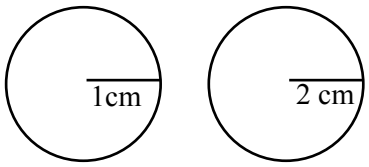
MEMORY BASED QUESTIONS JEE–MAIN EXAMINATION – APRIL 2026

(HELD ON SATURDAY 04th APRIL 2026) **TIME : 9:00 AM TO 12:00 NOON**

PHYSICS

TEST PAPER WITH SOLUTION

1. 

Find the work done in expanding the soap bubble from 1 cm to 2 cm. Surface tension is $\gamma = 7.2 \times 10^{-2}$ N/m

(1) 542.6×10^{-6} J

(2) 543.6×10^{-6} J

(3) 542.6×10^{-5} J

(4) 545.6×10^{-6} J

Ans. (1)

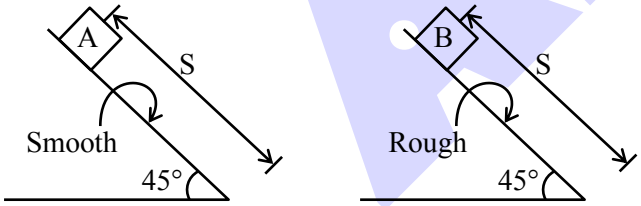
Sol. $W = \Delta U = 2\gamma\,[4\pi(2r)^2 - 4\pi r^2]$

$W = 2 \times 7.2 \times 10^{-2} \times 4\pi\,[4r^2 - r^2]$

$= 8\pi \times 7.2 \times 10^{-2} \times 3 \times (1 \times 10^{-2})^2$

$W = 542.6 \times 10^{-6}$ J

2. Two block A and B released from rest on two inclined plane of same inclination but one incline plane has rough surface as shown in figure. If block B takes 50% more time to reach bottom than A, find coefficient of friction (μ):

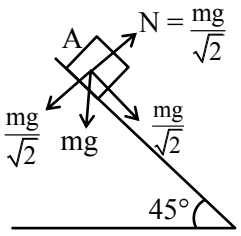


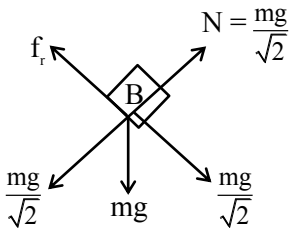
(1) $\frac{5}{9}$ (2) $\frac{13}{9}$

(3) $\frac{3}{9}$ (4) $\frac{7}{9}$

Ans. (1)

Sol.





$a = \frac{g}{\sqrt{2}}$ $a = \frac{g}{\sqrt{2}}(1-\mu)$

$S = \frac{1}{2}\left(\frac{g}{\sqrt{2}}\right)t^2$ $t_B = \sqrt{\frac{2\sqrt{2}S}{g(1-\mu)}}$

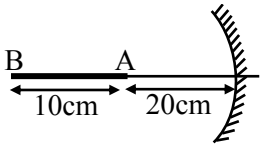
$t_A = \sqrt{\frac{2\sqrt{2}S}{g}}$

$t_B = 1.5\,t_A \Rightarrow t_B = \frac{3}{2}t_A$

$\frac{2\sqrt{2}S}{g(1-\mu)} = \frac{9}{4}\left(\frac{2\sqrt{2}S}{g}\right) \Rightarrow 1-\mu = \frac{4}{9}$

$\mu = 1 - \frac{4}{9} = \frac{5}{9}$

3. Find length of image of rod AB.



f = 10 cm

(1) 10 cm (2) 5 cm

(3) 15 cm (4) 20 cm

Ans. (2)

Sol. For A $u = -20$ cm, $f = -10$ cm

$\frac{1}{v} + \frac{1}{u} = \frac{1}{f}$ $\therefore v = \frac{u \times f}{u - f} = -20\text{cm}$

For B $u = -30$ cm, $f = -10$ cm

$\frac{1}{v} + \frac{1}{u} = \frac{1}{f}$

$v = \frac{uf}{u - f} = -15\text{cm}$

Length of image = 20 – 15 = 5 cm

4. Nuclei A & B form a nucleus C. BE per nucleon for A, B & C are 3MeV, 7MeV & 6MeV. Energy produced in following is :

$2A^3 + B^4 \rightarrow C^{10}$

(1) 12 MeV (2) 14 MeV

(3) 13 MeV (4) 15 MeV

Ans. (2)

Sol. Energy produced 'Q' is

$Q = BE(RHS) - BE(LHS)$

$= 10 \times 6 - [2 \times 3 \times 3 + 4 \times 7]$

$= 60 - [18 + 28]$

$Q = 60 - 46 = 14$ MeV

5. If force $\vec{F} = 2t\hat{i} + 3t^2\hat{j}$ and mass of particle m = 2 Kg then find power at t = 2s if particle was initially at rest :

(1) 54 watt (2) 58 watt

(3) 56 watt (4) 52 watt

Ans. (3)

Sol. $\vec{a} = \frac{\vec{F}}{m} = t\hat{i} + \frac{3t^2}{2}\hat{j}$

$\int dv = \int a dt$

$\vec{v} \Rightarrow \frac{t^2}{2}\hat{i} + \frac{t^3}{2}\hat{j}$

$P \Rightarrow \vec{F}.\vec{v} \Rightarrow t^3 + \frac{3}{2}t^5$

at t = 2 s

$P = 2^3 + \frac{3}{2} \times 2^5$

$= 8 + 3 \times 2^4$

$= 8 + 48$

$\Rightarrow 56$ watt

6. Two projectiles A & B are launched with same speed at angles 15° & 30° respectively. Find ratio of range A to range B.

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

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

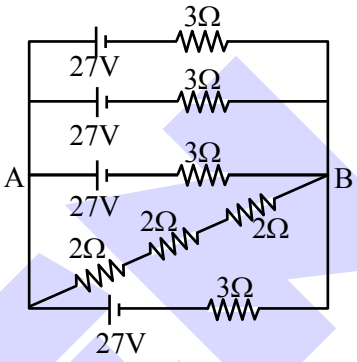
Ans. (2)

Sol. $\frac{R_A}{R_B} = \frac{u^2 \sin 2\theta_A / g}{u^2 \sin 2\theta_B / g}$

$= \frac{\sin 2\theta_A}{\sin 2\theta_B} = \frac{\sin 30^\circ}{\sin 60^\circ} = \frac{\frac{1}{2}}{\frac{\sqrt{3}}{2}}$

$\frac{R_A}{R_B} = \frac{1}{\sqrt{3}}$

7. Find voltage V_{AB} and i_{BA} ?



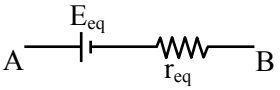
(1) 24V, 2A (2) 24V, 1A

(3) 18V, 2A (4) 18V, 1A

Ans. (2)

Sol. Equivalent circuit :

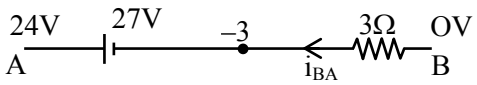
$Eeq = \frac{\frac{27}{3} + \frac{27}{3} + \frac{27}{3} + \frac{0}{6} + \frac{27}{3}}{\frac{1}{3} + \frac{1}{3} + \frac{1}{3} + \frac{1}{6} + \frac{1}{3}}$



$= \frac{36}{9/6} = 24V$

$r_{eq} = \frac{1}{\frac{1}{3} + \frac{1}{3} + \frac{1}{3} + \frac{1}{6} + \frac{1}{3}} = \frac{2}{3}\Omega$

$i_{BA} = \frac{3}{3}$



$= 1A$

8. In an AC circuit a resistor 100Ω, inductor 0.1mH and a capacitor are connected in series against on AC source 220V, 70Hz. If power factor of circuit is $\frac{1}{2}$ and $|X_L - X_C| = \sqrt{3}\alpha$ Find α.

(1) $100\sqrt{3}$ (2) 100

(3) $\frac{100}{\sqrt{3}}$ (4) 1000

Ans. (2)

Sol. $\cos\phi = \frac{1}{2} \quad \phi = 60^\circ$

$\therefore \tan\phi = \sqrt{3} = \frac{|X_L - X_C|}{R}$

$\therefore |X_L - X_C| = R\sqrt{3} = 100\sqrt{3}\,\Omega$

$\alpha = 100$

9. A solid sphere of mass 'M' and radius 'R' is split into 2 pieces of masses $\frac{7M}{8}$ and $\frac{M}{8}$. Sphere of mass $\frac{7M}{8}$ is converted into a disc of radius 2R and thickness 't'. Its MOI becomes I_1 other piece is made into a solid sphere and its MOI becomes I_2. Find $\frac{I_1}{I_2}$:

(1) 150 (2) 140

(3) 130 (4) 120

Ans. (2)

Sol. Volume of $\frac{7M}{8}$

$\frac{7M}{8} = \rho \times \pi(2R)^2 \times t$

$\frac{7M}{8} = \frac{3M}{4\pi R^3} \times \pi(4R^2)t$

$t = \frac{7R}{24}$

$I_1 = \frac{1}{2}\left(\frac{7M}{8}\right)(2R)^2$

$M = \frac{4}{3}\pi R^3 \rho$

$\rho = \frac{3M}{4\pi R^3}$

$\frac{M}{8} = \frac{4}{3}\pi r^3 \times \rho$

$\frac{M}{8} = \frac{4}{3}\pi r^3 \times \frac{3M}{4\pi R^3}$

$r^3 = \frac{R^3}{8}$

$r = \frac{R}{2}$

$I_2 = \frac{2}{5}\left(\frac{M}{8}\right)\left(\frac{R}{2}\right)^2 = \frac{MR^2}{80}$

$\frac{I_1}{I_2} = \frac{7MR^2}{4 \times \frac{MR^2}{80}} = 140$

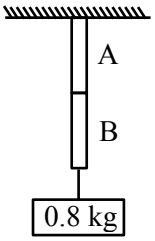
10. Length of rods are ℓ and 2ℓ respectively and their young's modulus are γ and 2γ respectively.

$\ell = 0.314$ m

R = 0.2 mm (same)

$\gamma = 2 \times 10^9$

Find total extension $\Delta\ell$ = ?



(1) 0.4 mm (2) 0.1 mm

(3) 0.2 mm (4) 0.3 mm

Ans. (3)

Sol. $\Delta\ell \Rightarrow \Delta\ell_1 + \Delta\ell_2$

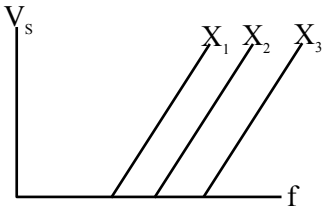
$\Rightarrow \frac{Mg.L_1}{A\gamma_1} + \frac{MgL_2}{A\gamma_2}$

$= \frac{Mg}{A}\left\{\frac{L}{\gamma} + \frac{2L}{2\gamma}\right\} = \frac{2MgL}{\gamma}$

$\Rightarrow \frac{0.8 \times 10}{\pi \times 4 \times 10^{-6}}\left\{\frac{2 \times 0.314}{2 \times 10^9}\right\}$

$= 2 \times 10^{-4}$ m = 0.2 mm

11. Graph shows stopping potential vs frequency of light incident. Choose the metal which will eject photoelectron with maximum kinetic energy for given frequency.



(1) X_1

(2) X_2

(3) X_3

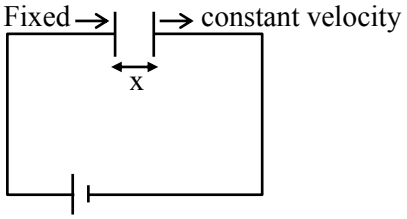
(4) can't be predicted

Ans. **(1)**

Sol. $K_m = eVs = E - \phi = hf - \phi$

The metal with highest stopping potential i.e. lowest threshold frequency will give maximum K.E. i.e, X_1.

12. If right plate of parallel plate capacitor is pulled at constant velocity. Then the rate of change of energy stored in capacitor is proportional to :-



(1) x^{-2}

(2) x^{-3}

(3) x^{-1}

(4) x^2

Ans. **(1)**

Sol. Capacitance $= C = \frac{\varepsilon_0 A}{x}$

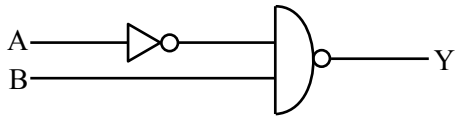
Energy stored $= U = \frac{1}{2}Cv^2$

$$U = \frac{1}{2}\frac{\varepsilon_0 A}{x}v^2$$

$$\frac{dU}{dt} = \frac{1}{2}\varepsilon_0 A v^2\left(-\frac{1}{x^2}\right)\frac{dx}{dt}$$

$$\frac{dU}{dt} \propto \frac{1}{x^2}$$

13. Two 4 bits binary numbers A = 1101 and B = 1010 are given in input logic. Find output y.



(1) 1000

(2) 1101

(3) 0010

(4) 0111

Ans. (2)

Sol. $Y = \overline{\overline{A}.B} = A + \overline{B}$

$A = 1101$

$B = 1010$

$\overline{B} = 0101$

$A + \overline{B} = 1101$

14. Resolving power of a telescope is 5×10^{-7} rad. If wavelength of incident light is 500 nm, then find diameter of aperture of telescope. (λ = 500 nm)

(1) 1.22 (2) 4.66

(3) 2.33 (4) 0.56

Ans. (1)

Sol. $\lambda_\theta \Rightarrow \frac{1.22\lambda}{D}$

$5 \times 10^{-7} = \frac{1.22 \times 500 \times 10^{-9}}{D}$

$D \Rightarrow 1.22$ m

15. An ideal gas has number of moles n = 2 initial volume V_0 and pressure $P = P_0\left[1+\left(\frac{V_0}{V}\right)^2\right]^{-1}$ is going from A(initial) to B (final) state so that volume becomes $3V_0$ find out $T_A - T_B$.

(1) $\frac{11P_0V_0}{10R}$ (2) $\frac{5P_0V_0}{11R}$

(3) $\frac{11P_0V_0}{5R}$ (4) $\frac{10P_0V_0}{11R}$

Ans. (1)

Sol. For $V = V_0$, $P = \frac{P_0}{2}$

$\frac{P_0}{2} \times V_0 = 2 \times R T_A$

$T_A = \frac{P_0V_0}{4R}$

for $V = 3V_0$ $\quad P = \frac{9P_0}{10}$

$\frac{9P_0}{10} \times 3V_0 = 2 \times RT_B$

$T_B = \frac{27P_0V_0}{20R}$

So, $T_B - T_A$

$= \frac{11P_0V_0}{10R}$

16. A slit of width 'a' is illuminated by the light of wavelength 'λ'. The linear separation between 1st and 3rd minima in the diffraction pattern produced on a screen placed at a distance 'D' from the slit is _____.

(1) $\frac{3D\lambda}{a}$ (2) $\frac{3D\lambda}{2a}$

(3) $\frac{D\lambda}{a}$ (4) $\frac{2D\lambda}{a}$

Ans. (4)

Sol. For minima

$y = \frac{nD\lambda}{a}$; $n = \pm1, \pm2, \ldots.$

For 1st minima $y_1 = \frac{D\lambda}{a}$

For 3rd minima $y_3 = \frac{3D\lambda}{a}$

separation $= y_3 - y_1$

$= \frac{2D\lambda}{a}$

17. In a screw gauge when the circular scale is given five complete rotation, it moves linearly by 2.5 mm. If the circular scale has 100 divisions, the least count of screw gauge is (mm)

(1) 1×10^{-2} (2) 5×10^{-3}

(3) 1×10^{-3} (4) 2×10^{-2}

Ans. (2)

Sol. Pich $\Rightarrow \frac{2.5\text{mm}}{5} = 0.5\text{mm} = 5\times10^{-4}\text{m}$

L.C. $\Rightarrow \frac{\text{Pitch}}{\text{No. of divisions}} = \frac{5\times10^{-4}}{100}\text{m}$

$= 5 \times 10^{-6}$ m

$= 5 \times 10^{-3}$ mm

18. There is a spiral which has

$r_i = 3$cm, $r_{ext} = 6$cm, I = 20 mA and N = 200 where,

r_i : internal radius

r_{ext} : external radius

N : number of turns

I : current

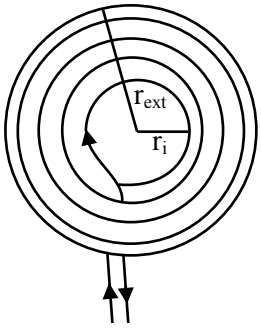
Find magnetic moment of the spiral :-

(1) 2.64×10^{-2} Am^2 (2) 4.87×10^{-2} Am^2

(3) 3.65×10^{-2} Am^2 (4) 6.67×10^{-2} Am^2

Ans. **(1)**

Sol.



$dM = (dI)\pi r^2$

$= (IdN)\pi r^2$

$M = \int_i^f I\left(\frac{N}{r_{ex} - r_i}\right) dr\,\pi r^2$

$M = \frac{I\pi N}{r_{ex} - r_i}\left[\frac{r^3}{3}\right]_{ri}^{r_{ex}}$

$M = \frac{I\pi N}{3(r_{ex} - r_{in})}(r_{ex}{}^3 - r_i^3)$

$M = \frac{20\times10^{-3}\times3.14\times200[6^3 - 3^3]10^{-6}}{3[3]\times10^{-2}}$

$M = \frac{2373.84\times10^{-6}}{9\times10^{-2}}$

$M = 263.76 \times 10^{-4}$

$M = 2.64 \times 10^{-2}$ Am^2

19. 2 forces are acting on a body:

$\vec{F}_1 = 3\hat{i} - 5\hat{j} + 2\hat{k}$

$\vec{F}_2 = 8\hat{i} + 2\hat{j} - 3\hat{k}$

and displacement of body is 25m along $3\hat{i} - 4\hat{j}$.

Find work done :-

(1) 225 Joule

(2) 200 Joule

(3) 125 Joule

(4) 325 Joule

Ans. **(1)**

Sol. $F_{net} = \vec{F}_1 + \vec{F}_2$

$\vec{F}_{net} = 11\hat{i} - 3\hat{j} - \hat{k}$

$\vec{S} = 25\frac{(3\hat{i} - 4\hat{j})}{5} = 15\hat{i} - 20\hat{j}$

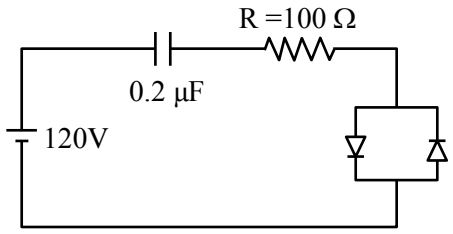
work $= \vec{F}.\vec{S}$

$= (11\hat{i} - 3\hat{j} - \hat{k}).(15\hat{k} + -20\hat{j})$

$= 165 + 60$

$= 225$ Joule

20. Each diode in circuit has 10Ω resistance in forwards bias and infinite resistance in reverse. Find time constant of circuit :



(1) 20 μs

(2) 22 μs

(3) 18 μs

(4) 5 μs

Ans. **(2)**

Sol. $\tau = RC$

$= 110 \times 0.2 \times 10^{-6}$

$= 22$ μs

21. Find final temperature of mixture of two gases. If one gas is at pressure P_1, temperature T_1, no. of moles n_1 & volume V_1. and second gas is at pressure P_2 temperature T_2, no. of moles n_2 & volume V_2. If final pressure is 'P' and Final volume is 'V'. Then find temperature of mixture.

(1) $\dfrac{PV}{\dfrac{P_1V_1}{T_1}+\dfrac{P_2V_2}{T_2}}$

(2) $\dfrac{PV(T_1+T_2)}{P_1V_1+P_2V_2}$

(3) $\dfrac{(P_1V_1+P_2V_2)(T_1+T_2)}{PV}$

(4) $\dfrac{PV}{P_1V_1}T_1+\left(\dfrac{PV}{P_2V_2}\right)T_2$

Ans. **(1)**

Sol. $n = n_1 + n_2$

$\therefore PV = nRT \qquad \Rightarrow n = \dfrac{PV}{RT}$

$$\frac{P(V)}{T_{Final}} = \frac{P_1V_1}{T_1} + \frac{P_2V_2}{T_2}$$

$$\frac{PV}{R\,T_f} = \frac{P_1V_1}{R\,T_1} + \frac{P_2V_2}{R\,T_2}$$

$$T_f = \frac{PV}{P_1V_1/T_1 + P_2V_2/T_2}$$

22. A particle is moving along x-axis where speed varies as $v^2 = 100 - x^2$. Determine time period :

(1) 4π (2) 8π

(3) 2π (4) π

Ans. **(3)**

Sol. $v^2 = 100 - x^2$

$v = \sqrt{100 - x^2}$

Comparing with

$v = \omega\sqrt{A^2 - x^2}$

$\omega = 1$

$A = 10$

Time period $(T) = \dfrac{2\pi}{\omega} = 2\pi$

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**

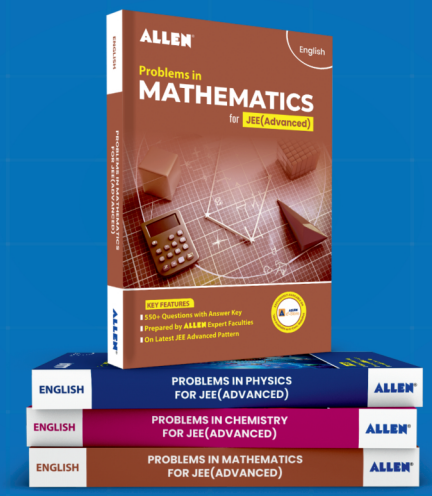
- **2000+** recorded video lectures
- **32** latest-pattern tests
- Digital study material & more

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

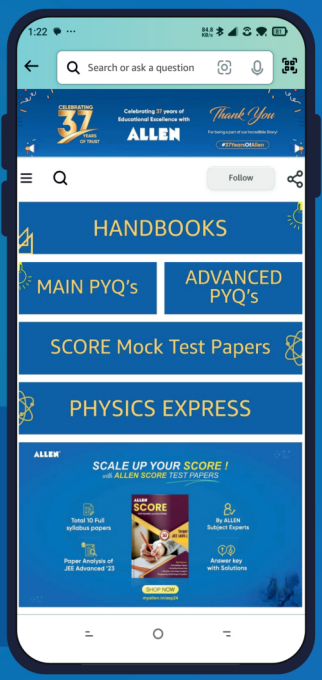
ALLEN

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