

**Time allowed: 3 Hours****Max. Marks: 70****General Instructions:**

- (a) All questions are compulsory
- (b) Section A: Q.no. 1 to 5 are very short questions and carries 1 mark each.
- (c) Section B: Q. no. 6 to 12 are short answer questions and carries 2 marks each.
- (d) Section C: Q. no. 13 to 24 are also short answer questions and carries 3 marks each.
- (e) Section D: Q. no. 25 to 27 are long answer questions and carry 5 marks each.
- (f) There is no overall choice. However an internal choice has been provided in two questions of one mark, two questions of two marks, four questions of three marks and all the three questions of five marks weightage. You have to attempt only one of the choices in such questions.
- (g) Use of log tables if necessary, use of calculators is not allowed.

**Section-A (1 mark each)**

**Q1.** Define common ion effect.

**OR**

Out of  $\text{FeCl}_3$  and  $\text{HNO}_3$  which will get hydrolyzed? What will be the nature of solution?

**Q2.** Define solubility product.

**Q3.** Define atomic mass unit.

**OR**

State modern periodic law.

**Q4.** What are isotopes?

**Q5.** Define bond enthalpy.

**Section-B (2 marks each)**

**Q6.** How many significant figures are present in 0.0025 and 2500?

**OR**

Define aqueous tension

**Q7.** What is the calorific value?

**OR**

Calculate the pH of  $10^{-8}$  M HCl solution.

**Q8.** Give two applications of Hess's Law.

**Q9.** Give two points of difference between s and p block elements.

**Q10.** Write four important properties of cathode rays.

**Q11.** Calculate the number of molecules present in 2.5 moles of water.

**Q12.** Give the geometry of  $\text{XeO}_3$  and  $\text{BrF}_5$

**Section-C (3 marks each)**

**Q13.** What is buffer capacity? Give the Henderson-Hasselbalch equation for acidic buffer.

**Q14.** pH of a solution is 6.8. Calculate  $H^+$  and  $OH^-$  ion in the solution

**Q15.** Explain Huckel's rule of aromaticity with suitable examples

**Q16.** Write the mechanism of sulphonation of benzene.

**Q17.** Give the composition of each of the following: Limestone, slaked lime and washing soda.

**Q18.** Give three postulates of VSEPR theory.

**Q19.** In a process, 764 J of heat is absorbed by a system and 269 J of work is done by the system. What is the change in internal energy for the process?

**OR**

Define state function. Give examples.

**Q20.** Give limitations of octet rule.

**OR**

- (a) Mention 2 anomalous properties of carbon.
- (b) Complete the following reactions

**Q21.** (a) Write a note on green chemistry

- (b) What is photochemical smog? Give example.
- (c) Give an example for secondary pollutant.

**Q22.** (a) Define pH. A 0.02 M solution of pyridinium hydrochloride has  $pH = 3.44$ .

- (b) Calculate the ionization constant of pyridine.

**OR**

Give oxidation numbers of (i) S in  $\text{H}_2\text{SO}_5$  (ii) Cr in  $\text{CrO}_5$  (iii) N in  $\text{NO}_3^-$

**Q23.** Give three uses of borax.

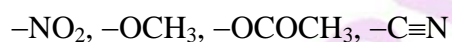
**Q24.** Give three differences between Classical Smog and Photochemical Smog

**Section-D (5 marks each)**

**Q25.** State Markownikoff's rule. Give the mechanism of addition of HBr to propene.

**OR**

- (a) Define geometrical isomers. Write geometrical isomers of  $\text{CHBr}=\text{CHBr}$ .
- (b) Classify the following substituents as ortho, meta and para directing groups.



**Q26.** (a) Describe the structure of diborane.

(b) Convert following in basic units: 35.6 pm and 34567 mg

**OR**

Account for the following:

- (a)  $\text{HNO}_3$  can be stored in aluminium containers. Give reason.
- (b) orthoboric acid is monobasic acid.
- (c)  $\text{CO}_2$  is gas,  $\text{SiO}_2$  is solid
- (d) Graphite is used as lubricant.
- (e) Borazine is more reactive than benzene.

c

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**Q27.** Give FIVE Differences between Ionic and Covalent bond

**OR**

What are allotropes? Discuss structure of crystalline forms of carbon.

