

## JEE Main 2024 Chemistry Question Paper April 6 Shift 2

1. For the reaction  $2P + Q \rightarrow S$ , if  $\Delta H = 400 \text{ kJ/mol}$  and  $\Delta S = 0.2 \text{ kJ/K}$ , at what temperature will equilibrium be attained?

- (1) 500 K
  - (2) 2000 K
  - (3) 1000 K
  - (4) 1500 K
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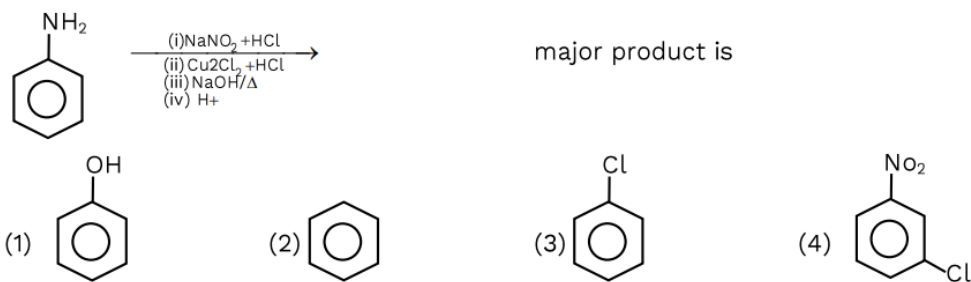
2. An electron in the first excited state of H-atom has energy  $-3.4 \text{ eV}$ . Find its kinetic energy.

- (1) 3.4 eV
  - (2) 1.7 eV
  - (3) 6.8 eV
  - (4) 13.6 eV
- 

3. How many molecules have central atoms with  $sp^2$  hybridisation? Given:  $\text{SiO}_2$ ,  $\text{NH}_3$ ,  $\text{CO}_2$ ,  $\text{SO}_2$ ,  $\text{C}_2\text{H}_4$ ,  $\text{C}_2\text{H}_2$ ,  $\text{C}_6\text{H}_6$ .

- (1) 2
  - (2) 4
  - (3) 3
  - (4) 5
- 

4.



5. For the reaction:  $\text{CO(g)} + \frac{1}{2} \text{O}_2(\text{g}) \rightleftharpoons \text{CO}_2(\text{g})$ , find  $K_p/K_c$ .

- (1)  $\frac{1}{(RT)^{1/2}}$
  - (2)  $(RT)^{1/2}$
  - (3)  $\frac{1}{RT}$
  - (4)  $RT$
- 

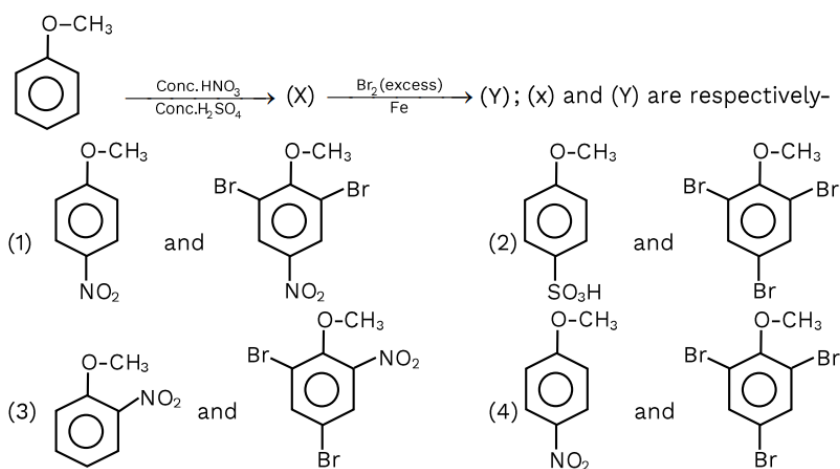
6. Which statement is incorrect for but-2-ene?

- (1) It forms two stereoisomers
- (2) Trans isomer is more stable than cis
- (3) Dipole moment of trans > cis
- (4) Melting point of trans > cis

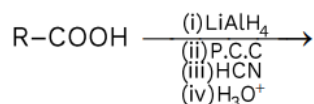
**7. Correct increasing order of number of unpaired electrons: Sc, Ti, Cr, Mn, V**

- (1) Cr > V > Mn > Ti > Sc
- (2) Mn > Cr > V > Ti > Sc
- (3) Cr > Mn > V > Ti > Sc
- (4) Cr > Mn > Ti > V > Sc

**8.**



**9. Carboxylic acid undergoes the following sequence:**



**Major product (X) is:**

- (1) R-H
- (2) R-CHO
- (3) R-CH<sub>2</sub>COOH
- (4) R-CH<sub>2</sub>-COOH

**10. Among VO<sub>2</sub><sup>-</sup>, Cr<sub>2</sub>O<sub>7</sub><sup>2-</sup>, MnO<sub>4</sub><sup>-</sup>, find the magnetic moment of the compound having least oxidizing power.**

- (1) 0 B.M.
- (2) 1.73 B.M.
- (3) 2.87 B.M.
- (4) 4.90 B.M.

11. Arrange in increasing order of wavelength: Li, Cs, Rb, K

- (1)  $\text{Li} > \text{Cs} > \text{Rb} > \text{K}$
  - (2)  $\text{Rb} > \text{K} > \text{Li} > \text{Cs}$
  - (3)  $\text{Li} > \text{Cs} > \text{K} > \text{Rb}$
  - (4)  $\text{Cs} > \text{Li} > \text{Rb} > \text{K}$
- 

12. A salt gives yellow precipitate with  $\text{AgNO}_3$ , but is insoluble in  $\text{NH}_4\text{OH}$ . Which anion does the salt contain?

- (1)  $\text{I}^-$
  - (2)  $\text{Br}^-$
  - (3)  $\text{Cl}^-$
  - (4)  $\text{F}^-$
- 

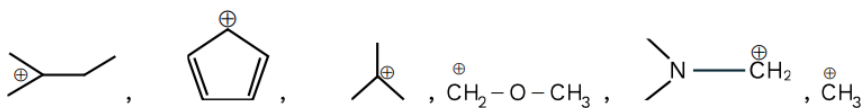
13. For a first-order reaction, the ratio  $t_{2/3}/t_{4/5}$  is:

- (1) 0.34
  - (2) 0.50
  - (3) 0.69
  - (4) 1.00
- 

14. For 3 M aqueous NaCl solution with density = 1.25 g/mL, calculate molality.

- (1) 2.17 m
  - (2) 2.79 m
  - (3) 3.7 m
  - (4) 3.17 m
- 

15. Numer of Carbocation which is not Stabilised by Hyper Conjugation



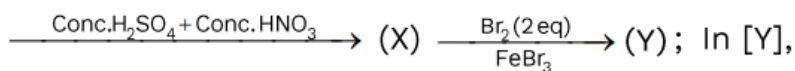
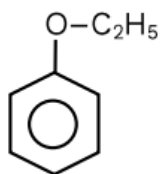
- (1) 2
  - (2) 3
  - (3) 4
  - (4) 5
- 

16. Select correct statement:

Statement-I:  $\text{PCl}_5$  and  $\text{BrF}_5$  are  $\text{sp}^3\text{d}$  hybridised.

Statement-II:  $\text{SF}_6$  and  $[\text{Co}(\text{NH}_3)_6]^{3+}$  are  $\text{sp}^3\text{d}^2$  hybridised.

- (1) Both statements are correct
- (2) Both statements are incorrect
- (3) Only Statement-I correct
- (4) Only Statement-II correct

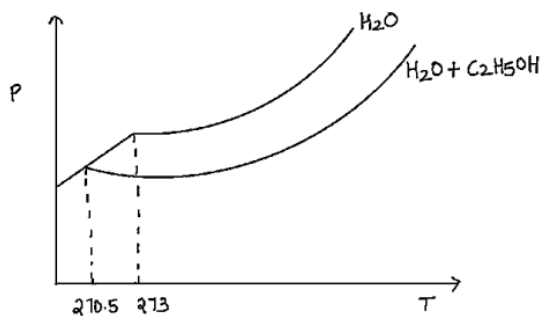


17.

In product (Y), the ratio of oxygen atoms to bromine atoms is  $n \times 10^{-1}$ . Find the value of  $n$ .

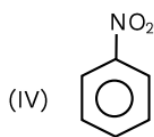
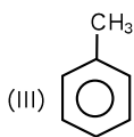
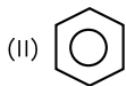
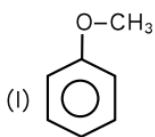
- (1) 5
- (2) 10
- (3) 15
- (4) 20

18. In 100 mL  $\text{H}_2\text{O}$ ,  $x \times 10^{-3}$  mL of ethanol (density = 0.8 g/mL) is added. A colligative property graph is shown. Using  $K_f(\text{H}_2\text{O}) = 1.86 \text{ K kg mol}^{-1}$ , find the value of  $x$ .



- (1) 5420 mL
- (2) 6810 mL
- (3) 7728 mL
- (4) 8200 mL

19. Rate of Electrophilic Aromatic Substitution Reaction (E.A.S.R) for the following compounds is:



- (1) I > III > II > IV
- (2) I > II > III > IV
- (3) IV > III > II > I
- (4) I = III > II > IV

20. Find the shortest wavelength of Paschen series for hydrogen atom.

- (1)  $\frac{9}{R}$
- (2)  $\frac{16}{R}$

- (3)  $\frac{144}{7R}$   
(4)  $\frac{7R}{144}$
- 

**21. Which statements about enzymes are correct?**

- (1) Enzymes are biocatalysts  
(2) Enzymes are non-specific for reactions  
(3) Most enzymes are globular proteins  
(4) Enzyme oxidase interconverts maltose into glucose

- (1) 1, 2  
(2) 2, 4  
(3) 1, 3  
(4) 3, 4
- 

**22. Match the reaction type with reaction name.**

- (A)  $\text{Na} + \text{H}_2\text{O} \rightarrow \text{NaOH} + \text{H}_2$   
(B)  $\text{N}_2 + \text{O}_2 \rightarrow 2\text{NO}$   
(C)  $\text{NO}_2 \rightarrow \text{NO} + \text{NO}_3^-$   
(D)  $\text{PbCO}_3 \rightarrow \text{PbO} + \text{CO}_2$

Name: (P) Decomposition

- (Q) Displacement  
(R) Combination  
(S) Disproportionation

- (1) A→Q; B→S; C→R; D→P  
(2) A→P; B→R; C→S; D→Q  
(3) A→Q; B→R; C→S; D→P  
(4) A→P; B→S; C→R; D→Q
- 

**23. How can we convert an electrochemical cell into an electrolytic cell?**

- (1) By changing electrodes  
(2) By reversing ions in salt bridge  
(3) By applying opposite lower potential  
(4) By applying opposite higher potential
- 

**24. In Group 14 of periodic table, which statements are correct?**

- (A) Covalent radius decreases down the group  
(B) Down the group  $p\pi-p\pi$  bond strength decreases  
(C) Electronegativity decreases down the group  
(D) Carbon does not show negative oxidation state

- (1) A, B, C  
(2) A, B, C, D  
(3) B, C  
(4) B, C, D

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**25. IUPAC name of  $[PtBr_2(PMe_3)_2]$  is:**

- (1) Dibromido(trimethylphosphine)platinum(II)
  - (2) Dibromido(trimethylphosphine)platinum(IV)
  - (3) Dibromido(trimethylphosphine)platinate(IV)
  - (4) (trimethylphosphine)Dibromidoplatinum(IV)
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