

JEE Main 2024 Question Paper April 4 Shift 1 (B.E./B.Tech)

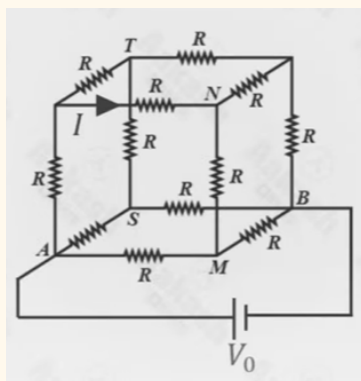
JEE Main Physics Questions

Ques 1. Five identical convex lenses are placed one after the other in close contact. The power of this arrangement is 25 D. Then, the power of one such lens is

- A. 10 D
- B. 5 D
- C. 125 D
- D. 20 D

Ans. B

Ques 2. A cubical arrangement of 12 resistors each having resistance R is shown. Find I .



- A. $V_0/3R$
- B. $V_0/6R$
- C. $V_0/4R$
- D. $V_0/8R$

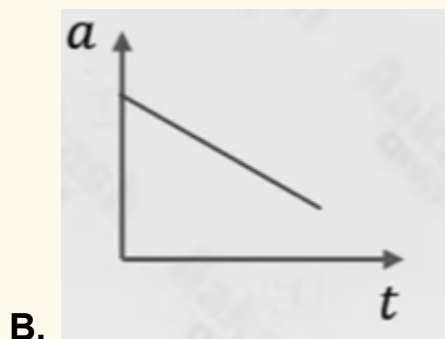
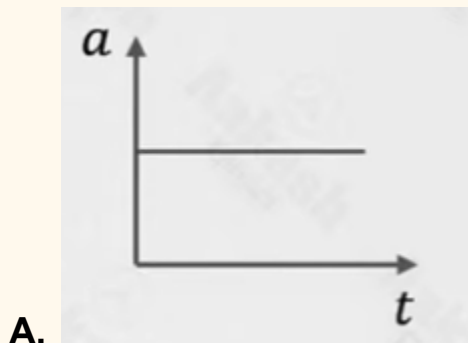
Ans. B

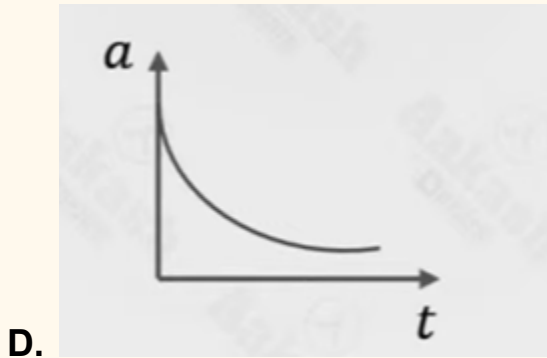
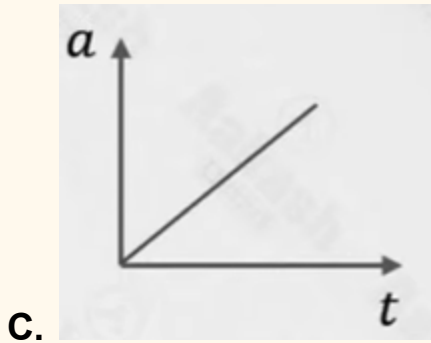
Ques 3. On a given rough incline plane, a solid sphere and a hollow cylinder having the same radius are rolled one by one, with the same speed. Ratio of heights attained by solid sphere and hollow cylinder is

- A. 9/10
- B. 3/10
- C. 7/10
- D. 6/10

Ans. C

Ques 4. A wooden block is initially at rest on a smooth surface. Now a horizontal force is applied on the block which increases linearly with time. The acceleration- time ($a - t$) graph for the block would be





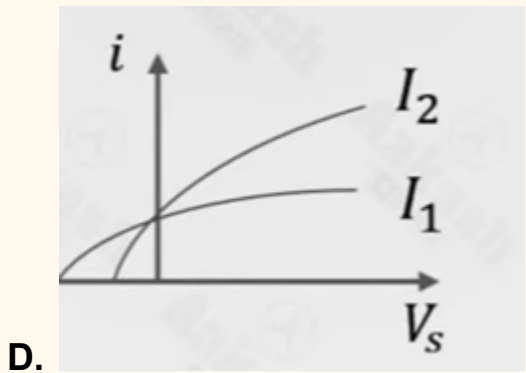
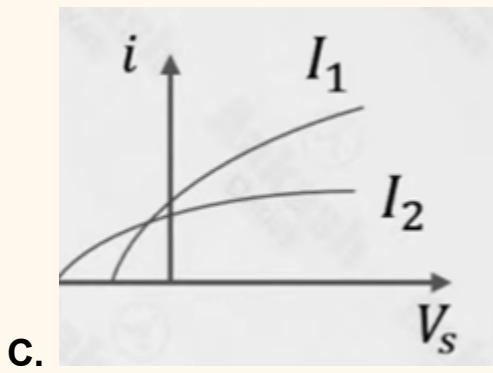
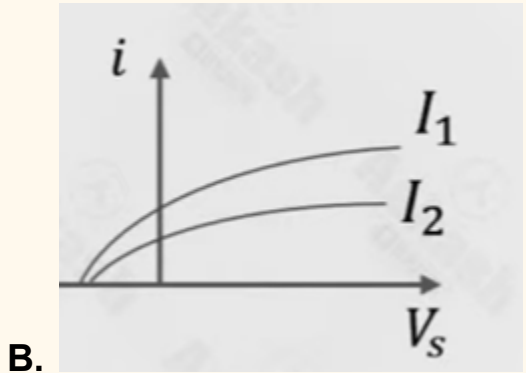
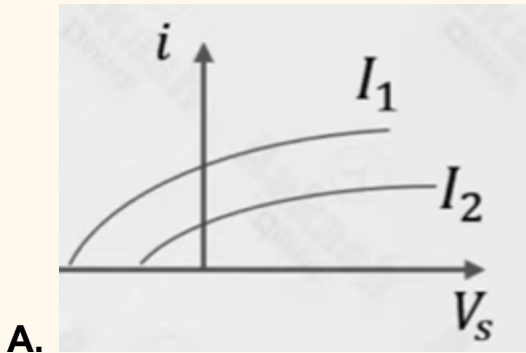
Ans. C

Ques 5. An electron is projected along the axis of solenoid which carries constant current i , the trajectory of electron shall be

- A. Circular path
- B. Uniform motion along the axis
- C. Uniform accelerated motion in straight line
- D. Parabolic path

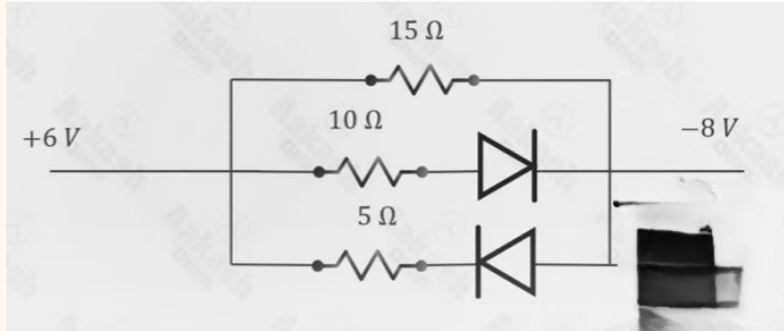
Ans. B

Ques 6. Which graph correctly represents the photo current (i) vs stopping potential (V_s) for the same frequency but different intensity? (here, $I_1 > I_2$)



Ans. B

Ques 7. Consider the network shown:



The equivalent resistance of the network is

- A. 12Ω
- B. 36Ω
- C. 20Ω
- D. 6Ω

Ans. D

Ques 8. Instantaneous current in a circuit is $i(t) = [6 + \sqrt{54} \sin(2\pi t + \pi/3)]$ A RMS value of current is

- A. $2\sqrt{6}$ A
- B. 7 A
- C. $3\sqrt{7}$ A
- D. $6\sqrt{2}$ A

Ans. C

Ques 9. The equation of stationary wave is given as $y = 2A \sin(2\pi/\lambda \cdot nt) \cos(2\pi/\lambda \cdot x)$, then which of the following is not correct.

- A. Dimension of x is [L]
- B. Dimension of n is $[LT^{-1}]$
- C. Dimension of n/λ is [T]
- D. Dimension of nt is [L]

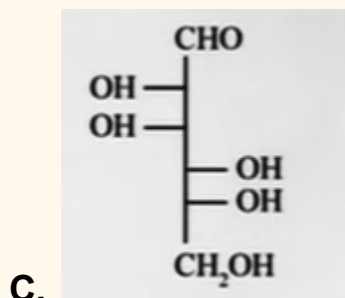
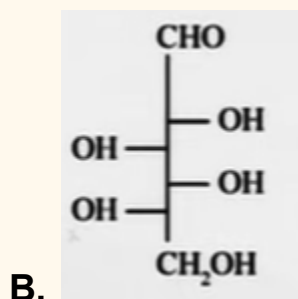
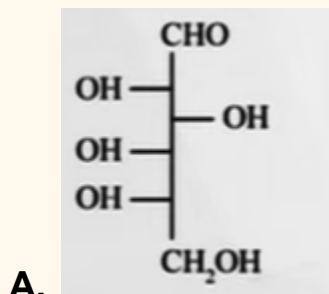
Ans. C

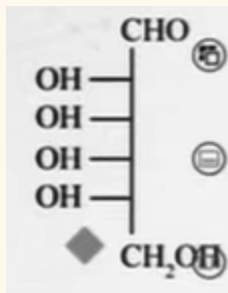
Ques 10. Because of force (separately) of 3 N & 2 N, elongation in spring are found to be 'a' and 'b' unit respectively then (2a -3b) is.

Ans. 0

JEE Main Chemistry Questions

Ques 1. Which of the following is the correct structure of L- Glucose





Ans. B

Ques 2. Which of the following has a maximum dipole moment?

- A. NH_3
- B. NF_3
- C. PF_5
- D. PCl_5

Ans. A

Ques 3. If emf of hydrogen electrode at 25°C is zero in pure water, then pressure of H_2 in bar is?

- A. 10^{-14}
- B. 10^{-7}
- C. 1
- D. 0.5

Ans. A

Ques 4. For which of the following elements, only one oxidation state is possible?

- A. Sc
- B. Co
- C. Ni

D. Fe

Ans. A

Ques 5. Among the following, decreasing order of basic strength will be:

OH^- , H^- , HCOO^- , CH_3COO^- , OR^-

(I) (II) (III) (IV) (V)

A. II > V > III > I > IV

B. II > V > I > IV > III

C. III > IV > I > V > II

D. V > I > IV > II > III

Ans. B

Ques 6. Which of the following is the correct order of first ionization enthalpy?

A. $\text{Be} < \text{B} < \text{O} < \text{F} < \text{N}$

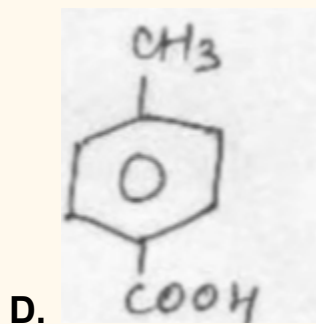
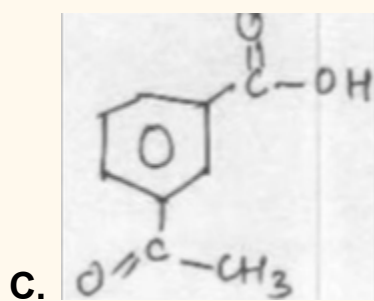
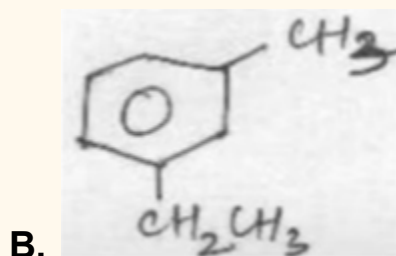
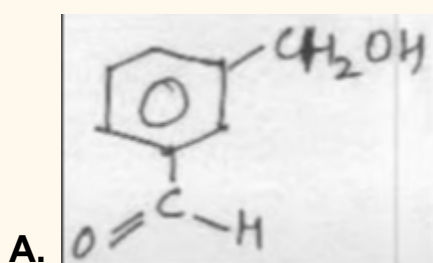
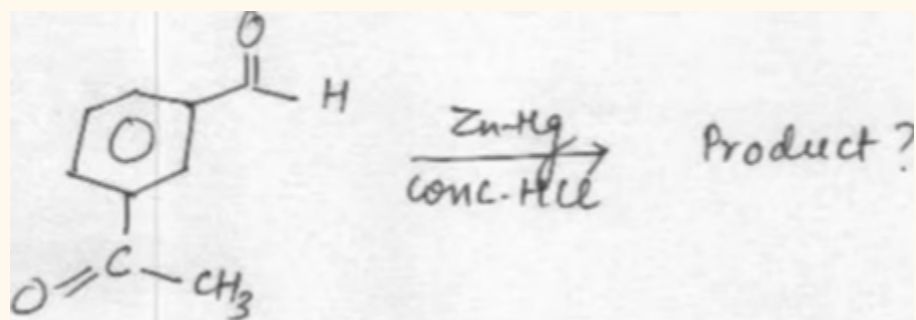
B. $\text{B} < \text{Be} < \text{O} < \text{N} < \text{F}$

C. $\text{B} < \text{Be} < \text{N} < \text{F} < \text{O}$

D. $\text{Be} < \text{B} < \text{N} < \text{F} < \text{O}$

Ans. B

Ques 7.



Ans. B

Ques 8. How many of the following compounds are sp^3 hybridised

- A. ClO_3^-**
- B. ClO_2^-**
- C. NH_3 ,**
- D. NO_2**

Ans. 3

Ques 9. The total number of chain isomers possible for a compound with molecular formula C_7H_{16} are:

Ans. 9

Ques 10. Statement-1: Aldol condensation is caused by acidity of α hydrogens.

Statement-2: Cross aldol is not possible between Ph-CHO and CH_3CHO

- A. Both Statement-1 and Statement-2 are correct**
- B. Both Statement-1 and Statement-2 are incorrect**
- C. Statement-1 is correct but Statement-2 is incorrect**
- D. Statement-1 is incorrect but Statement-2 is correct**

Ans. C

Ques 11. Which of the following will not give Lassaigne's test?

- A. Urea**
- B. Azobenzene**

- C. Hydrazine
- D. Phenylhydrazine

Ans. C

Ques 12. Among the following, species that have one unpaired electron:

- A. CN^-
- B. O_2^{2-}
- C. O_2^+
- D. NO^-

Ans. C

Ques 13. Decreasing order of the field strength of the following ligands will

be: CO , CN^- , Cl^- , H_2O

- A. $\text{CO} > \text{CN}^- > \text{H}_2\text{O} > \text{Cl}^-$
- B. $\text{CO} > \text{CN}^- > \text{Cl}^- > \text{H}_2\text{O}$
- C. $\text{CN}^- > \text{CO} > \text{H}_2\text{O} > \text{Cl}^-$
- D. $\text{CN}^- > \text{CO} > \text{Cl}^- > \text{H}_2\text{O}$

Ans. A

JEE Main Mathematics Questions

Ques 1. If $f(x) =$

$$\begin{cases} x - 2, & 0 \leq x \leq 2 \\ -2, & -2 \leq x \leq 0 \end{cases}$$

and $h(x) = f(|x|) + |f(x)|$, $\int_0^k h(x) dx$ is equal to _____. ($k > 0$)

- A. 0
- B. $k/2$
- C. $2k$
- D. k

Ans. A

Ques 2. Find the number of rational numbers in the expansion of $(2^{1/5} + 5^{1/3})^{15}$.

- A. 3133
- B. 6131
- C. 931
- D. 633

Ans. A

Ques 3. Three urn A, B, C, A has 7 red and 5 black balls, B has 5 red and 7 black balls, C has 6 red and 6 black balls. One urn is selected and black ball is taken out. Find probability that the selected urn is A.

- A. $7/18$
- B. $5/17$
- C. $7/19$

D. 5/18

Ans. D

Find $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \frac{\sin^2 x}{1+2^x} dx$

Ques 4.

- A. $\pi/4$
- B. $\pi/8$
- C. 4π
- D. $\pi/2$

Ans. A

Ques 5.

$$f(x) = \frac{2x^2 - 3x + 8}{2x^2 + 3x + 8}$$

Then sum of maximum and minimum values of $f(x)$ is:

- A. 136/55
- B. 146/55
- C. 146/11
- D. 136/11

Ans. B

Ques 6. The coefficient of x^7 in $(1 - x - x^2 + x^3)^6$

- A. 132

- B. 144
- C. -132
- D. -144

Ans. D

Ques 7. If $(z)^2 + |z| = 0$ and if α is sum of roots and β is product of non-zero roots, then find $4(\alpha^2 + \beta^2)$

- A. $\frac{1}{4}$
- B. 1
- C. 4
- D. 2

Ans. C

Ques 8. If the length of focal chord of $y^2 = 12x$ is 15 and if the distance of the focal chord from origin is p then $10p^2$ is equal to:

- A. 36
- B. 25
- C. 72
- D. 144

Ans. C

Ques 9.

$$\text{If } f(x) = \begin{cases} \frac{1-\cos x}{x^2} ; x < 0 \\ 2 ; x = 0 \\ \frac{\beta\sqrt{1-\cos x}}{x} ; x > 0 \end{cases}$$

is continuous at $x = 0$, then $\alpha^2 + \beta^2 = ?$

- A. 10
- B. 12
- C. 13
- D. 9

Ans. B

Ques 10. In $\triangle ABC$, there are 18 points. On side AB, there are P1, P2, P3, P4, P5. On BC, P6, P7, P8, P9, P10, P11 points. On CA, P12, ... , P18 points. By joining any three points from P1, P2, ... , P18 forms a triangle. How many triangles are possible.

Ans. 751

Ques 11.

$$\text{If } \lim_{x \rightarrow 1} \frac{(5x+1)^{\frac{1}{3}} - (x+5)^{\frac{1}{3}}}{(2x+3)^{\frac{1}{2}} - (x+4)^{\frac{1}{2}}} = \frac{m(5)^{\frac{1}{2}}}{n(2n)^{\frac{2}{3}}}$$

Then $8m + 12n$ is ?

Ans. 100

Ques 12. In a G.P., $T_1 = 2$, $T_2 = P$, $T_3 = Q$. These are also terms of an A.P. (7th, 8th & 13th term). If 5th term of G.P. = nth term of A.P., then find n.

Ans. 27

