

03/04/2025

Morning



Aakash

Medical | IIT-JEE | Foundations

Corporate Office : AESL, 3rd Floor, Incuspaze Campus-2, Plot-13,
Sector-18, Udyog Vihar, Gurugram, Haryana-122015



Join our Youtube channel for JEE Main Memory Based Paper Live Discussion

Memory Based Answers & Solutions

Time : 3 hrs.

for

M.M. : 300

JEE (Main)-2025 (Online) Phase-2

(Physics, Chemistry and Mathematics)

IMPORTANT INSTRUCTIONS:

- (1) The test is of **3 hours** duration.
- (2) This test paper consists of 75 questions. Each subject (PCM) has 25 questions. The maximum marks are 300.
- (3) This question paper contains **Three Parts**. **Part-A** is Physics, **Part-B** is Chemistry and **Part-C** is **Mathematics**. Each part has only two sections: **Section-A** and **Section-B**.
- (4) **Section - A** : Attempt all questions.
- (5) **Section - B** : Attempt all questions.
- (6) **Section - A (01 – 20)** contains 20 multiple choice questions which have **only one correct answer**. Each question carries **+4 marks** for correct answer and **-1 mark** for wrong answer.
- (7) **Section - B (21 – 25)** contains 5 **Numerical value** based questions. The answer to each question should be rounded off to the **nearest integer**. Each question carries **+4 marks** for correct answer and **-1 mark** for wrong answer.

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70+ 100 PERCENTILERS (PHYSICS, CHEMISTRY & MATHEMATICS)

1000+ 99 PERCENTILERS & ABOVE

4000+ 95 PERCENTILERS & ABOVE

100 Percentile in Physics & Maths



Shreyas Lohiya
PSID: 00003389699

100 Percentile in Physics



Harsh Jha
PSID: 00014863322

100 Percentile in Physics & Chemistry



Devya Rustagi
PSID: 00014768785

99.99 Percentile



Amogh Bansal
PSID: 00014769016

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1 AIR JEE (Adv.) 2020



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PHYSICS

SECTION - A

Multiple Choice Questions: This section contains 20 multiple choice questions. Each question has 4 choices (1), (2), (3) and (4), out of which **ONLY ONE** is correct.

Choose the correct answer:

1. An ideal gas with an adiabatic exponent 1.5, initially at 27°C is compressed adiabatically from 800 cc to 200 cc. The final temperature of the gas is

- (1) 600 K
- (2) 300 K
- (3) 450 K
- (4) 273 K

Answer (1)

Sol. $T_i = 27^\circ\text{C}$ or 300 K

$$T_f = (300\text{ K}) \left(\frac{800\text{ cc}}{200\text{ cc}} \right)^{1.5-1}$$

$$T_f V_f^{\gamma-1} = T_i V_i^{\gamma-1}$$

$$T_f = T_i \left(\frac{V_i}{V_f} \right)^{\gamma-1}$$

$$= 300\text{ K} (4)^{0.5}$$

$$= 600\text{ K}$$

2. In YDSE, light of intensity of 4I and 9I passes through two slits respectively. Difference of maximum and minimum intensity of interference pattern is

- (1) 5I
- (2) 10I
- (3) 24I
- (4) 26I

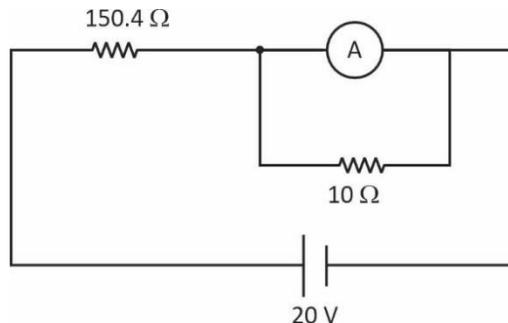
Answer (3)

Sol. $I_{\max} = (\sqrt{I_1} + \sqrt{I_2})^2 = 25I$

$$I_{\min} = (\sqrt{I_1} - \sqrt{I_2})^2 = I$$

$$\Delta I = 24I$$

3. An ammeter having resistance 240 Ω is connected in the given circuit as shown. Find current through the ammeter.



- (1) 1 mA
- (2) 5 mA
- (3) 100 mA
- (4) 2.5 mA

Answer (2)

Sol. $R_{\text{eq}} = 150.4 + \frac{10 \times 240}{250}$

$$= 160\ \Omega$$

$$I = \frac{20}{160} = \frac{1}{8}$$

$$I_A = \frac{10}{250} I = \frac{1}{25 \times 8} = \frac{1}{200}$$

$$I_A = 5\text{ mA}$$

4. A thin uniform wire of length 25 m and area of cross-section 5mm² has resistivity 2 × 10⁻⁶ Ω – m. If the wire is bent to form a circle, the resistance across diametrically opposite points is

- (1) 5 Ω
- (2) 2.5 Ω
- (3) 10 Ω
- (4) 12.5 Ω

Answer (2)

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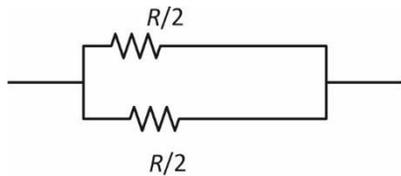


Amogh Bansal
PSID: 00014769016

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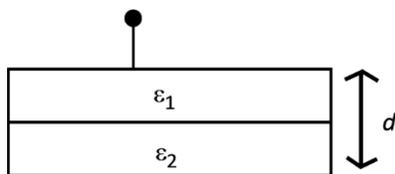
Sol. $R = \rho \frac{l}{A} = \frac{(2 \times 10^{-6} \Omega \text{ m})(25 \text{ m})}{5 \times 10^{-6} \text{ m}^2}$



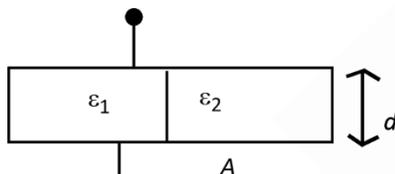
$R = 10 \Omega$

Resistance across diametrically point is $\frac{R}{4} = 2.5 \Omega$

5. Capacitors with dielectric are shown in figure (symmetric situation).



(i)
 C_1



(ii)
 C_2

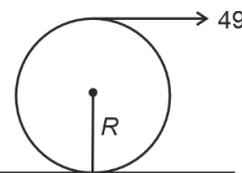
Find $\frac{C_1}{C_2}$

- (1) $\frac{4\epsilon_1\epsilon_2}{(\epsilon_1 + \epsilon_2)^2}$ (2) $\frac{4\epsilon_1\epsilon_2}{\epsilon_1 + \epsilon_2}$
 (3) $\frac{2\epsilon_1\epsilon_2}{(\epsilon_1 + \epsilon_2)^2}$ (4) $\frac{(\epsilon_1\epsilon_2)^2}{(\epsilon_1 + \epsilon_2)^2}$

Answer (1)

Sol. $\frac{1}{C_1} = \frac{d}{2A\epsilon_1} + \frac{d}{2A\epsilon_2}$
 $\Rightarrow C_1 = \frac{2A}{d} \frac{\epsilon_1\epsilon_2}{(\epsilon_1 + \epsilon_2)^2}$
 $C_2 = \frac{A\epsilon_1}{2d} + \frac{A\epsilon_2}{2d}$
 $C_2 = \frac{A}{2d}(\epsilon_1 + \epsilon_2)$
 $\frac{C_1}{C_2} = \frac{4\epsilon_1\epsilon_2}{(\epsilon_1 + \epsilon_2)^2}$

6. A sphere of mass 20 kg is pulled with force of 49 N as shown in diagram. Acceleration of sphere assuming no slipping.



- (1) 2.5 m/s² (2) 2.8 m/s²
 (3) 1.4 m/s² (4) 3.5 m/s²

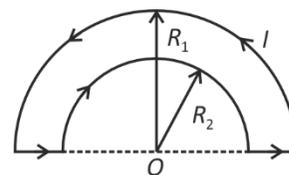
Answer (4)

Sol. $\tau = F2R = \frac{7}{5}MR^2\alpha = \frac{7}{5}MRa$

$2F = \frac{7}{5}Ma$

$a = \frac{10F}{7M} = \frac{10 \times 49}{7 \times 20} = 3.5 \text{ m/s}^2$

7. A current carrying wire is bent as shown in the figure. Find magnetic field at centre 'O' of the semi-circles. (take $R_1 = 4\pi$ and $R_2 = 6\pi$)



- (1) $8.3I \times 10^{-6} \text{ T}$ (2) $8.3I \times 10^{-9} \text{ T}$
 (3) $4\pi I \times 10^{-7} \text{ T}$ (4) $6I \times 10^{-8} \text{ T}$

Answer (2)

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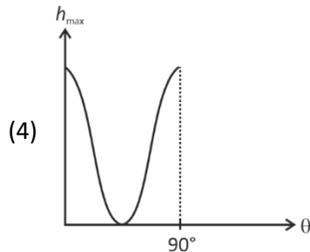
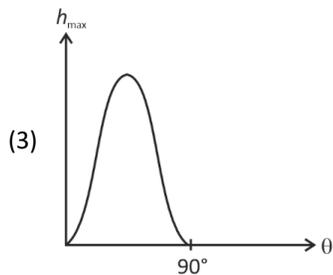
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Answer (1)

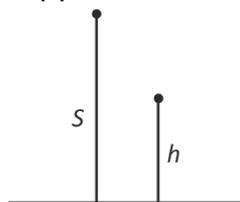
Sol. $h_{\max} = \frac{u^2}{2g} \sin^2 \theta$

12. An object is dropped from height S . At a point its kinetic energy is three times its potential energy. Find its height from ground and speed at that point.

- (1) $\frac{3S}{4}, \sqrt{\frac{3gS}{2}}$ (2) $\frac{S}{4}, \sqrt{\frac{3gS}{2}}$
 (3) $\frac{S}{2}, \sqrt{gS}$ (4) $\frac{S}{4}, \sqrt{\frac{3gS}{4}}$

Answer (2)

Sol.



$$KE + PE = mgS$$

$$3PE + PE = mgS$$

$$4mgh = mgS$$

$$h = \frac{S}{4}$$

$$v = \sqrt{2g \cdot \left(\frac{3S}{4}\right)}$$

$$v = \sqrt{\frac{3gS}{2}}$$

13. The electric potential at the surface of a shell of radius 10 cm is 120 V. Find the potential at its centre, at $r = 5$ cm from centre and at $r = 15$ cm from centre.

- (1) 0 V, 0 V, 80 V (2) 120 V, 120 V, 80 V
 (3) 120 V, 0 V, 80 V (4) 80 V, 0 V, 120 V

Answer (2)

Sol. $V_{\text{inside}} = V_{\text{surface}}$

$$\Rightarrow V_{\text{centre}} = V(r = 5 \text{ cm}) = 120 \text{ V}$$

$$V_{\text{outside}} = \frac{(V_{\text{surface}})(R)}{r}$$

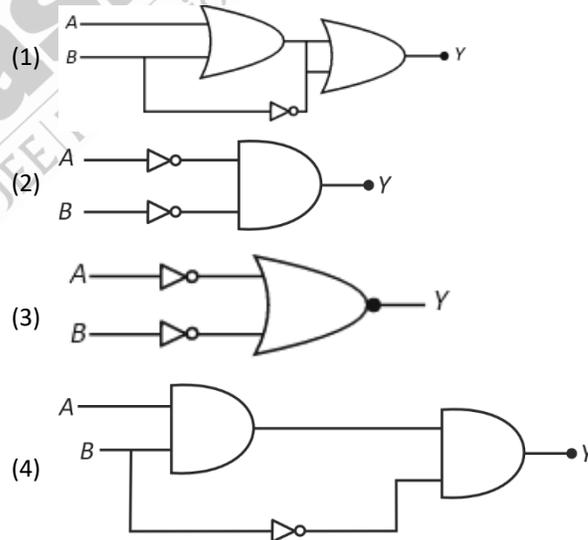
$$\Rightarrow V(r = 15 \text{ cm}) = \frac{(120 \text{ V})(10 \text{ cm})}{(15 \text{ cm})}$$

$$= 80 \text{ V}$$

14. Truth table of logical circuit is given

A	B	Y
0	0	0
1	1	1
0	1	0
1	0	0

Then identify the correct circuit.



Answer (3)

Sol. Truth table is of AND gate

$$A \cdot B = \overline{\overline{A} + \overline{B}}$$

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15. Find the colour corresponding to photons of energy 3 eV.

- (1) Violet
- (2) Yellow
- (3) Green
- (4) Blue

Answer (4)

Sol. $\lambda = \frac{12400}{E(eV)} \text{ \AA} = \frac{12400}{3} = 4133 \text{ \AA}$

V I B G Y O R
3800\AA 5500\AA 7600\AA

16. Choose the correct option.

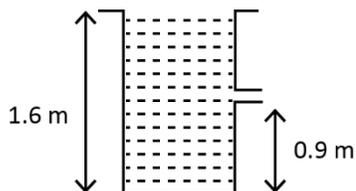
- a. Gravitational potential (i) $M^{-1}L^3T^{-2}$
- b. Gravitational constant (ii) ML^2T^{-2}
- c. Acceleration due to gravity (iii) $M^0L^2T^{-2}$
- d. Potential energy (iv) M^0LT^{-2}

- (1) a(iii), b(ii), c(iv), d(i)
- (2) a(iii), b(i), c(iv), d(ii)
- (3) a(ii), b(i), c(iv), d(iii)
- (4) a(ii), b(iv), c(i), d(iii)

Answer (2)

Sol. Conceptual

17. A container of height 1.6 m is having a small hole at height of 0.9 m from ground then find speed of efflux from the hole [use $g = 9.8 \text{ m/s}^2$]



- (1) 3.71 m/s
- (2) 2.97 m/s
- (3) 4.12 m/s
- (4) 5.79 m/s

Answer (1)

Sol. $u = \sqrt{2gh} = \sqrt{2 \times 9.8 \times 0.7} = \sqrt{2 \times 14 \times 0.7 \times 0.7} = 0.7\sqrt{28}$
 $= 0.7 \times 5.3$

- 18.
- 19.
- 20.

SECTION - B

Numerical Value Type Questions: This section contains 5 Numerical based questions. The answer to each question should be rounded-off to the nearest integer.

21. Find force (in millinewton) on current carrying wire of length $l = 4 \text{ m}$, and current of 8 A placed perpendicular to the magnetic field of $\beta = 0.15 \text{ T}$.

Answer (4800)

Sol. $F = Id\vec{l} \times \vec{B}$

$\Rightarrow |\vec{F}| = 8 \times 4 \times 0.15 = 4.8 \text{ N}$

$\Rightarrow |\vec{F}| = 4800 \text{ (milli Newton)}$

- 22.
- 23.
- 24.
- 25.

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