

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

---

## JEE Main Physics Questions

**Ques 1.** 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.

**Ans.** 50 m/s

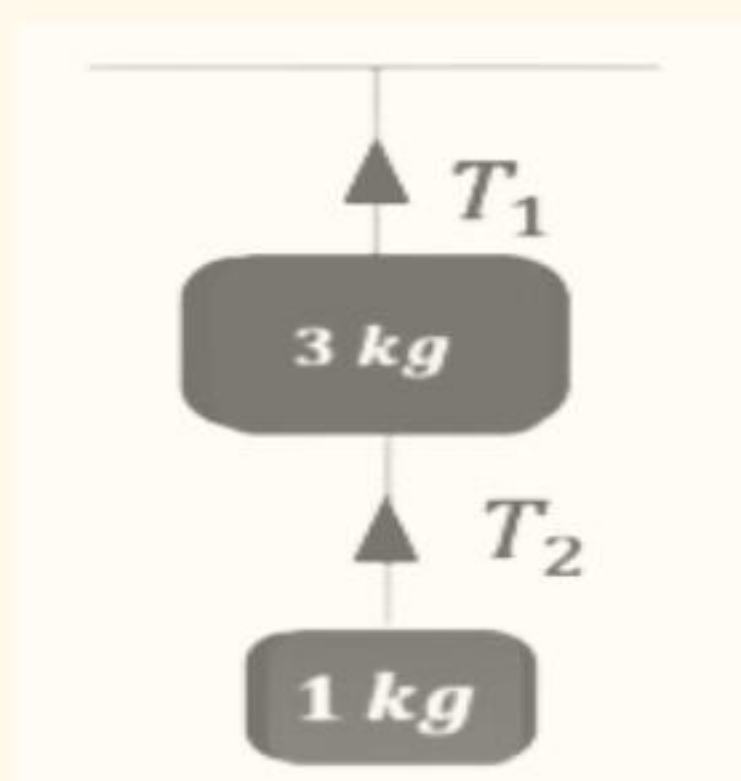
**Ques 2.** A body of mass of 4kg experiences two forces  $\vec{F}_1 = 5\hat{i} + 8\hat{j} + 7\hat{k}$ , &  $\vec{F}_2 = 3\hat{i} - 4\hat{j} - 3\hat{k}$  then acceleration acting on the body R

**Ans.**  $\sqrt{6}$

**Ques 3.** A source produced electromagnetic wave of frequency 60MHz. Find the wavelength of this wave in air.

**Ans.** 5 m

**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

Ans. D

**Ques 5. A Big drop is formed by coalescing 1000 small droplets of water. The surface water. The surface energy will become.**

Ans. 1/10.

---

### JEE Main Chemistry Questions

**Ques 1. Number of radial nodes present in 3p are**

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

Ans. B

**Ques 2. Which of the following compounds have colour due to d-d transition?**

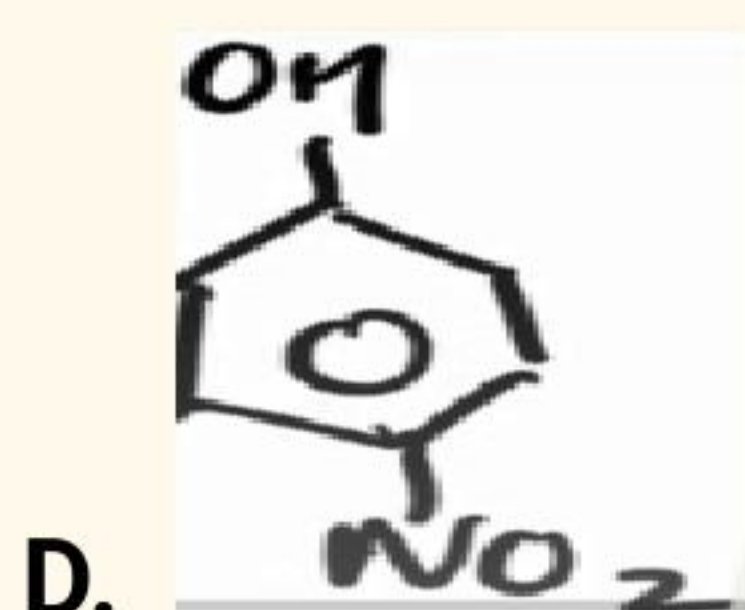
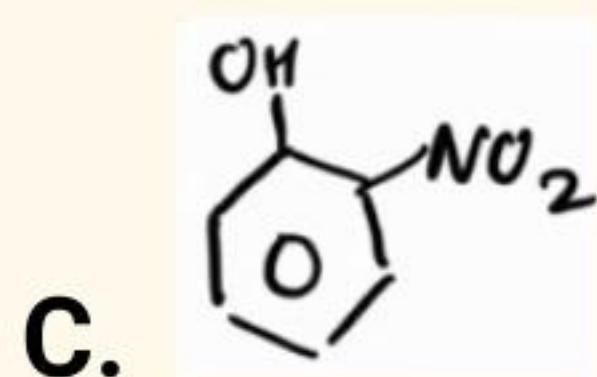
- A.  $\text{KMnO}_4$
- B.  $\text{K}_2\text{Cr}_2\text{O}_7$
- C.  $\text{K}_2\text{CrO}_4$
- D.  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$

Ans. D

**Ques 3. Which of the following compounds has intramolecular hydrogen bonding in it?**

**A. NH<sub>3</sub>**

**B. H<sub>2</sub>O**



**Ans. B**

**Ques 4. Which of the following has the highest 3rd ionization energy?**

**A. Mn**

**B. V**

**C. Cr**

**D. Fe**

**Ans. A**

**Ques 5. A 10 mL hydrocarbon (C<sub>2</sub>H<sub>4</sub>) on combustion give 40 mL CO<sub>2</sub> and 50 mL H<sub>2</sub>O. Calculate the value of x+y**

**Ans. 14**

**Ques 6. Solubility of Ca<sub>3</sub>(PO<sub>4</sub>)<sub>2</sub> in 100 mL of pure water is W gm. Find out K<sub>sp</sub> of Ca<sub>3</sub>(PO<sub>4</sub>)<sub>2</sub> is:  
(M: Molecular mass of Ca<sub>3</sub>(PO<sub>4</sub>)<sub>2</sub>)**

**A. 108 \* (W/M)<sup>5</sup>**

**B. 108 \* 10<sup>5</sup> \* [W/M]<sup>5</sup>**

- C.  $108 \times 10^4 \times [W/M]^5$
- D.  $108 \times 10^6 \times [W/M]^5$

Ans. B

**Ques 7. 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

Ans. D

**Ques 8. Which of the following compounds in 3d series does not show +3 oxidation state?**

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

Ans. D

**Ques 9. What is the order of reducing character for AsH<sub>3</sub>, NH<sub>3</sub>, PH<sub>3</sub> (group 15 hydrides)?**

- A. NH<sub>3</sub> > PH<sub>3</sub> > AsH<sub>3</sub>
- B. PH<sub>3</sub> > NH<sub>3</sub> > AsH<sub>3</sub>
- C. AsH<sub>3</sub> > PH<sub>3</sub> > NH<sub>3</sub>
- D. NH<sub>3</sub> > AsH<sub>3</sub> > PH<sub>3</sub>

Ans. C

---

## JEE Main Mathematics Questions

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

**Ans.** 80/9

**Ques 2.** 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:

**Ans.** 108

**Ques 3.** The number of solution of the equation

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

is:

**Ans.** 0

**Ques 4.** 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

**Ans.** 50

**Ques 5.** 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

**Ans. 17**

ZOLLEGE.in