

Total No. of printed pages = 7

**END SEMESTER EXAMINATION – 2022**

Semester : 1st

Subject Code : Sc-103

**CHEMISTRY - I**

Full Marks – 70

Time – Three hours

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

**Instructions :**

1. All questions of PART-A are compulsory.
2. Answer any five questions from PART-B.

**PART – A**

Marks – 25

1. Fill in the blanks.  $1 \times 5 = 5$ 
  - (a) 32 grams of methane contains \_\_\_\_\_ molecules.
  - (b) Conjugate acid of  $\text{OH}^-$  is \_\_\_\_\_.
  - (c) Oxidation number of Cr in  $\text{K}_2\text{Cr}_2\text{O}_7$  is \_\_\_\_\_.

[Turn over]

(d) f-sub-shell has \_\_\_\_\_ orbitals.

(e) The basis of modern periodic table is \_\_\_\_\_.

2. Write true or false :  $1 \times 5 = 5$

(a) Pi bond is formed by head on overlapping of atomic orbitals.

(b)  $\text{pH} + \text{pOH} = 7$ .

(c) Electrolysis of acidulated water liberates oxygen at the cathode.

(d) Temporary hardness of water can be removed by boiling.

(e) Molar volume of a gas at STP is 22.4 litres.

3. Choose the correct answers :  $1 \times 5 = 5$

(a) Equivalent mass of sulphuric acid is

(i) same as molecular mass

(ii) twice the molecular mass

(iii) half of the molecular mass

(iv) one-tenth of molecular mass

(b) Group 18 elements in the periodic table is known as

- (i) Halogen
- (ii) Noble gases
- (iii) Representative elements
- (iv) Transition elements

(c) The relation between  $K_p$  and  $K_c$  is

- (i)  $K_c = K_p(RT)^{\Delta n}$
- (ii)  $K_p = K_c$
- (iii)  $K_c = K_p(RT)$
- (iv)  $K_p = K_c(RT)^{\Delta n}$

(d) Caustic embrittlement in boiler is due to

- (i) KOH
- (ii)  $Mg(OH)_2$
- (iii) NaOH
- (iv)  $Na_2O$

- (e) The numerical value of Universal Gas Constant (R) depends upon
- (i) nature of the gas
  - (ii) temperature of the gas
  - (iii) pressure of the gas
  - (iv) units of measurement.

4. Match the following :

$1 \times 5 = 5$

|                      |                                 |
|----------------------|---------------------------------|
| (a) Heisenberg       | (i) Softening of water          |
| (b) Normality        | (ii) Uncertainty principle      |
| (c) Enzyme           | (iii) Concentration of solution |
| (d) pH               | (iv) Biological catalyst        |
| (e) Permutit process | (v) Hydrogenion concentration   |

5. Answer the following questions in brief : 1×5=5

- (a) Who proposed Modern Periodic law ?
- (b) Who introduced pH scale ?
- (c) What is the relation between molarity and grams per litre ?
- (d) What is the SI unit for pressure of a gas ?
- (e) What is the shape of p-orbital ?

MRP - B

Marks - 45

6. (a) State Avogadro's hypothesis. Calculate the volume occupied by 6 grams of hydrogen at 1.5 atmosphere and 27°C. 1+3=4

- (b) State the difference between oxidation number and valency. 2
- (c) Balance by ion electron method :



3

7. (a) Discuss Lewis concept of acids and bases with examples. 3
- (b) 5.3 grams of sodium carbonate is dissolved in 5000 ml of water. Express the concentration of solution in terms of normality. 3
- (c) State and explain de-Broglie's hypothesis. 3
8. (a) Write electronic configuration of Copper and Potassium. 2
- (b) What do you mean by ionization enthalpy ? What are the factors affecting ionization enthalpy ? Arrange C,N,O and F in decreasing order of ionization enthalpy. 1+2+1=4
- (c) Write the differences between ionic compound and covalent compound. 3
9. (a) State and explain Law of Mass action. 4
- (b) Calculate the pH of 0.001 M solution of  $\text{Ca}(\text{OH})_2$  assuming it to be completely ionized. 3
- (c) Write electron dot structure of  $\text{NH}_3$ . 2

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10. (a) Discuss homogeneous and heterogeneous catalysis with examples. 4

(b) What do you mean by primary cell and secondary cell ? Give one example of each. 2+2=4

(c) What do you mean by Galvanization ? 1

11. Write short notes on any three : 3×3=9

(a) Hund's Rule of maximum multiplicity.

(b) Dalton's Law of Partial pressure.

(c) Common ion effect.

(d) Soft water and hard water.