JEE (MAIN) 2026

MEMORY BASED QUESTIONS & TEXT SOLUTION

SHIFT-1

DATE & DAY: 22nd January 2026 & Thursday

PAPER-1

Duration: 3 Hrs.
Time: 09:00 – 12:00 IST

SUBJECT: PHYSICS

PART : PHYSICS

1. Two disc having same moment of inertia about their axis. Thickness is t_1 and t_2 and they have same density. If $R_1/R_2 = 1/2$, then find t_1/t_2.
   (1) 1/16   (2)16   (3) 1/4   (4)4

   Ans. **(2)**

2. In series R-L circuit, voltage of battery is 10 V. Resistance and inductance are 10Ω and 10 mH respectively. Find energy stored in the inductor when current reaches $\frac{1}{e}$ times of maximum value
   (1) 0.67 mJ   (2) 1.33 mJ   (3) 0.33 mJ   (4) 0.50 mJ

   Ans. **(1)**

3. In a potentiometer null point for two resistance R_1 and R_2 is at 40 cm as shown. If 16Ω is connected in parallel to R_2 then null point is at 50 cm then R_1 and R_2 are respectively.
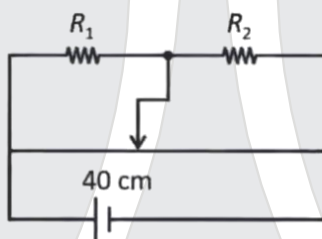
   (1) $16\Omega, 48\Omega$ (2) $32\Omega, 32/3\Omega$ (3)$16/3\Omega, 8\Omega$ (4) $32/3\Omega, 32\Omega$

   Ans. **(3)**

4. A projectile is thrown upward at an angle $60°$ with the horizontal. The speed of the projectile is $20\ m/s$ when its direction of motion is 45 with the horizontal. The initial speed of the particle is

   Ans. $20\sqrt{2}\ m/s$

5. Match the Following:-

LIST-1	LIST-2
a) Spring constant	i) $ML^2\ T^{-2}\ K^{-1}$
b) Thermal conductivity	ii) $ML°T^{-2}$
c) Boltzmann constant	iii) $ML^2\ T^{-2}\ A^{-2}$
d) Inductance	iv) $MLT^{-3}\ K^{-1}$

   Ans. **[a-(ii), b-(iv), c-(i), d-(iii)]**

6. Two thin circular rings are lying in the same plane and are touching each other at a single point. The first ring has mass 5 kg and radius 10 cm , while the second ring has mass 10 kg and radius 20 cm . Find the moment of inertia of the combined system about a straight line passing through the point of contact and lying in the plane of the rings.(tangent)
   (1) $\frac{24}{40}\ kg\ m^2$ (2) $\frac{27}{50}\ kg\ m^2$ (3) $\frac{17}{12}\ kg\ m^2$ (4) $\frac{27}{40}\ kg\ m^2$
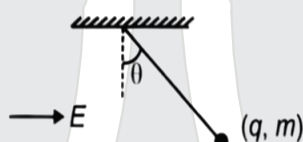
   Ans. **(4)**

7. In the given situation force at center on 1 kg mass is F_1. Now if $4m$ and $3m$ is interchanged the force is F_2. Given : $\frac{F_1}{F_2} = \frac{2}{\sqrt{\alpha}}$. Find α.

(1) $\alpha = 1$ (2) $\alpha = 3$ (3) $\alpha = 7$ (4) $\alpha = 5$
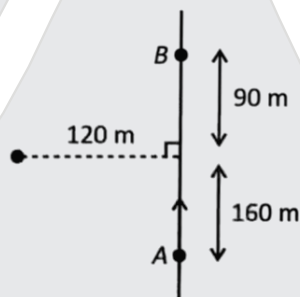
Ans. (4)

8. A simple pendulum with bob (mass m & charge) is in equilibrium in presence of horizontal electric field E then tension in thread is

(1) $\sqrt{m^2g^2 + q^2E^2}$ (2) $mg + qE$ (3) $mg + qE\tan\theta$ (4) $\sqrt{mg + qE}$
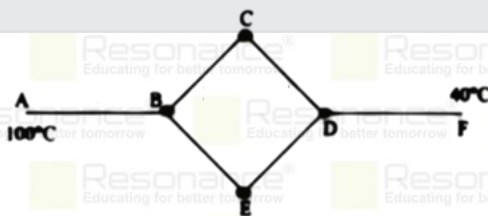
Ans. (1)

9. Detector D moves from A to B and observe the frequencies are differing by 10 Hz . Source is emitting frequency f_0 as shown: Speed of detector is 35 times less than speed of sound. Then f_0 is

(1) 150 Hz   (2) 250 Hz   (3) 350 Hz   (4) 400 Hz

Ans. (2)

10. Six identical Metal rods are arranged as shown, find the temperatures at junction at $B \& D$.

Ans. (80, 60)

11. In adiabatic process the temperature reduces to $\frac{1}{4}$ th and volume increases to 8 times. Find adiabatic constant of the gas.

(1) 3/4   (2) 5/7   (3) 5/3   (4) 8/5

Ans. (3)

12. An α-particle with KE 7.9 MeV is projected towards a stationary target nucleus of $Z = 79$. Find the distance of closest approach.

(1) 1.44×10^{-14}　　　(2) 2.88×10^{-14}　　　(3) 1.44×10^{-15}　　　(4) 2.88×10^{-15}

Ans. (2)

13. Six charges $(4 + q, 2 - q)$ are present at circle of radius r and centred at origin as shown. Electric field at origin is
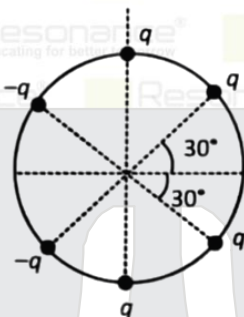
(1) $\frac{\sqrt{3}q}{4\pi\epsilon_0 r^2}\hat{\imath}$　　　(2) $\frac{\sqrt{3}q}{4\pi\epsilon_0 r^2}(-\hat{\imath})$　　　(3) $\frac{\sqrt{3}q}{2\pi\epsilon_0 r^2}(-\hat{\imath})$　　　(4) $\frac{\sqrt{3}q}{\pi\epsilon_0 r^2}(\hat{\imath})$

Ans. (3)

14. A ray of light is incident at an angle i on an equilateral prism. If the ray emerges grazing the second face, find angle of refraction at first surface. Refractive index of prism $\sqrt{2}$.

(1) $10°$　　　(2) $15°$　　　(3) $30°$　　　(4) $45°$

Ans. (2)

15. A planet 'A' having density ρ and radius R has escape velocity $= 10 \text{ km/sec}$. Find the escape velocity (in m/s) of a planet B having density and radius both 10% that of planet A.

(1) $100\sqrt{10}$　　　(2) $100\sqrt{20}$　　　(3) $\sqrt{3000}$　　　(4) $\sqrt{900}$

Ans. (1)

16. A conducting rod of mass m and length l is moving on a infinite pair of conducting rails as shown. Conducting rails are connected to a resistance R at one end. Motion is in vertical plane and horizontal magnetic field in the region B. Find terminal speed of rod.
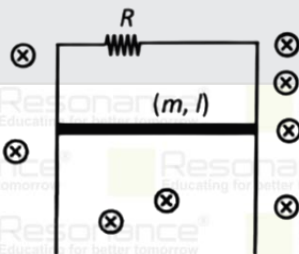
(1) $V_0 = \frac{3mgR}{2B^2l^2}$　　　(2) $V_0 = \frac{mgR}{2B^2l^2}$　　　(3) $V_0 = \frac{mgR}{B^2l^2}$　　　(4) $V_0 = \frac{2mgR}{B^2l^2}$

Ans. (3)

17. A sinusoidal EMW is given by $\vec{E} = 20\sin\left(\frac{2}{300}x - 10^6 t\right)$ propagating in a non-magnetic material. Dielectric constant of material is

(1) 9×10^4 (2) 3×10^2 (3) 4   (4) 2

Ans. (3)

18. Combination of lenses are arranged in case I and case II as shown in figure. Magnification in two cases are m_1 and m_2. Find $\left|\frac{m_1}{m_2}\right|$.
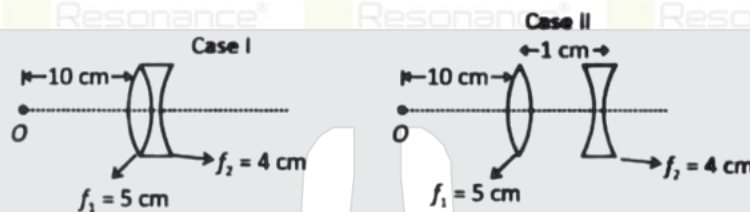
(1) 5/6   (2) 4/3   (3) 3/4   (4) 6/5

Ans. (1)

19. **Statement-I:** Fluid exerts pressure on the surface of a solid in contact with it.

Statement-II : The excess potential energy of molecules at the surface of a liquid leads to surface tension.

(1) Both are true and statement-II B correct explanation of Statement-I

(2) Both are true but statement-II is not correct explanation of Statement-I

(3) Statement-I is true but Statement-II is false

(4) Statement-II is true but statement-I is false

Ans. (2)

20. A ray parallel to x axis (principal axis of curved surface. The x co-ordinate where ray cuts x-axis (in m) is : (The radius of curvature is 50 cm)
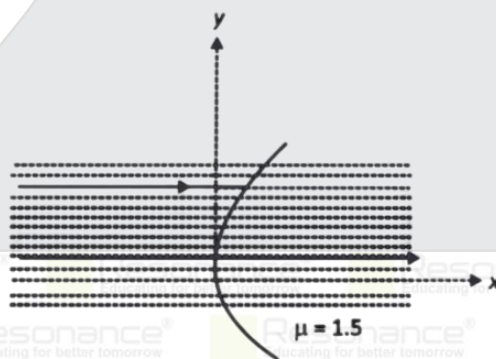
(1) 1.5   (2) 0.5   (3) 1   (4) 2

Ans. (1)

21. Match the column-I with the correct numerical values of energy/heat in Column-II (is universal gas constant)

	Column-I		Column-II
(A)	1 mole of monoatomic ideal gas undergoes polytopic process $PV^{-1/2}$ with $\Delta T = 320$ K find ΔU	(P)	650 R
(B)	Find heat supplied to 2 moles of gas having heat capacity as $\frac{5}{2}R$ and $\Delta T = 130$ K	(Q)	575 R
(C)	Find the ΔU for 1 mole diatomic gas for $\Delta T = 230$ K	(R)	480 R

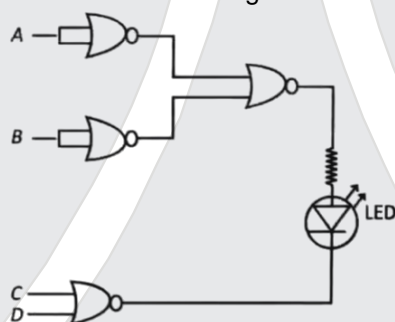(1) $A \rightarrow R; B \rightarrow P; C \rightarrow Q$ (2) $A \rightarrow P; B \rightarrow R; C \rightarrow Q$

(3) $A \rightarrow R; B \rightarrow Q; C \rightarrow P$ (4) $A \rightarrow Q; B \rightarrow P; C \rightarrow R$

Ans. (1)

22. In the given logic circuit shown in the figure, inputs A, B, C, and D are applied as shown. An LED is connected at the output. In which of the following combinations will the LED glow.

(1) $A = 1, B = 1, C = 0, D = 0$ (2) $A = 1, B = 0, C = 0, D = 0$

(3) $A = 0, B = 1, C = 1, D = 0$ (4) $A = 1, B = 1, C = 1, D = 1$

Ans. (4)