

**JEE Main 24<sup>th</sup> Feb Shift 1 Memory-Based Topics – CollegeDekho Exclusive**

Question	Question
<p>An astronaut has left the international space station to test a new space scooter. His partner measures the fall velocity changes which take place in 10s interval. Find the magnitude and direction of average acceleration at the beginning of 10 sec interval, the astronaut is moving towards the x-axis in 10m/sec and at the end is 10 sec. He is moving towards the -ve axis at 5m/sec.  <b>Ans.</b> 1.5 m/sec, -ve x-axis</p>	<p>What will be the energy if you increase lambda</p>
<p>Two capacitors are given. Find the series and parallel resistant and their ratio.</p>	<p>Find the work done by the cyclin process.</p>
<p>Calculate the ionization energy of all third period elements.</p>	<p>If there is degradation of vegetation, then what effect is caused in the environment from gas released?</p>
<p>A P and V graph was given, find the work done.</p>	<p>Calculate the ionization energy of all third period elements.</p>
<p>The non-existence of <math>PbI_4</math> is due to _____  <b>Ans.</b> Small size of Pb ion and large size of I ion. Highly reduced power of I ion.</p>	<p>Block m has amplitude A. If another mass of m is added what will be the new amplitude?</p>
<p>A body cools down from 100C to 90C in 20 minutes. It will cool down from 110C to 100C in _____  <b>Ans.</b> Less than 20 minute</p>	<p>An ore of Tin containing <math>FeCrO_4</math> is concentrated by _____  <b>Ans.</b> Magnetic separator</p>
<p>A cube is given and it has -q charge in one corner and +q charges in all the remaining 7 corners. Find the electric field inside the cube.</p>	<p>Compare the Ionisation Energy of SC, RI, V, Cr, Mn...</p>
<p>What is the composition of gunmetal?  <b>Ans.</b> 88 percent copper, 10 percent tin, and 2 percent zinc</p>	<p>The ratio of effusion does not depend on _____  <b>Ans.</b> Size of molecule</p>
<p>Youngs double slit experiment . Relation between slit width and wavelength</p>	<p>There was a question from communication</p>
<p>The relation between youngs modulus bulk modulus and shear modulus( mcq)</p>	<p>Ration between time period of two satellite( mcq)</p>
<p>There was a question from current electricitu regarding the potential differences between two points</p>	<p>Relation between f and r of convex mirror</p>
<p>A velocity versus time graph was given. Had to choose the option showing acceleration versus time.</p>	<p>An ordinary dice. The probability of odd numbers coming twice is equal to probability of even numbers coming 3 times. Find probability of getting odd numbers 3 times</p>

Two towers. One is 3 times the height of the other. Distance between them 150 m. From the mid point of the distance between 2 towers, angle of elevation calculated for both the roofs. The angles are complementary. Find height of short building.

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Q2. In a double star system, find  $\omega$ .



Answer A

A  $\omega = \sqrt{\frac{G(m_1 + m_2)}{r^3}}$   
 B  $\omega = \sqrt{\frac{Gm_1 m_2}{(m_1 + m_2)^2 r^3}}$   
 C  $\omega = \sqrt{\frac{Gm_1}{r^3}}$   
 D  $\omega = \sqrt{\frac{Gm_2}{r^3}}$

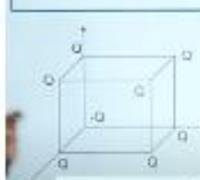
Q1. Match the following for the value of 'a' for following process represented by  $PV^a = \text{constant}$ ?

a) constant pressure                      p)  $a = 0$   
 b) constant volume                        q)  $a = 1$   
 c) constant temperature                r)  $a = \infty$   
 d) No heat exchange                      s)  $a = \gamma$

Answer - B

A a + q, b + s, c + p, d + r  
 B a + p, b + r, c + q, d + s  
 C a + s, b + p, c + r, d + q  
 D a + p, b + r, c + q, d + r

Q4. Find field at center of cube of side a.



Answer B

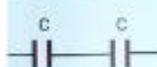
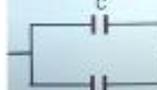
A  $\frac{46Q}{3a^2}$   
 B  $\frac{86Q}{3a^2}$   
 C  $\frac{166Q}{3a^2}$   
 D None of these

Q3. what is the sign of convex mirror ?

Answer A

A +ve  
 B -ve  
 C Can be +ve or -ve  
 D None of these

Two equal capacitors are as shown in the two figure I and II. The ratio of equivalent capacitance in the two diagrams is :-

Answer C

A  $\frac{C_I}{C_{II}} = \frac{1}{2}$   
 B  $\frac{C_I}{C_{II}} = 1$   
 C  $\frac{C_I}{C_{II}} = \frac{1}{4}$   
 D None of these

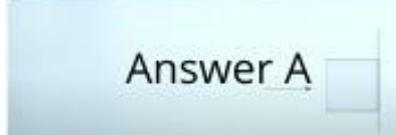
Q6. Compare the magnitudes of moment of inertia of (masses & Radius are equal)

(a) Ring About Diameter ( $I_a$ )  
 (b) Disc About  $\perp$  axis passing through centre ( $I_b$ )  
 (c) SOLID cylinder about (Axis) ( $I_c$ )  
 (d) SOLID sphere ( $I_d$ )

Answer A

A  $I_a = I_b = I_c > I_d$   
 B  $I_a = I_b > I_c > I_d$

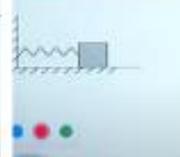
Q7. Find the minimum force  $F$ , that should be applied to the block of mass  $m = 0.5 \text{ kg}$ , so that the block stays in equilibrium with the rough vertical wall having friction coefficient  $\mu = 0.2$ . (Take  $g = 10 \text{ m/s}^2$ )



Answer A

A 25 N  
 B 20 N  
 C 50 N  
 D None of these

Q8. A horizontal spring block system (mass  $m$ , spring constant  $k$ ) is oscillating on a smooth surface with amplitude  $A$ . If at the mean position an identical block is kept on it so that they move together after what is the new amplitude



Answer C

A A  
 B  $\frac{A}{2}$   
 C  $\frac{A}{\sqrt{2}}$   
 D  $\frac{A}{2\sqrt{2}}$

Q9. In the shown circuit the following the battery is of EMF 4 and internal resistance  $8 \Omega$ . Find the potential difference between points x and y is shown in the circuit.

- A  $V_x - V_y = 2.4 \text{ V}$
- B  $V_y - V_x = -2 \text{ V}$
- C  $V_x - V_y = 4 \text{ V}$
- D  $V_x - V_y = -4 \text{ V}$

**Answer - A**

Q10. How does the energy of photon change of the corresponding wavelength increases?

- A Increases
- B Decreases
- C may increase or decrease
- D Doesn't depend on wavelength

**Answer B**

A die is rolled  $n$  times. If the probability of getting odd number 2 times is equal to the probability of getting even number 3 times. Find the probability of getting odd number odd times

Common tangent to the curve  $y^2 = 2x - 3$  and  $x^2 = 4y$  lies parallel to the line

$$\lim_{n \rightarrow \infty} \tan \left( \sum_{r=1}^n \tan^{-1} \left( \frac{1}{r^2 + r + 1} \right) \right)$$

$\vec{a}, \vec{b}, \vec{c}$  are coplanar &  $\vec{b}$  is  $\perp$  to  $\vec{c}$ ,  $\vec{a} \cdot \vec{c} = 7$   
 $\vec{a} = -\hat{i} + \hat{j} + \hat{k}$ ;  $\vec{b} = 2\hat{i} + \hat{k}$ .  $2(\vec{a} + \vec{b} + \vec{c})^2 =$

Diameter of  $x^2 + y^2 - 2x - 6y + 6 = 0$  is chord of circle with center (2, 4).

The solution of differential equation

$$x dy - y dx = \sqrt{x^2 + y^2} dx \text{ is}$$

$$f(x) = \frac{4x^3 - 3x^2}{6} - 2 \sin x + (2x - 1) \cos x, \text{ then } f'(x)$$

Answer A

- (A) increases in  $(\frac{1}{2}, \infty)$
- (B) decreases in  $(\frac{1}{2}, \infty)$
- (C) increases in  $(-\infty, \frac{1}{2})$

$$\int \frac{(\cos x - \sin x)}{\sqrt{8 - \sin 2x}} dx = A \sin^{-1} \left( \frac{\sin x + \cos x}{B} \right), (A, B) =$$

Answer A

- (A) (1, 3)
- (B) (-1, 3)
- (C) (1, -3)
- (D) (3, 1)

A man on st. lines whose arithmetic mean of reciprocal of intercepts on axes is  $\frac{1}{4}$ . There are 3 marbles at A(1, 1), B(2, 2), C(4, 4). Then which marble lie on its path

Answer B

- (A) A
- (B) B
- (C) C
- (D) All of these

The abscissa of A and B are the roots of the equation  $x^2 + 2ax - b^2 = 0$  and their co-ordinates are roots of the equation  $y^2 + 2py - q^2 = 0$ . The equation of the circle with AB as diameter is

- (A)  $x^2 + y^2 + 2ax + 2py - b^2 - q^2 = 0$
- (B)  $x^2 + y^2 + 2ax + py - b^2 - q^2 = 0$
- (C)  $x^2 + y^2 + 2ax + 2py + b^2 + q^2 = 0$
- (D) None of these

Answer A

Which of the following is tautology?

- (A)  $A \cup (A \cap B)$
- (B)  $B \rightarrow (A \cap A \rightarrow B)$
- (C)  $A \cap (A \cup B)$
- (D)  $(A \cap (A \rightarrow B)) \rightarrow B$

Answer D

$a_1, a_2, \dots, a_{10}$  are in G.P.,  $\frac{a_7}{a_5} = 25$ . Find  $\frac{a_{10}}{a_9}$ .

If  $p + q = 2$  and  $p^4 + q^4 = 272$  where p and q are the roots of a quadratic equation then find quadratic equation

Answer B

- (A)  $x^2 - 2x + 8 = 0$
- (B)  $x^2 - 2x + 16 = 0$
- (C)  $x^2 - 2x + 132 = 0$
- (D)  $x^2 - 2x + 4 = 0$

If you had appeared for the exam, you can share your feedback and questions on **Whats App** Number 9059528251 or E-Mail ID sakunth.kumar@collegedekho.com

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