

# JEE Main 2024 Question Paper Feb 1 Shift 2 (B.E./B.Tech)

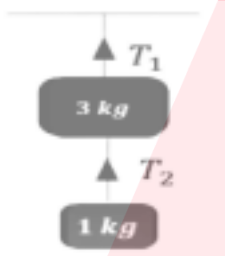
## JEE Main Physics Questions

Q. Two trains run on North-South parallel tracks. Train A moves with velocity 20 m/s towards North and train B moves with velocity 30 m/s towards South. Then find the velocity of train B with respect to train A.

Q. A body of mass of 4kg experiences two forces  $\vec{F}_1 = 5\hat{i} + 8\hat{j} + 7\hat{k}$ , &  $\vec{F}_2 = 3\hat{i} - 4\hat{j} - 3\hat{k}$  then acceleration acting on the body R

Q. A source produced electromagnetic wave of frequency 60MHz. Find the wavelength of this wave in air.

Ques 4. In the figure shown, find the ratio of tensions in the strings,  $T_1/T_2$



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

Q. A Big drop is formed by coalescing 1000 small droplets of water. The surface water. The surface energy will become.

## JEE Main Chemistry Questions

Q. Number of radial nodes present in 3p are

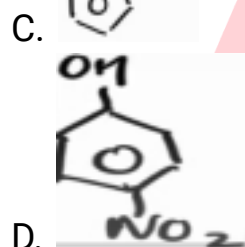
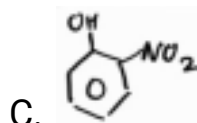
- A. 0
- B. 1
- C. 2
- D. 4

Q. Which of the following compounds have colour due to d-d transition?

- A.  $\text{KMnO}_4$
- B.  $\text{K}_2\text{Cr}_2\text{O}_7$
- C.  $\text{K}_2\text{CrO}_4$
- D.  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$

Q. Which of the following compounds has intramolecular hydrogen bonding in it?

- A.  $\text{NH}_3$
- B.  $\text{H}_2\text{O}$



Q. Which of the following has the highest 3rd ionization energy?

- A. Mn
- B. V
- C. Cr
- D. Fe

Q. A 10 mL hydrocarbon ( $C_2H_4$ ) on combustion give 40 mL  $CO_2$  and 50 mL  $H_2O$ . Calculate the value of  $x+y$

Q. Solubility of  $Ca_3(PO_4)_2$  in 100 mL of pure water is  $W$  gm. Find out  $K_{sp}$  of  $Ca_3(PO_4)_2$  is: (M: Molecular mass of  $Ca_3(PO_4)_2$ )

- A.  $108 * (W/M)^5$
- B.  $108 * 10^5 * [W/M]^5$
- C.  $108 * 10^4 * [W/M]^5$
- D.  $108 * 10^6 * [W/M]^5$

Q. Which of the following sets of elements can be detected by Lassaigne's Test ?

- A. N and S only
- B. N, P and S only
- C. P and halogens only
- D. N, P, S and halogens

Q. Which of the following compounds in 3d series does not show +3 oxidation state?

- A. V
- B. Cr
- C. Mn
- D. Cu

Q. What is the order of reducing character for  $AsH_3$ ,  $NH_3$ ,  $PH_3$  (group 15 hydrides)?

- A.  $NH_3 > PH_3 > AsH_3$
- B.  $PH_3 > NH_3 > AsH_3$
- C.  $AsH_3 > PH_3 > NH_3$
- D.  $NH_3 > AsH_3 > PH_3$

Q. Let  $\alpha$  and  $\beta$  be the roots of equation  $px^2 + qx + r = 0$ , where  $P \neq 0$ . If  $p, q, r$  be the consecutive terms of a non-constant G.P. and  $1/\alpha + 1/\beta = 3/4$  then the value of  $(\alpha - \beta)^2$  is:

Q. If the mirror image of the point  $P(3,4,9)$  in the line

$\frac{x-1}{3} = \frac{y+1}{2} = \frac{z-2}{1}$  is  $(\alpha, \beta, \gamma)$  then find  $14(\alpha + \beta + \gamma)$  is:

Q. The number of solutions of the equation

$4\sin^2 x - 4\cos^3 x + 9 - 4\cos x = 0, x \in [-2\pi, 2\pi]$  is:

Q. If the domain of the function

$f(x) = \frac{\sqrt{x^2-25}}{(\sqrt{4-x^2})} + \log(x^2 + 2x - 15)$  is  $(-\infty, \alpha) \cup (\beta, \infty)$ , then  $\alpha^2 + \beta^2$  is equal to  $b$

Q. Let the system of equations  $x+2y+3z = 5$ ,  $2x+3y+z = 9$ ,  $4x+3y+\lambda z = \mu$  have an infinite number of solutions. Then  $\lambda + 2\mu$  is equal to