

Total No. of printed pages = 6

**END SEMESTER (REGULAR/RETEST)  
EXAMINATION, DECEMBER -2023**

Branch : Common

Semester : 1st (New)

Subject Code : Sc-103

**CHEMISTRY-I**

Full Marks -70

Time – Three hours

The figures in the margin indicate full marks  
for the questions.

**Instructions :**

- (i) Questions number 1 to 3 are compulsory and objective type.
- (ii) Answer any *five* questions from questions number 4 to 9.

1. Fill in the blanks :

$1 \times 5 = 5$

- (a) In the titration between Sulphuric acid and Sodium carbonate \_\_\_\_\_ is used as an indicator.
- (b) E.C.E value of copper is \_\_\_\_\_.

[Turn over

(c) The acidity of  $\text{Al}(\text{OH})_3$  is \_\_\_\_\_.

(d) Pi bond is \_\_\_\_\_ than sigma bond.

(e)  $p^{\text{H}} + p^{\text{OH}} = \text{_____}$ .

2. Choose the correct answers :

$1 \times 5 = 5$

(a)  $\text{MgCl}_2$  contains

(i) Ionic bond      (ii) covalent bond  
(iii) Dative bond      (iv) Hydrogen bond

(b) At N.T.P 32 grams of  $\text{SO}_2$  occupies

(i) 11.2 litre      (ii) 22.4 litre  
(iii) 44.8 litre      (iv) 1 litre

(c) The outermost electron of sodium atom has principal quantum number

(i) 1      (ii) 2  
(iii) 3      (iv) 4

(d) Conjugate acid of  $\text{HSO}_4^-$  is

(i)  $\text{SO}_3^{2-}$       (ii)  $\text{SO}_4^{2-}$   
(iii)  $\text{H}_2\text{SO}_4$       (iv)  $\text{H}_2\text{SO}_3$

(e) The catalyst used in the manufacture of Ammonia by the Haber's process is

- Iron
- Nitric oxide
- Vanadium pentoxide
- Molybdenum.

3. Match the following columns :  $1 \times 5 = 5$

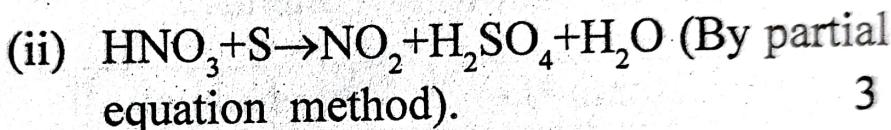
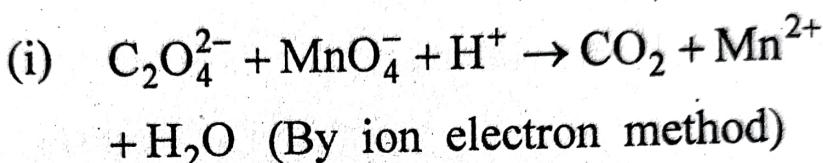
Column-I	Column-II
(a) S-orbitals	(i) Most electronegative element
(b) Sludge and Scale formation	(ii) Semi-conductor
(c) Fluorine	(iii) Spherically symmetrical
(d) $KMnO_4$	(iv) Boiler trouble
(e) Germanium	(v) Strong oxidizing agent

4. (a) State and explain Boyle's law and Charle's law.  $2+2=4$

(b) State Avogadro's hypothesis. At 25°C temperature and 500 mm pressure the volume of a definite mass of a gas is 1000 ml. Calculate the volume of the gas at N.T.P.

1+3=4

(c) Balance the following equation (any one) :



5. (a) What are the limitations of a chemical equation ? 2

(b) What is a decinormal solution ? What volume of 0.1(N) NaOH is required to neutralize 30 ml of 0.25(N) HCl solution ? 4

(c) Discuss the Bronsted-Lowry concept of acids and bases with suitable examples. 3

(d) Differentiate between Orbit and Orbital. 2

6. (a) State and explain the Aufbau principle. Write the electronic configuration of Cr and Mn.

4

(b) What is electron affinity? Discuss its variation in the periodic table. 3

(c) What is an ionic bond? Explain with example. Write at least two important characteristics of an ionic compound. 4

7. (a) What is a Catalyst? Write its important characteristics. 3

(b) What do you mean by  $p^H$  of a solution? Calculate the  $p^H$  of 0.001(M) NaOH solution. 4

(c) State and explain the Faraday's first and second law of electrolysis. 4

8. (a) How long will it take to deposit 5 grams of zinc if a current of 10 ampere is passed through a  $ZnSO_4$  solution? 3

(b) What is sterilization of water? Explain how water is sterilized by using bleaching powder. 4

(c) What are the main causes of hardness in water? How hardness in water is removed by the Permutit method? 4

9. (a) What is a salt bridge? What is its function in an electrochemical cell? 2

(b) Write short notes on any *three*:  $3 \times 3 = 9$

(i) Common ion effect

(ii) Application of electrolysis

(iii) Heisenberg's uncertainty principle

(iv) Co-ordinate covalent bond.