

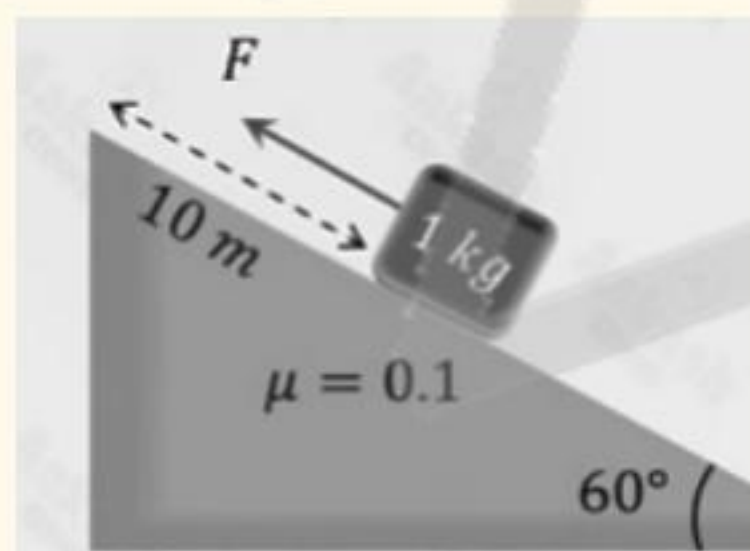
JEE Main 2024 Question Paper Jan 30 Shift 2 (B.E./B.Tech)

JEE Main Physics Questions

Ques 1. Two balls are thrown from height 400 m, at an angle 60° and 45° horizontally, respectively. Their range and time of flight are the same. Find the ratio of their respective initial velocities.

Ans. $\sqrt{2}/\sqrt{3}$

Ques 2. A block of mass 1 kg is ascended on an inclined plane by a distance of 10 m as shown in diagram, with the help of force of 10 N along the incline. Find work done against the friction.



- A. 10 J
- B. $5\sqrt{3}$ J
- C. 5J
- D. $(10 - 5\sqrt{3})$ J

Ans. C

Ques 3. A force of 10 N is applied on a three block system as shown. Find the two tensions T_1 and T_2 .

- A. 2N, 5 N
- B. 5N, 2 N
- C. 3N, 4 N
- D. 4N, 3 N

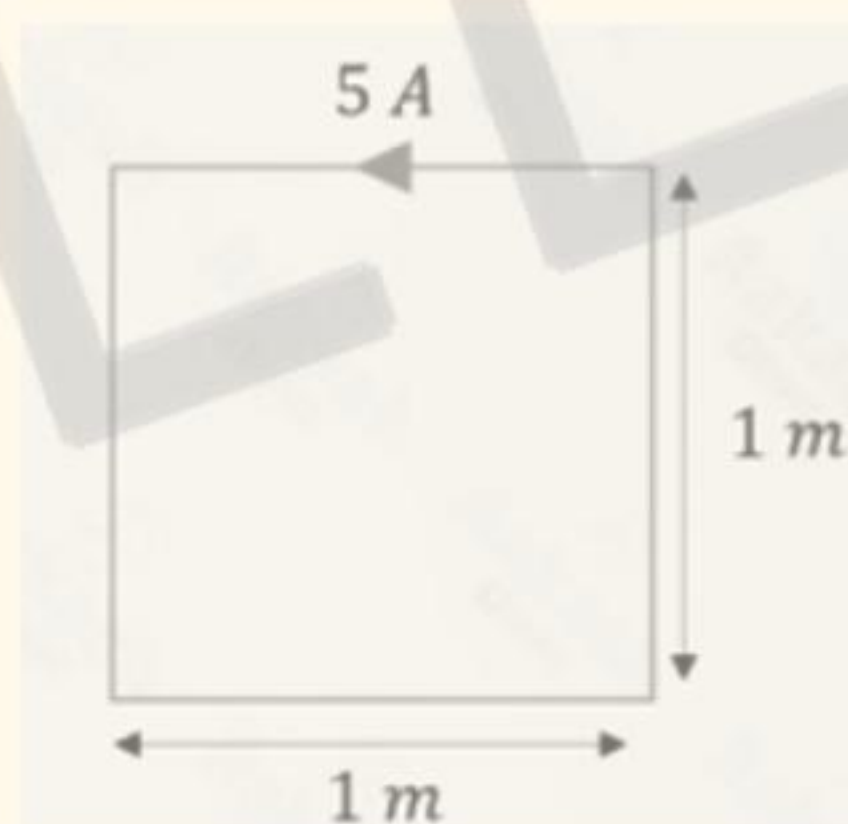
Ans. A

Ques 4. The slope of graph between stopping potential (V_0) and Frequency of incident photon (f) in photoelectric effect is (h = Plank's Constant, e = charge on electron)

- A. h/e
- B. $h/2e$
- C. $2h/e$
- D. e/h

Ans. A

Ques 5. A square loop of side 1 m is carrying a current of 5 A as shown. If the magnetic field at the center is $x\sqrt{2} * 10^{-7}$ find x .



Ans. 40

Ques 6. A planet exists of mass $1^{\text{th}}/6$ of the earth's mass and radius $1^{\text{rd}}/3$ of the earth's radius. If the escape speed for earth is 11.2 km / s then the escape speed for the planet shall be km/s. (nearest integer)

Ans. 8

Ques 7. An electron in the 5th excited state of He^+ atom moves to the 1st excited state. Find the number of possible spectral lines formed.

Ans. 6

JEE Main Chemistry Questions

Ques 1. Why does KMnO_4 show colour?

- A. Due to d-d transition
- B. Due to metal to ligand charge transfer
- C. Due to ligand to metal charge transfer
- D. Due to F-center

Ans. C

Ques 2. C is added to solution of A and B, find mole fraction of C

- A. $n_c / (n_A + n_B + n_c)$
- B. $n_c / (n_A \cdot n_B + n_c)$
- C. $n_c / (n_A \cdot n_c + n_B)$
- D. $n_c / (n_A + n_B)$

Ans. A

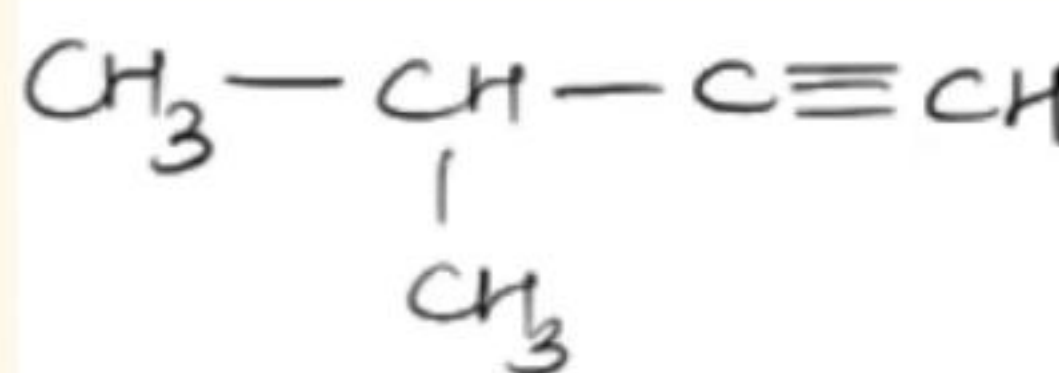
Ques 3. Which of the following solution will have lowest freezing point

- A. 180 g of glucose in 1 L solution
- B. 180 g of benzoic acid in 1 L solution
- C. 180 g of CH_3COOH in 1 L solution
- D. 180 g of sucrose in 1 L solution

Ans. C

Ques 4. IUPAC name of compound

- A. 2-Methylbutane
- B. 3-Methylbut-1-yne



- C. 2-Methylbutene
- D. 3-Methylbutane

Ans. B

Ques 5. Which reagent on reacting with phenol gives salicylaldehyde?

- A. CO_2 , NaOH
- B. CHCl_3 , NaOH
- C. CCl_4 , NaOH
- D. H_2O , H^+

Ans. B

Ques 6. Find out the correct order of stability for given carbocations.

$(\text{CH}_3)_3\text{C}^+$, $(\text{CH}_3)_2\text{CH}^+$, CH_3CH_2^+ , CH_3^+

- A. $\text{II} > \text{I} > \text{III} > \text{IV}$
- B. $\text{I} > \text{II} > \text{III} > \text{IV}$
- C. $\text{IV} > \text{III} > \text{II} > \text{I}$
- D. $\text{I} > \text{II} > \text{IV} > \text{III}$

Ans. B

Ques 7. Which of the following has a square pyramidal shape?

- A. PCl_5
- B. BrF_5
- C. PF_5
- D. $[\text{Ni}(\text{CN})_4]^{2-}$

Ans. B

Ques 8. Consider the following statements:

Statement I: Since electronegativity of $\text{F} > \text{H}$, so dipole moment of $\text{NF}_3 > \text{NH}_3$

Statement II: Lone pair dipole in NH_3 is not in the direction of resultant bond dipole while in case of NF_3 the lone pair dipole is in the direction of resultant bond dipole

- A. Statement I: True Statement II: False
- B. Statement I: True Statement II: True
- C. Statement I: False Statement II: False
- D. Statement I: False Statement II: True

Ans. C

Ques 9. Arrange the following according to their decreasing oxidizing power BrO_4^- , IO_4^- , ClO_4^-

- A. $\text{ClO}_4^- > \text{IO}_4^- > \text{BrO}_4^-$
- B. $\text{BrO}_4^- > \text{IO}_4^- > \text{ClO}_4^-$
- C. $\text{IO}_4^- > \text{BrO}_4^- > \text{ClO}_4^-$
- D. $\text{BrO}_4^- > \text{ClO}_4^- > \text{IO}_4^-$

Ans. B

JEE Main Mathematics Questions

Ques 1. Bag A contains 7 white balls & 3 red balls. Bag B contains 3 white balls & 2 red balls. A ball is chosen randomly & found to be red then find the probability that it is taken from bag A.

- A. $7/20$
- B. $\frac{1}{2}$
- C. $3/7$
- D. $\frac{1}{5}$

Ans. C

Ques 2. Given $|\vec{b}| = 2$, $|\vec{b} \times \vec{a}| = 2$, then the value of $|\vec{b} \times \vec{a} - \vec{b}|^2$ is

- A. 0
- B. 8
- C. 1
- D. 10

Ans. B

Ques 3. If $f(x) = \ln(2x/(4x^2-x-3)) + \cos^{-1}((2x+1)/(x+2))$ if domain of $f(x)$ is $[\alpha, \beta)$, then $5\alpha - 4\beta$ is:

- A. -2
- B. 3
- C. -4
- D. 1

Ans. A

Ques 4. If $f(x) = (x - 2)^2 (x - 3)^3$ and $x \in [1, 4]$ If M and m denotes maximum and minimum values respectively, then $M - m$ is

Ans. 12

Ques 5. $f * (y - 2)^2 = (x - 1)$ and $x - 2y + 4 = 0$ then find the area bounded by the curves between the coordinate axis in first quadra (in sq. units)

Ans. 3