

## JEE Main 2024 April 8 Shift 2 Question Paper

1.

$\text{NiCl}_4^{-2}, (\text{Co}(\text{NH}_3)_6)^{+3}$  has how many unpaired electrons ?

2.

The line segment joining the points. (5,2) and (2,a) subtends an angle  $\pi/4$  at the origin then the absolute value of the product of all possible values of a is

3.

Decreasing order of Acidic nature

(a)  $\text{HCOOH}$

(b)  $\text{CH}_3 - \text{CH}_2 - \text{COOH}$

(c)  $\text{CH}_3\text{COOH}$

(d)  $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{COOH}$

4.

Value of  $\frac{3 \cos 36^\circ + 5 \sin 18^\circ}{5 \cos 36^\circ - 3 \sin 18^\circ}$  is  $\frac{a\sqrt{5}-b}{c}$  where a, b, c are natural numbers and  $\text{gcd}(a, c) = 1$  then  $a + b + c$  is

5.

S-I Primary secondary and Tertiary amines react with  $C_6H_5SO_2Cl$

S-II They form soluble products with NaOH

- a. Statement 1 is true and statement 2 is false.
- b. Statement 1 is false and statement 2 is true.
- c. Statement 1 and statement 2 , both are true.
- d. Statement 1 and statement 2 , both are false.

6.

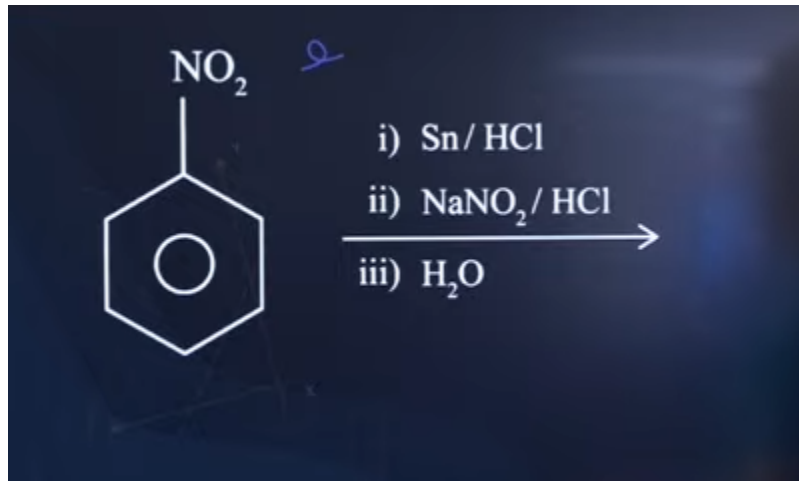
$$\text{If } \alpha \neq a, \begin{vmatrix} \alpha & b & c \\ a & \beta & c \\ a & b & \gamma \end{vmatrix}, \frac{a}{\alpha-a} + \frac{b}{\beta-b} + \frac{c}{\gamma-c} = \gamma \neq c$$

7.

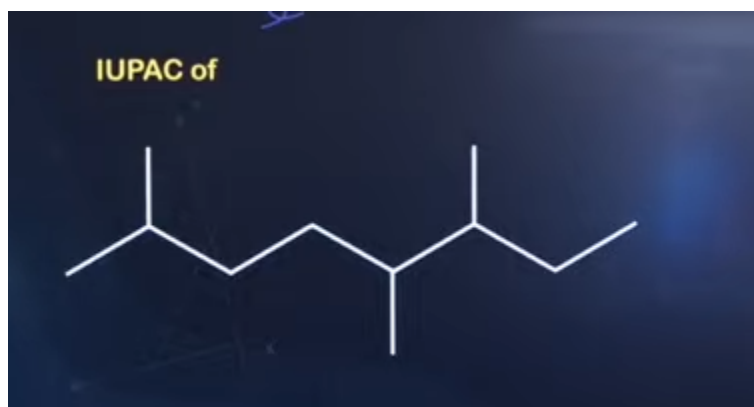
If De- Broglie wavelength of electron is equal to De-Broglie wavelength of proton, then what is the relation between their kinetic energy

- a.  $KE_e > KE_p$
- b.  $KE_p > KE_e$
- c.  $KE_p = KE_e$
- d.  $2KE_e = KE_p$

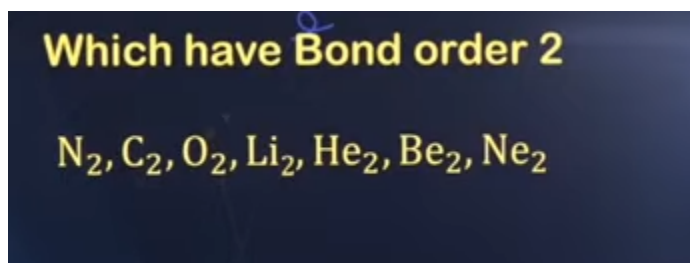
8.



9.



10.



11.

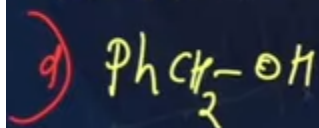
Carbocation structure is?

- (1) Trigonal planar
- (2) Pyramidal
- (3) Tetrahedral
- (4) Square planar.

12.

Which of the following easily reacts with NaOH

- a)  $C_2H_5OH$
- b)  $C_6H_5OH$
- c)  $(CH_3)_3C - OH$



13.

Which of the following are aromatic compounds?

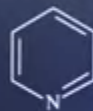
- a. Only (i) and (ii)
- b. Only (ii) and (iii)
- c. Only (i) and (iii)
- d. All are Aromatic



(a)



(b)



(c)

14.

The sum of all possible values of  $\theta \in [-\pi, 2\pi]$ , for  $\frac{1+i\cos\theta}{1-2i\cos\theta}$  is purely imaginary.

15.

$y = y(x)$  be the solution curve of the differential equation  $\sec y \frac{dy}{dx} + 2x \sin y = x^3 \cos y$ ,  $y(1) = 0$  the  $y\sqrt{3}$  is

16.

a Figure shows two charges  $q_1$  &  $q_2$  placed on x-axis as shown. If electric field at P is along X - direction, find  $\frac{q_1}{q_2}$

(a)  $\frac{4\sqrt{5}}{25}$

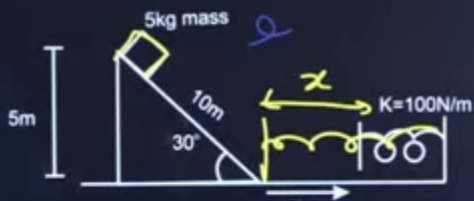
(b)  $\frac{8\sqrt{5}}{25}$

(c)  $\frac{12}{25}$

(d)  $\frac{16\sqrt{5}}{25}$



17.



A block of mass 5 kg is released as shown in the figure. Surface  $CD$  is rough with  $\mu = 0.5$ , rest of all the surfaces are smooth. Find the maximum compression in the spring (Initially spring is in its natural length.)

18.

Urea molality is 4.4 m in aqueous solution. What is the mole fraction

19.

The no. of distinct real roots of the equation  $|x + 1||x + 3| - 4|x + 2| + 5 = 0$  is:

20.

The number of ways five alphabets can be chosen from the alphabets of the words MATHEMATICS where the chosen alphabets are not necessarily distinct.

21.

The term independent of  $x$  in the expansion of

$\left[\sqrt{ax^2} + \frac{1}{2x^3}\right]^{10}$  is 105, then  $a^2$  is

22.

If the system of equations  $x + y - z = \lambda$ ,  $7x + 9y + \mu z = -3$ ,  $5x + y + 2z = -1$  has infinitely many solutions then  $(2\mu + 3\lambda)$  is

23.

Position of 10<sup>th</sup> maximum  $\lambda = 500\text{nm}$ ,  $d = 1\text{mm}$ , and  $D = 1\text{mm}$