

# JEE Main 2023 Answer Key

Date and Shift: April 13 Shift 1

Memory-Based Questions

## Physics Answer Key

Question No.	Answer Key
1	A
2	A
3	C
4	A
5	B
6	B
7	A
8	4
9	10
10	A

## Chemistry Answer Key

Question No.	Answer Key
1	B
2	C
3	2
4	A
5	9.34%
6	A
7	3
8	C
9	6
10	A

## Mathematics Answer Key

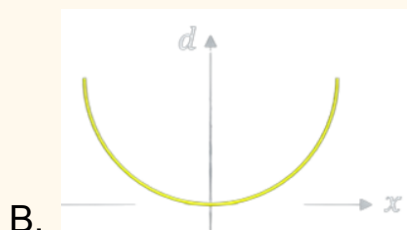
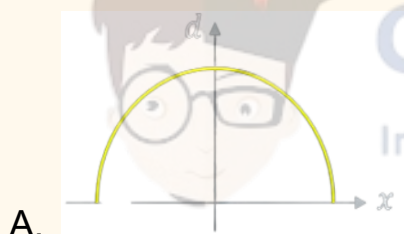
Question No.	Answer Key
1	D
2	20
3	4
4	A
5	A
6	3
7	D
8	8
9	C
10	C

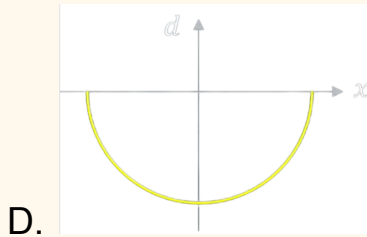
## JEE Main 2023 Physics Question Paper

**Question 1.** If the height of the tower used for L.D.S is increased by 21% then percentage change in range is?

- A. 10%
- B. 21%
- C. 19%
- D. 42%

**Question 2.** Select the correct graph showing the difference ( $d$ ) between total energy and potential energy of a particle in linear SHM with position  $x$  of the particle ( $x = 0$  is the mean position)





**Question 3.** A dipole of charge  $0.01\text{C}$  and separation  $0.4\text{mm}$ , is placed in an electric field of strength  $10\text{ dyne/CC}$  , Find the maximum torque exerted on the dipole in the field.

- A.  $4 \times 10^{-9}\text{ Nm}$
- B.  $2 \times 10^{-10}\text{ Nm}$
- C.  $4 \times 10^{-10}\text{ Nm}$
- D.  $2 \times 10^{-9}\text{ Nm}$

**Question 4.** Two bodies having the same linear momentum have a ratio of kinetic energy as  $16:9$ . Find the ratio of masses of these bodies.

- A.  $9/16$
- B.  $4/3$
- C.  $3/4$
- D.  $16/9$

**Question 5.** What is the center of gravity of a semi-circular disc of radius  $(R)$ ?

- A.  $2R/\pi$
- B.  $4R/3\pi$
- C.  $R/2$
- D.  $3R/8$

**Question 6.** Pressure for polytropic process  $P$  varies with volume  $V$  as  $P = av^{-3}$ , find out the bulk modulus.

- A.  $3V$
- B.  $3P$
- C.  $P$
- D.  $V$

**Question 7.** The work function for two metals are  $9\text{eV}$  and  $4.5\text{eV}$ . Find the approx. difference between their threshold wavelength.(use  $hc = 1240 \text{ eV} \cdot \text{nm}$ )

- A.  $138 \text{ nm}$
- B.  $130 \text{ nm}$
- C.  $112 \text{ nm}$
- D.  $145 \text{ nm}$

**Question 8.** If a wire of resistance  $R$  is connected across  $V_0$ , then power is  $P_0$ . The wire is cut into two equal parts and connected with  $V_0$  individually, then the sum of power dissipated is  $P_1$ , then  $P_0/P_1$  is  $1/x$ . Find the value of  $x$ .

**Question 9.** A particle is performing SHM having position  $x = A \cos 30^\circ$ , and  $A = 40 \text{ cm}$ . If its kinetic energy at this position is  $200 \text{ J}$ , the value of force constant in  $(\text{kN/m})$  is?

**Question 10.** For the given radioactive decay  ${}^{298}_{94}\text{X} \rightarrow {}^{294}_{92}\text{X} + {}^4_2\alpha + Q$  - value, binding energy per nucleon of  $X$ ,  $Y$  and  $\alpha$  are  $a$ ,  $b$  and  $c$ . The  $Q$  - value is equal to



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- A.  $294b + 4c - 298a$
  - B.  $92b + 2c - 94a$
  - C.  $294b + 4c + 298a$
  - D.  $92b + 2c + 94a$
- 

## JEE Main 2023 Chemistry Question Paper

**Question 1. Which of the following free radicals helps in depletion of the ozone layer?**

- A. NO
- B. Cl
- C. OH
- D.  $\text{CH}_3$

**Question 2. In which of the following options the species changes from paramagnetic to diamagnetic and bond order increases.**

- A.  $\text{N}_2 \rightarrow \text{N}_2^+$
- B.  $\text{O}_2 \rightarrow \text{O}_2^+$
- C.  $\text{NO} \rightarrow \text{NO}^+$
- D.  $\text{O}_2 \rightarrow \text{O}^+$

**Question 3. Radius of the 2nd orbit of  $\text{He}^+$  is  $r_0$ . Radius of the 4th orbit of  $\text{Be}^{3+}$  is  $xr_0$ . Find x.**

**Question 4. What happens when lyophilic sol is added to lyophobic sol. prevention from coagulation precipitation emulsion electrophoresis**

- A. Prevention from coagulation
- B. Precipitation
- C. Emulsion
- D. Electrophoresis

**Question 5.** An organic compound on combustion gives 0.22 g of  $\text{CO}_2$  and 0.126 g of  $\text{H}_2\text{O}$ . If the percentage of C in given organic compound is 40% , the percentage of H will be?

**Question 6.** Which of the following shows an incorrect method of refining?

- A. Zinc:Liquation
- B. Copper:Electrolysis
- C. Titanium:Van Arkel Method
- D. Nickel:Mond's Process

**Question 7.** For the 1<sup>st</sup> order reactions, the ratio of  $t_{50\%}$  to  $t_{87.5\%}$  will be:

**Question 8.** The pair of lanthanides will exceptionally high 3<sup>rd</sup> ionisation enthalpy than neighbouring elements:

- A. Lu and Yb
- B. Eu and Gb
- C. Eu and Yb
- D. Dy and Yb

**Question 9.** If  $(1+1/x)^{1/2} v_{av} = v_{rms}$ , then x is:



**Question 10. Incorrect statement about Borazine is:**

- A. It has banana shape bonds
  - B. It has electron delocalisation
  - C. It reacts with water
  - D. Cyclic in nature
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**JEE Main 2023 Mathematics Question Paper**

**Question 1. Find the sum of series:**

**$2 \cdot 2^2 - 2 \cdot 3^2 + 2 \cdot 4^2 + \dots$  (20 terms)**

- A. 462
- B. -462
- C. 460
- D. -460

**Question 2. Let the number of matrices of order  $3 \times 3$  are possible using the digits  $[0, 1, 2, 3, \dots, 10)$  is  $m^n$ , then  $(m + n)$  is \_\_\_\_\_. (where  $m$  is a prime number)**

**Question 3. Remainder when  $2^{2022}$  is divided by 15 is equal to\_\_**

**Question 4.** The number of 7 digits numbers made using 1,2,3,4 whose sum of digits is 12 is?

- A. 413
- B. 311
- C. 308
- D. 393

**Question 5.** If  $dy/dx = y+7$  and  $y(0) = 0$ , then the value of  $y(1)$  is?

- A.  $7(e - 1)$
- B.  $2(e - 1)$
- C.  $7e$
- D. None of these

**Question 6.** If  $g(x) = \sqrt{x+1}$  &  $f(g(x)) = 3-\sqrt{x+1}$  then  $f(0) = ?$

**Question 7.** Find area bounded by the curves  $y = \max\{\sin x, \cos x\}$  and x-axis between  $x = -\pi$  and  $x = \pi$

- A.  $2 + \sqrt{2}$
- B.  $\sqrt{2}$
- C.  $1 + \sqrt{2}$
- D.  $2\sqrt{2}$

**Question 8.** For the data:

$x_i$	1	3	5	7	9
$f_i$	4	24	28	$a$	8

If the mean of data is 5 and mean deviation about mean is  $M$  and variance is  $\sigma^2$ , then  $3\sigma/M + \sigma^2$  is?

**Question 9.** The integral  $\int_0^{\infty} \frac{6}{(e^{3x} + 6e^{2x} + 11e^x + 6)} dx$

- A.  $\ln 32$
- B.  $\ln 27$
- C.  $\ln 32/27$
- D.  $\ln 27/32$

**Question 10.** Plane  $P_3$  is passing through  $(1,1,1)$  and line of intersection of  $P_1$  and  $P_2$  where  $P_1: 2x - y + z = 5$  and  $P_2: x + 3y + 2z + 2 = 0$ . Then distance of  $(1,1,10)$  from  $P_3$  is:

- A.  $53/85$
- B.  $\sqrt{85}$
- C.  $52/\sqrt{85}$
- D.  $53$



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