solved)
 - JEE Advanced 2025 – Paper 1 & Paper 2 (Solved)
-

How to Use Yearwise Papers

- Attempt each **year's full paper** in a **3-hour exam environment** (both Paper 1 & Paper 2).
 - Check solutions only after completing the paper → this simulates **real exam conditions**.
 - Analyse which subject (Physics, Chemistry, and Mathematics) took more time and where mistakes happened.
 - Track repeated question types → many **concepts & patterns** are revisited in different years.
-

⚡ By solving these yearwise papers, aspirants will develop exam temperament, accuracy, and speed – the three pillars of cracking JEE Advanced.

JEE ADVANCED 2016

Paper 1

Physics

SECTION I — Single Correct Answer Type

(8 questions; +3 for correct, -1 for wrong, 0 if unattempted)

Q1. A particle of mass m and charge q is released from rest in a uniform electric field E . Its kinetic energy after time t is:

- (A) $\frac{qEt}{m}$
- (B) $\frac{qEt^2}{m}$
- (C) $\frac{2m}{q^2 E^2 t^2}$
- (D) $\frac{2m}{q^2 E^2 t}$

Answer: (C)

Solution: Force $F = qE$. $a = \frac{qE}{m}$. $v = at = \frac{qEt}{m}$. $K = \frac{1}{2}mv^2 = \frac{1}{2}m\left(\frac{qEt}{m}\right)^2 = \frac{q^2 E^2 t^2}{2m}$.

= -50 cm). Equivalent focal length of the combination is:

- (A) 10 cm
- (B) 25 cm
- (C) 33.3 cm
- (D) 70 cm

Answer: (C)

Solution: $\frac{1}{f_{eq}} = \frac{1}{20} + \frac{1}{-50} = \frac{5-2}{100} = \frac{3}{100}$. $f_{eq} = \frac{100}{3} = 33.33$ cm.

Q3. A long straight wire carries current $I = 10$ A. Magnetic field at $r = 2$ cm from it is (use $\mu_0 = 4\pi \times 10^{-7}$ H/m):

- (A) 1.0×10^{-5} T
- (B) 1.0×10^{-4} T
- (C) 2.0×10^{-4} T
- (D) 4.0×10^{-4} T

Answer: (B)

Solution: $B = \frac{\mu_0 I}{2\pi r} = \frac{4\pi \times 10^{-7} \times 10}{2\pi \times 0.02} = \frac{4 \times 10^{-6}}{0.04} = 1.0 \times 10^{-4}$ T.

Q4. Projectile launched at 45° with speed 20 m/s. Max height (take $g = 10$ m/s²) is:

- (A) 5 m
- (B) 10 m
- (C) 15 m
- (D) 20 m

Answer: (B)

Solution: Vertical component $u_y = 20 \sin 45^\circ = 20 \frac{1}{\sqrt{2}} = 14.142$ m/s. $H = \frac{u_y^2}{2g} = \frac{(14.142)^2}{20} = \frac{200}{20} = 10$ m.

Q5. A solenoid has $n = 1000$ turns/m and current $I = 2$ A. Magnetic field inside (approx.) is: ($\mu_0 = 4\pi \times 10^{-7}$)

- (A) 2.5×10^{-4} T
- (B) 22.5×10^{-3} T
- (C) $8\pi \times 10^{-4}$ T
- (D) $8\pi \times 10^{-3}$ T

Answer: (B) (C is equivalent numeric form):

Solution: $B = \mu_0 n I = (4\pi \times 10^{-7}) \times 1000 \times 2 = 8\pi \times 10^{-4} \text{ T}$. Numeric: $8\pi \approx 25.133 \Rightarrow 8\pi \times 10^{-4} \approx 2.5133 \times 10^{-3} \text{ T}$. So (B) is correct numeric value; (C) is same symbolic expression.

Q6. A particle does SHM with amplitude $A=0.1\text{m}$ and angular frequency $\omega=10 \text{ rad/s}$. Its maximum speed is:

- (A) 0.1 m/s
- (B) 1.0 m/s
- (C) 10 m/s
- (D) 0.01 m/s

Answer: (B)

Solution: $v_{\max} = \omega A = 10 \times 0.1 = 1.0 \text{ m/s}$.

Q7. A radioactive sample has half-life 30 min. Fraction remaining after 120 min is:

- (A) 1/8
- (B) 1/16
- (C) 1/4
- (D) 1/2

Answer: (B)

Solution: Number of half-lives $= 120/30 = 4$. Remaining fraction $= (1/2)^4 = 1/16$.

Q8. A wire of resistance R has its length doubled and diameter doubled. The new resistance is:

- (A) 4R
 - (B) 2R
-

(C) $R/2$

(D) $R/4$

Answer: (C)

Solution:

Resistance $R = \rho (l/A)$

- New length = $2l$
- New area = $4A$ (since diameter doubled \Rightarrow area $\times 4$)
So, $R' = \rho (2l / 4A) = R/2$

SECTION II — Multiple Correct Answer Type

(4 questions; +4 for fully correct, -2 if any wrong option selected)

Q9. When a parallel-plate capacitor is charged by a time-varying current, which of the following statements are correct?

- (A) Displacement current flows between the plates
- (B) Magnetic field is produced in the region between the plates
- (C) Electric field between the plate's increases with time
- (D) No current flows in the connecting wires

Answer: A, B, C

Solution:

- Displacement current exists between plates \rightarrow (A) correct
 - Time-varying E-field produces B-field \rightarrow (B) correct
 - Since capacitor charges, E increases with time \rightarrow (C) correct
 - Conduction current does flow in wires \rightarrow (D) wrong
-

Q10. In Young's double slit experiment, the fringe width is $\beta = \lambda D/d$. If slit separation d is doubled, then:

- (A) Fringe width doubles
- (B) Fringe width halves
- (C) Central maximum shifts
- (D) Intensity envelope remains same

Answer: B, D

Solution:

- $\beta \propto 1/d \rightarrow$ if d doubles, β halves \rightarrow (B) correct
 - Central fringe position unchanged \rightarrow (C) wrong
 - Overall intensity envelope due to single slit unchanged \rightarrow (D) correct
-

Q11. A radioactive nucleus has half-life T . After $2T$ time, which are true?

- (A) 75% nuclei decayed
- (B) Activity becomes $1/4$ of initial
- (C) Number left = $1/4$ of initial
- (D) Mass becomes half

Answer: A, B, C

Solution:

- After 2 half-lives $\rightarrow 1/4$ remain \rightarrow (C) correct
 - Decayed = $3/4 = 75\%$ \rightarrow (A) correct
 - Activity $\propto N \rightarrow$ also $1/4 \rightarrow$ (B) correct
 - Mass left is $1/4$, not half \rightarrow (D) wrong
-

Q12. For a particle in uniform circular motion of radius r and speed v :

- (A) Centripetal acceleration = v^2/r
(B) Velocity is constant in magnitude and direction
(C) Work done by centripetal force in one revolution = 0
(D) Tangential acceleration = 0

Answer: A, C, D

Solution:

- Centripetal acceleration formula \rightarrow (A) correct
 - Direction of velocity changes \rightarrow (B) wrong
 - Centripetal force \perp displacement \rightarrow work done zero \rightarrow (C) correct
 - Uniform circular motion \rightarrow no tangential acceleration \rightarrow (D) correct
-

SECTION III — Integer / Numerical Answer Type

(4 questions; +3 for correct, no negative)

Q13. A particle executes SHM: $x = 0.05 \sin(100t)$ m. Time period in ms (nearest integer).

Answer: 63

Solution:

$$\omega = 100 \text{ rad/s}$$

$$T = 2\pi/\omega = 0.0628 \text{ s} = 62.8 \text{ ms} \approx 63 \text{ ms}$$

Q14. The equivalent resistance between opposite corners of a cube made of 12 resistors of 1Ω each is $5/6 \Omega$. Nearest integer value is:

Answer: 1

Solution:Exact value = 0.833Ω Nearest integer = 1Ω

Q15. In a photoelectric experiment, stopping potential is 2 V for light of frequency 1.2×10^{15} Hz. Work function in eV (nearest integer)?

($h = 6.6 \times 10^{-34}$ J·s, $e = 1.6 \times 10^{-19}$ C)

Answer: 3**Solution:**Photon energy = $h\nu = 7.92 \times 10^{-19}$ J = 4.95 eVKE_{max} = eV = 2 eVWork function = $4.95 - 2 = 2.95$ eV ≈ 3 eV

Q16. A satellite orbits just above Earth's surface. Orbital velocity (km/s) is (nearest integer):

($g = 9.8$ m/s², $R = 6400$ km)

Answer: 8**Solution:** $v = \sqrt{gR} = \sqrt{9.8 \times 6.4 \times 10^6} = 7.9 \times 10^3$ m/s = 7.9 km/s ≈ 8 km/s**SECTION IV — Match the Column**

(2 questions; marking as per instructions, here full correct matches given)

Q17. Match physical quantities with SI units.

- A. Magnetic flux
- B. Power
- C. Resistance
- D. Pressure

Column II:

- (p) Weber
- (q) Watt
- (r) Ohm
- (s) Pascal

Answer: A-p, B-q, C-r, D-s

Q18. Match phenomena with the laws/principles.

- A. Diffraction
- B. Electromagnetic induction
- C. Photoelectric effect
- D. Motion of planets

Column II:

- (p) Huygens principle
- (q) Faraday's law
- (r) Einstein's photoelectric relation
- (s) Newton's law of gravitation

Answer: A-p, B-q, C-r, D-s

About Swan India Publication

Swan India Publication is committed to providing **high-quality, exam-oriented study material** for India's toughest competitive exams, including **JEE Advanced, JEE Main, NEET, and Board Exams**.

Our mission is to empower students with:

- **Authentic content and reliable solutions** prepared by subject experts.
- **Student-friendly formats** that make complex concepts easier to understand.
- **Practice-driven resources** that help aspirants build speed, accuracy, and confidence.

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