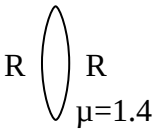
MEMORY BASED QUESTIONS JEE–MAIN EXAMINATION – APRIL 2026

(HELD ON SATURDAY 04th APRIL 2026) **TIME : 3:00 PM TO 6:00 PM**

PHYSICS

TEST PAPER WITH SOLUTION

1. As shown figure for a biconvex lens focal length is f and both radius of curvatures are R. Find value of f/R



(1) 1.25 (2) 1.5

(3) 2 (4) 2.5

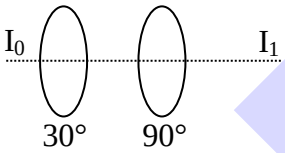
Ans. **(1)**

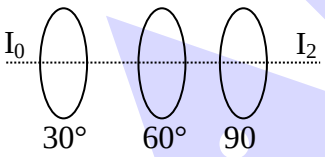
Sol. $\frac{1}{f} = (1.4 - 1)\left(\frac{1}{R} - \frac{1}{-R}\right)$

$\frac{1}{f} = \frac{0.8}{R}$

$\frac{f}{R} = 1.25$

2. Two setup of polarizers are used to polarize natural light as shown. Find value of ratio of intensities $\frac{I_1}{I_2}$. Angle of axes is shown in figure from a fixed axis.





(1) $\frac{4}{9}$ (2) $\frac{3}{4}$

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

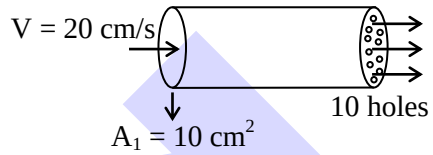
Ans. **(1)**

Sol. $I_1 = \frac{I_0}{2}\cos^2 60° = \frac{I_0}{8}$

$I_2 = \frac{I_0}{2}\cos^2 30° \cos^2 30° = \frac{9I_0}{32}$

$\frac{I_1}{I_2} = \frac{4}{9}$

3. Figure shows a pipe with cross-section area 10 cm^2. Water flows from one end with velocity 20 cm/s. Other end of the pipe is closed and consists of 10 holes each of area 30 mm^2. find velocity of water coming out from each hole.



(1) 66 cm/s (2) 0.66 cm/s

(3) 6.6 cm/s (4) 66 mm/s

Ans. **(1)**

Sol. Continuity equation

$A_1V_1 = A_2V_2$

$10 \times 10^{-4} \times 20 \times 10^{-2} = 10 \times 30 \times 10^{-6} \times V_2$

$v_2 = \frac{2}{3}$ m/s

$\Rightarrow 0.66$ m/s $\Rightarrow$ 66 cm/s

4. **Assertion (A) :** Free charge cannot exist inside conductor.

Reason (R): If a free charge is kept between the plates of a capacitor, then it will experience force and it will drift.

(1) A & R both correct and R explain the A.

(2) A & R both correct and R does not explain A.

(3) A is true but R is false.

(4) A is false but R is true

Ans. **(2)**

Sol. Theoretical Questions

Both statements are correct but Reason does not explain the Assertion.

5. Material of $\mu_r = 400$ is present inside a solenoid where magnetic field is found to be 1T. If magnetic intensity here is $\alpha \times 10^5$ SI units, find α.
($\mu_0 = 4\pi \times 10^{-7}$ SI units)

(1) $\frac{1}{4\pi}$ (2) $\frac{1}{16\pi}$

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

Ans. (2)

Sol. $H = \frac{B}{\mu} = \frac{B}{\mu_0\mu_r} = \frac{1}{400\times 4\pi\times 10^{-7}}$

$H = \frac{1}{16\pi} \times 10^5$

6. In a YDSE experiment a sheet of thickness t and $\mu = 1.56$ introduced at a slit. The central maxima shift to position of 7^{th} maxima. Wavelength of light is 480 nm. If t = xμm find the value of x.

Ans. (6)

Sol. $\Delta y = (\mu - 1)\, t\, \frac{D}{d} = 7\frac{\lambda D}{d}$

$(\mu - 1)t = 7\lambda$

$(1.56 - 1)t = 7 \times 480 \times 10^{-9}$

$t = 6\mu m$

7. **Statement-1 :** Two gases H_2 and O_2 are having same average kinetic energy, then they have same temperature.

Statement-2 : H_2 and O_2 will have same V_{rms} at same temperature.

(1) Statement-1 & Statement-2 both are correct and Statement-2 is correct explanation of Statement-1.

(2) Both Statement-1 & Statement-2 correct but Statement-2 is not correct explanation of Statement-1.

(3) Statement-1 true and Statement-2 is false.

(4) Both are false.

Ans. (3)

Sol. $V_{rms} = \sqrt{\frac{3RT}{M}}$

$KE = \frac{3}{2}nRT$

8. A solenoid of radius 2 cm and with 125 turns is kept in a uniform magnetic field of 0.4 T carries a current of 1A. The axis of solenoid makes angle 30° with the field. The torque acting on the solenoid will be :

(1) $\pi \times 10^{-6}$ N-m (2) $\pi \times 10^{-2}$ N-m

(3) $2\pi \times 10^{-6}$ N-m (4) $2\pi \times 10^{-2}$ N-m

Ans. (2)

Sol. Magnetic moment of solenoid = iAN

$= 1 \times \pi \times \left(\frac{2}{100}\right)^2 \times 125$

$\therefore \tau = |\vec{M}\times\vec{B}| = 125 \times 4\pi \times 10^{-4} \times 0.4 \times \sin 30°$

$= 100\pi \times 10^{-4}$ N-m.

9. A force $\vec{F} = (5\hat{i} + 2\hat{j})$ N is acting for 2 sec on an object of mass 0.1 kg, which is initially at rest at origin. Find final position.

(1) $50\hat{i} + 20\hat{j}$ (2) $100\hat{i} + 20\hat{j}$

(3) $50\hat{i} + 40\hat{j}$ (4) $100\hat{i} + 40\hat{j}$

Ans. (4)

Sol. $\vec{F} = 5\hat{i} + 2\hat{j}$

$\vec{a} = \frac{\vec{F}}{m} = \frac{5}{0.1}\hat{i} + \frac{2}{0.1}\hat{j} = 50\hat{i} + 20\hat{j}$

$\vec{S} = \frac{1}{2}\vec{a}t^2 = \frac{1}{2}\times(50\hat{i} + 20\hat{j})2^2$

$\vec{S} = 100\hat{i} + 40\hat{j}$

10. A Zener diode has voltage rating of 10 volts and maximum power drop across Zener diode is 0.5 watt. What resistance (in Ohm) should be connected in series with Zener diode so that it can be operated safely by a battery of 25 volts?

(1) 300 Ω (2) 200 Ω

(3) 30 Ω (4) 20 Ω

Ans. (1)

Sol. Maximum current from diode

$i = \frac{P}{V} = \frac{0.5}{10} = 0.05A$

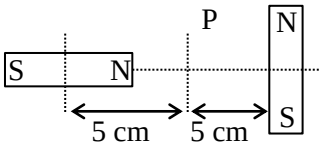
Now let resistance is R

$V_B = i\,(R + R_{diode})$

$25 = 0.05 \times R + 10$

$R = \frac{15}{0.05} = 300\ \Omega$

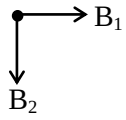
11. Point P at r = 5 cm distance from centers of two bar magnetic each of magnetic moment $3\sqrt{5}$ A-m. Magnetic field at P is ?



(1) 1.5 mT (2) 12 mT
(3) 2.5 mT (4) 4.5 mT

Ans. **(2)**

Sol. $B_{net} = \sqrt{B_1^2 + B_2^2} = \frac{\mu_0}{4\pi}\frac{M}{(r)^3}\sqrt{5}$



$= 10^{-7} \times 3\sqrt{5} \times \sqrt{5} \times \frac{8}{10^{-3}}$

$= 120 \times 10^{-4} = 12$ mT

12. **Assertion :** For a diode in reverse biased, current is independent of applied voltage before breakdown and it increases drastically just after breakdown.

Reason : Before breakdown only majority charge carriers flow.

(1) A & R both correct and R explain the A.
(2) A & R both correct and R does not explain A.
(3) A is true but R is false.
(4) A is false but R is true

Ans. **(3)**

Sol. Theoretical

13. Electron and proton are accelerated with same potential to achieve de-Broglie wavelength of λ_1 and λ_2 (m_p = 1849 me) then $\frac{\lambda_1}{\lambda_2}$ = ?

(1) 37 (2) 43
(3) $\frac{1}{41}$ (4) $\frac{1}{48}$

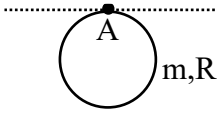
Ans. **(2)**

Sol. $\lambda = \frac{h}{\sqrt{2mq\Delta v}}$

$\lambda \propto \frac{1}{\sqrt{m}}$

$\frac{\lambda_e}{\lambda_p} = \sqrt{\frac{m_p}{m_e}} = \sqrt{1849} = 43$

14. Figure show a disc of mass 'm' & radius R hinged at point 'A' and free to oscillate about the axis. Find the time period for small oscillation of the disc



(1) $2\pi\sqrt{\frac{3R}{4g}}$ (2) $2\pi\sqrt{\frac{R}{g}}$
(3) $2\pi\sqrt{\frac{5R}{4g}}$ (4) $2\pi\sqrt{\frac{R}{4g}}$

Ans. **(3)**

Sol. $I_{disc} = \frac{mR^2}{4} + mR^2 = \frac{5mR^2}{4}$

$\therefore$ For small displacement

$\tau = -mgR\theta$

$\therefore \alpha = -\frac{mgR}{\frac{5mR^2}{4g}}\theta$

$\therefore \omega = \sqrt{\frac{4g}{5R}}$

$\therefore T = 2\pi\sqrt{\frac{5R}{4g}}$

15. A particle is projected from ground whose x, y -co-ordinates varies with time according to equations $x = 24t$, $y = 43.6t - 4.9t^2$. Find initial angle θ made by $\vec{v}$ with x-axis.

(1) $\cot^{-1}(1.82)$ (2) $\tan^{-1}(1.82)$
(3) $\tan^{-1}(2.82)$ (4) $\tan^{-1}(3.4)$

Ans. **(2)**

Sol. $v_x \Rightarrow \frac{dx}{dt} = 24$

$v_y = \frac{dy}{dt} = 43.6 - 9.8t$

$\tan\theta = \frac{v_y}{v_x} = \frac{43.6 - 9.8t}{24}$

at t = 0 {Initially}

$\tan\theta \Rightarrow \frac{43.6}{24} = 1.82$

or $\theta = \tan^{-1}(1.82)$

16. At what height does gravitational acceleration becomes $\frac{1}{9}$th of gravity at the surface of a planet, if radius of the planet is R?

(1) $\frac{4R}{3}$

(2) 2R

(3) $2\sqrt{2}R$

(4) $2\sqrt{3}R$

Ans. (2)

Sol. $g_h = \frac{g_s}{\left(1+\frac{h}{R}\right)^2}$

$\frac{g_s}{9} = \frac{g_s}{\left(1+\frac{h}{R}\right)^2}$

$1+\frac{h}{R} = 3$

$h = 2R$

17. Two cars A & B are moving on a road with speed 100 km/hr and 80 km/hr. A stone is thrown from car B with speed V km/hr relative to it. Stone hit the car A with speed 5 m/s with respect to car A (ignore gravity). The value of V is :- [all the given velocities are in same direction]

(1) 40 km/hr

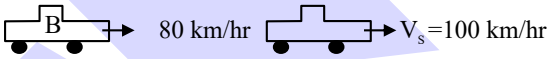
(2) 38 km/hr

(3) 38 m/s

(4) 40 m/s

Ans. (2)

Sol.



$\vec{V} = \vec{V}_{SB}$

$\vec{V} = \vec{V}_S - \vec{V}_B$

$V_B + V = \vec{V}_S$

$\boxed{\vec{V}_S = V + 80}$

$\vec{V}_{SA} = 5m/s = 18km/hr$

$\vec{V}_S - \vec{V}_A = \vec{V}_{SA}$

$V + 80 - 100 = 18$ km/hr

$V - 20 = 18$

$V = 38$ km/hr

18. A toy gun fires bullets in every possible direction. It is found that bullet lands at a maximum horizontal distance of 6.4m from gun. Find speed of projection ($g = 10m/s^2$)

Ans. **(8)**

Sol. $R_{max} = \frac{v^2}{g} = 6.4$

$v = \sqrt{64} = 8$ m/s

19. A rod of length L is heated from temp T_1 to T_2 Let $T_2 - T_1 = \Delta T$ and expansion of rod = ΔL_1

The rod is further heated from T_2 to T_3 such that $T_1 + T_3 = 2T_2$. Find expansion of rod ΔL_2

(1) $\Delta L_2 = \Delta L_1 (1+ \alpha\Delta T)$

(2) $\Delta L_2 = \Delta L_1 (1 + 2\alpha\Delta T)$

(3) $\Delta L_2 = \Delta L_1 (1+ \alpha^2\Delta T^2)$

(4) $\Delta L_2 = \Delta L_1 (1+ 2\alpha^2\Delta T^2)$

Ans. **(1)**

Sol. $T_3 - T_2 = (2T_2 - T_1) - T_2 = T_2 - T_1$

at temp T_2

$L_1 = L (1 + \alpha(T_2 - T_1) = L + L\alpha\Delta T$ ....(1)

$L_1 - L = \alpha\Delta T \Rightarrow \Delta L_1 = \alpha\Delta T$

at temp T_3

$L_2 = L_1 (1 + \alpha (T_3 - T_2)) = L_1 + L_1 \alpha\Delta T$ ...(2)

(2) – (1)

$L_2 - L_1 = (L_1 - L) + (L_1 - L) \alpha\Delta T$

$\Delta L_2 = \Delta L_1 + \Delta L_1 \alpha\Delta T$

$= \Delta L_1 (1 + \alpha\Delta T)$

20. $\vec{B} = B_0 \sin(\omega t - kx)\hat{j}$ is magnetic field of EM wave then its electic field is:

(1) $-E_0 \sin(\omega t - kx)\ \hat{k}$

(2) $+E_0 \sin(\omega t - kx)\ \hat{i}$

(3) $-E_0 \sin(\omega t - kx)\ \hat{i}$

(4) $+E_0 \sin(\omega t - kx)\ \hat{k}$

Ans. **(1)**

Sol. $\hat{E} = \hat{B} \times \hat{C}$

$= \hat{j} \times \hat{i} = -\hat{k}$

$\Rightarrow E = -E_0 \sin(\omega t - kx)\hat{k}$

21. Why does only few α-particles rebound from gold nucleus in Rutherford experiment

S1→Size of gold nucleus is very less than gold atom

S2→Impact parameter of α particles is very less.

S3→Nuclear charge of He^{+2} particles is very less as compared to gold

S4→Very few α particles undergo head on collision.

Then correct statement are

(1) S1 and S2

(2) S1, S2 and S3

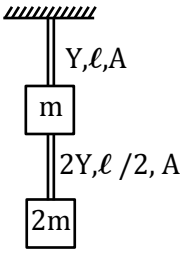
(3) S1, S2 and S4

(4) S1 and S3

Ans. **(3)**

Sol. Theoritical

22. Two rods and two blocks are connected as shown in figure. Find out ratio of extension in the rods :-



(1) 6 : 1 (2) 2 : 1

(3) 3 : 1 (4) 4 : 1

Ans. **(1)**

Sol. $\Delta\ell = \frac{T\ell}{YA}$

$\Delta\ell_1 = \frac{3mg\ell}{YA}$

$\Delta\ell_2 = \frac{2mg(\ell/2)}{2YA} = \frac{mg\ell}{2YA}$

$\frac{\Delta\ell_1}{\Delta\ell_2} = 6$

23. Match the given quantities according to their dimension :-

(A) ϕ (Work function)	(P) T^{-1}
(B) h (Planck's constant)	(Q) $ML^2T^{-3}A^{-1}$
(C) V_S (Stopping potential)	(R) ML^2T^{-1}
(D) f (frequency)	(S) ML^2T^{-2}

(1) A-R, B-S, C-Q, D-P
(2) A-S, B-R, C-P, D-Q
(3) A-S, B-R, C-Q, D-P
(4) A-P, B-Q, C-R, D-S

Ans. **(3)**

Sol. $[\phi] = ML^2T^{-2}$

$$[h] = \left[\frac{E}{f}\right] = ML^2T^{-2}T = ML^2T^{-1}$$

$$[V_S] = \left[\frac{E}{q}\right] = \frac{ML^2T^{-2}}{AT} = ML^2T^{-3}A^{-1}$$

$[f] = T^{-1}$

24. A dipole is kept in an electric field $\vec{E}_1 = E_0\hat{i}$. It oscillates with some frequency. New electric field $\vec{E}_2 = 2E_0\hat{j} + 2E_0\hat{k}$ is superimposed over existing electric field. Now dipole is kept in direction of E_{net} and is displaced slightly, it oscillates with some other frequency. Find percentage change in frequency.

(1) 100% (2) 200%
(3) 50% (4) 73%

Ans. **(4)**

Sol. Initially for small oscillation

$\vec{\tau} = PE\sin\theta \approx PE\theta$

$$\alpha = \frac{PE}{I}\theta$$

$$\omega^2 = \frac{PE}{I}$$

$$\omega = \sqrt{\frac{PE}{I}}$$

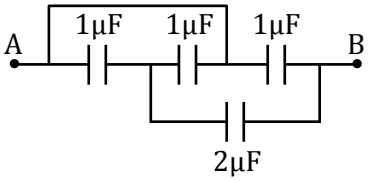
Finally, $\vec{E}_{net} = \vec{E}_1 + \vec{E}_2 = E_0\hat{i} + 2E_0\hat{j} + 2E_0\hat{k}$

$$E_{net} = \sqrt{E_0^2 + 4E_0^2 + 4E_0^2} = 3E_0$$

$$\omega' = \sqrt{\frac{P3E_0}{I}} = 1.73\sqrt{\frac{PE_0}{I}}$$

% change in ω = 73%

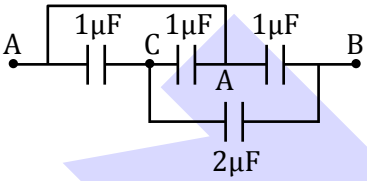
25. For given capacitor circuit, find out equivalent capacitance between A and B.

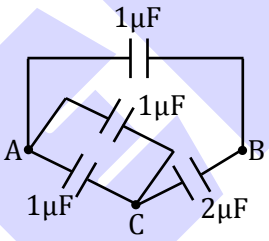


(1) 4 μF (2) 2 μF
(3) 1 μF (4) 0.5 μF

Ans. **(2)**

Sol.





$C_{AB} = 2\mu F$

भरोसा जताया नहीं, जीता जाता है

जब नतीजे मायने रखते हैं,
तो स्टूडेंट्स **ALLEN** KOTA को चुनते हैं

JOIN
LEADER COURSE
For Class 12th pass students

Target: JEE (Main+Adv.) 2027

Batches Starting from

15 April &
06, 27 May 2026

Click to know more

AIR 1
JEE Adv. 2025
Rajit Gupta
7 Year Classroom Course

ALLEN

ALLEN Scholarship Admission Test (ASAT)

Win up to
90% Scholarship*
On JEE, NEET &
Foundation Courses

Test Dates: 5, 12, 19 & 26 April

Register for ~~500~~ ₹99/-

*Limited period offer, subject to the scholarship rules and the T&Cs.

ALLEN ONLINE

Ace **JEE 2027** with our

Leader Online Course

- **900+** hours of LIVE classes
- **30** latest pattern tests
- **24/7** AI-powered doubt support & more

Avail up to a

90% **scholarship** with **ASAT.**

Enrol Now

ALLEN ONLINE

Prefer learning at your own pace?

Start anytime with the **Leader Self-Study PLUS Course**

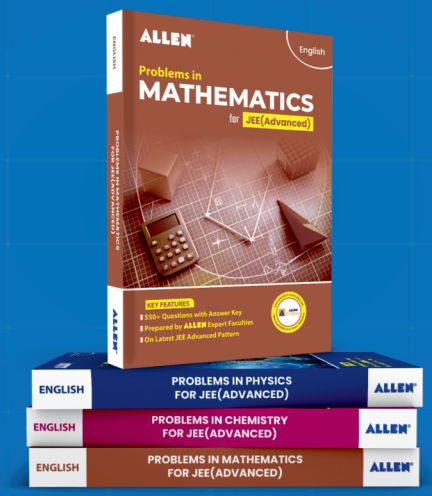
- **2000+** recorded video lectures
- **32** latest-pattern tests
- Digital study material & more

Enrol Now

DON'T PREPARE HARDER
PREPARE RIGHT !

Advanced-level MCQs

Prepared By ALLEN Experts



Well Graded Exercise

Detailed Answer Key

SHOP NOW on ALLEN e-Store

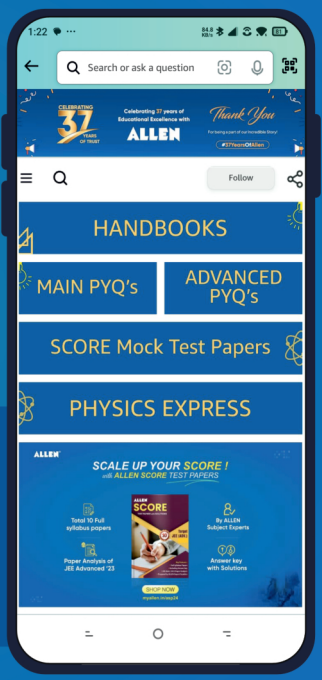
ALLEN

Get The Latest
IIT-JEE Special Books
at Your Door Steps...!!

JOIN THE JOURNEY OF LEARNING

with

HANDBOOKS | ADVANCED-QB | SCORE PAPERS
PHYSICS EXPRESS | MAIN PYQ's | Adv. PYQ's



SHOP NOW

Available in HINDI & ENGLISH