

JEE Main 2024 Question Paper April 5 Shift 2 (B.E./B.Tech)

JEE Main Mathematics Questions

Ques 1. The 50th word in the dictionary using the letters B, B, H, J, O is:

- A. OBBJH
- B. OBBHJ
- C. JHBBO
- D. BBHOJ

Ans. A

Ques 2.

$$\left(\frac{1}{3^5} + \frac{2x}{5^3} \right)^{12}$$

. Find which term is constant.

- A. 4th
- B. 5th
- C. 6th
- D. 7th

Ans. D

Ques 3. Let $4^{1+x} + 4^{1-x}$, $k/2$, $16^x + 16^{-x}$ are in A. P. then least value of k is _____

Ans. 10

Ques 4. The number of real solution $x|x + 5| + 2|x + 7| - 2 = 0$ is

Ans. 3

Ques 5. Let image of point $(8,5,7)$ with respect to line

$\frac{x-1}{2} = \frac{y+1}{3} = \frac{z-2}{5}$ is (α,β,γ) . Then, $\alpha + \beta + \gamma$ is equal to_____.

- A. 10**
- B. 12**
- C. 9**
- D. 14**

Ans. D

Ques 6. Area bounded by $y = -2|x|$ and $y = x|x|$ is:

- A. $\frac{2}{3}$**
- B. $\frac{1}{3}$**
- C. $\frac{1}{2}$**
- D. $\frac{4}{3}$**

Ans. D

Ques 7. If $|a| = 2$, $|b| = 3$ and $a = b \times 2$, then minimum value of $|\hat{c} - a|^2$ is:

- A. 13**
- B. 5**
- C. $\frac{40}{9}$**
- D. $\frac{20}{9}$**

Ans. C

$$A = \begin{bmatrix} \alpha & \alpha & \alpha \\ \beta & \alpha & -\beta \\ -\alpha & \alpha & \alpha \end{bmatrix}$$

Ques 8. $A =$

B is formed by co-factor of A matrix, then find out determinant of AB .

A. $4\alpha^3(2\alpha + \beta)^5$

B. $12\alpha^4(\alpha + \beta)^2$

C. $8\alpha^6(\alpha + \beta)^3$

D. $18\alpha^8(\alpha + \beta)^3$

Ans. C

Ques 9. Consider a equation $P(x) = ax^2 + bx + c = 0$. If $a, b, c \in A$, where $A = \{1, 2, 3, 4, 5, 6\}$. Then the probability that $P(x)$ has real and distinct roots?

A. $\frac{1}{4}$

B. $\frac{1}{16}$

C. $\frac{25}{108}$

D. $\frac{19}{108}$

Ans. D

Ques 10. A line L is perpendicular to $y = 2x + 10$ such that it touches the parabola $y^2 = 4(x - g)$. Then the distance between point of contact and origin is equal to (

A. 165

B. 175

C. 185

D. 190

Ans. C

Ques 11. If $S = \{2, 4, 8, 16, \dots, 512\}$. If S is broken in 3 equal subsets A , B and C such that $A \cap B = B \cap C = C \cap A = \varphi$ and $A \cup B \cup C = S$ then maximum number of ways to break is

- A. 9C_3
- B. $9!/(3!)^3$
- C. $9!/(3!)^4$
- D. $9!/(3!)^2$

Ans. B

Ques 12. If $y = \frac{2 \cos 2\theta + \cos \theta}{\cos 3\theta + \cos^2 \theta + \cos \theta}$, Then value of $y'' + y' + y$ is

- A. $\sec \theta (1 - \tan 3\theta)$
- B. $\tan \theta (\sec 3\theta + 2 \tan 2\theta)$
- C. $\sec \theta (2 \sec 2\theta + \tan \theta)$
- D. $\cot \theta (\sec 3\theta + 2 \tan \theta)$

Ans. C

JEE Main Chemistry Questions

Ques 1. Find out E cell of the given cell $M | M^{2+} || x^{2-} | x$.

$$E_{M^{2+} | M}^{\circ} = 0.34 \text{ V}$$

$$E_{x | x^{2-}}^{\circ} = 0.46 \text{ V}$$

- A. 0.80 V
- B. 0.12 V
- C. -0.12 V

D. -0.80 V

Ans. B

Ques 2. Which of the following is true regarding coagulation of egg:

- A. 1° structure does not change
- B. 2° structure does not change
- C. 3° structure does not change
- D. Denaturation of protein does not occur.

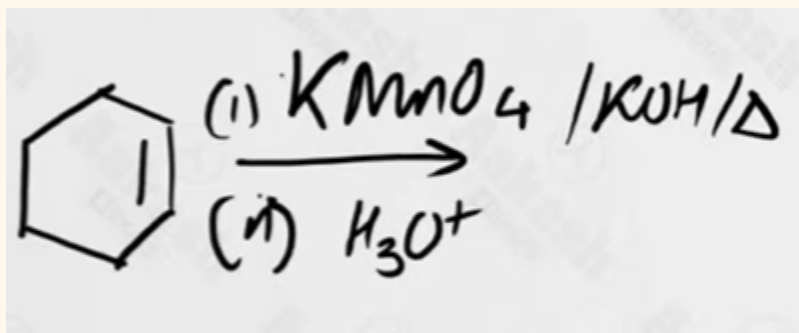
Ans. A

Ques 3. Find out value of C_p/C_v for an ideal gas undergoing reversible adiabatic process for which $P \propto T^3$ is given

- A. 4/3
- B. 3/2
- C. 5/4
- D. 5/3

Ans. B

Ques 4. Consider the following reaction:



The product is

- A. Adipic Acid
- B. Oxalic Acid
- C. Succinic acid
- D. Benzoic Acid

Ans. A

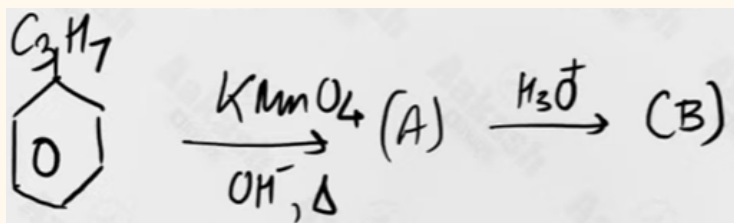
Ques 5. How many of the following have zero dipole moment
 H_2S , CH_4 , NH_3 , BF_3 , SO_2 , NF_3

Ans. 2

Ques 6. In an atom, how many electrons can have
 (i) $n = 4$ (ii) $m_l = 1$ (iii) $m_s = \frac{1}{2}$

Ans. 3

Ques 7. Number of π bonds present in product B is:



Ans. 4

Ques 8. From the given information, calculate enthalpy of formation of 2 moles of $\text{C}_6\text{H}_6(\text{l})$ at 25°C . Given: $\Delta_f H(\text{C}_6\text{H}_6(\text{l})) = -3264.6 \text{ kJ/mol}$
 $\Delta_f H(\text{C}(\text{s})) = -393.5 \text{ kJ/mol}$ $\Delta_f H(\text{H}_2\text{O}(\text{l})) = -285.83 \text{ kJ/mol}$

- A. -124.5 kJ/mol
- B. -46.11 kJ/mol
- C. 46.11 kJ/mol

D. 124.5 kJ/mol

Ans. C

Ques 9. Which of the following molecule is an acidic oxide?

- A. N_2O_3
- B. NO
- C. CO
- D. CaO

Ans. A

Ques 10. Equanil drug is used for which disease?

- A. Infertility
- B. Hypertension and depression
- C. Acidity
- D. Eye-itching

Ans. B

JEE Main Physics Questions

Ques 1. Angular momentum of an electron in an orbit of radius R of a hydrogen atom is directly proportional to

- A. R
- B. $1/R$
- C. $1/\sqrt{R}$
- D. \sqrt{R}

Ans. D

Ques 2. Shortest wavelength in Lyman series has wavelength of 915 Å. Longest wavelength of Balmer series has a value of ?

- A. 5296 Å**
- B. 3647 Å**
- C. 6588 Å**
- D. 7294 Å**

Ans. C

Ques 3. A solid sphere is rolling without slipping. Find the ratio of rotational kinetic energy to total kinetic energy of sphere.

- A. 4/7**
- B. 3/7**
- C. 2/7**
- D. 5/7**

Ans. C

Ques 4. A truck is moving from rest with constant power P. if the displacement of the truck is proportional to t^n , where t is time, find n.

- A. 2**
- B. 3/2**
- C. 1/2**
- D. 5/2**

Ans. B

Ques 5. A block of mass 50 kg is moving with speed of 10 m/s on a rough horizontal surface (friction coefficient of 0.3). Find the kinetic friction acting on the object.

- A. 500 N**
- B. 150 N**
- C. 167 N**
- D. 16 N**

Ans. B

Ques 6. In thermodynamics adiabatic process, pressure is directly proportional to cube of absolute temperature. Find C_p/C_v for the gas

- A. 4/3**
- B. 7/5**
- C. 3/2**
- D. 8/7**

Ans. C

Ques 7. In a hydraulic lift force F is applied to balance 10 N load, diameter of effort arm is 14 cm and load arm is 1.4 cm. The F is equal to

- A. 500 N**
- B. 100 N**
- C. 2000 N**
- D. 1000 N**

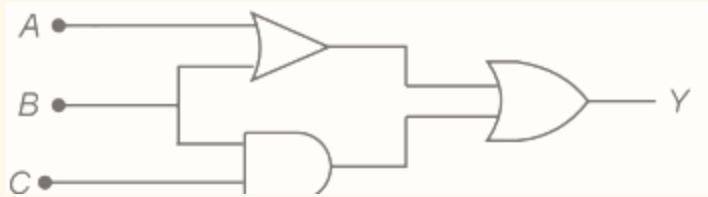
Ans. 4

Ques 8. In sonometer, fundamental frequency changes from 400 Hz to 500 Hz keeping same tension. Find percentage change in length.

- A. 5%**
- B. 10%**
- C. 20%**
- D. 40%**

Ans. C

Ques 9. For what boolean values of A, B & C the given logic gate gives output of zero?



- A. $A = 1, B = 0, C = 1$
- B. $A = 0, B = 0, C = 1$
- C. $A = 0, B = 1, C = 1$
- D. $A = 1, B = 1, C = 1$

Ans. B

Ques 10. 20R resistance wire is cut into 10 equal parts. Now each part first is connected in series and then in parallel. Find ratio of equivalent resistance in both cases ($R_{\text{series}} : R_{\text{parallel}}$)

- A. 100 : 1
- B. 50 : 1
- C. 25 : 1
- D. 5 : 1

Ans. A