(6 pages)

Reg. No. : ....

Code No. : 20669 E   **Sub. Code : EFCH 11**

B.Sc. (CBCS) DEGREE EXAMINATION,
NOVEMBER 2023.

First Semester

Chemistry

FOUNDATION COURSE

(For those who joined in July 2023 onwards)

Time : Three hours   Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. The number of possible value for the magnetic quantum number (m) of the 'd' electrons is
   (a) 1   (b) 5
   (c) 4   (d) 3

2. Which orbital has the following quantum numbers $n = 2$, $l = 1$, $m = 0$?
   (a) $2S$ (b) $2P_x$
   (c) $2P_y$ (d) $2P_z$

3. Dipole moment μ is given by
   (a) $\mu = qI$ (b) $\mu = qI^2$
   (c) $\mu = \dfrac{q}{I}$ (d) None of the above

4. BF_3 molecule is having hybridisation
   (a) sp   (b) sp^2
   (c) d^{2}sp^3 (d) dsp^2

5. Which is the structural formula 2, 3-Dimethyl-2-hexene?

   (a) $CH_3 - CH - C = CH - C_2H_5$
   $\quad\quad\quad\; | \quad\quad |$
   $\quad\quad\; CH_3 \; CH_3$

   (b) $CH_3 - C = \;\; C - CH_2 - CH_3$
   $\quad\quad\quad\;\; | \quad\quad\; |$
   $\quad\quad\;\; CH_3 \; CH_3$

   (c) $\quad\quad\quad\; CH_3$
   $\quad\quad\quad\quad |$
   $CH_2 - C - CH = CH - C_2H_5$
   $\quad\quad\;\; |$
   $\quad\quad\; CH_3$

   (d) $\quad\quad\quad\; CH_3$
   $\quad\quad\quad\quad |$
   $CH_3 - CH - CH - CH = CH - CH_2$
   $\quad\quad\quad\quad\quad |$
   $\quad\quad\quad\quad CH_3$

6. ($\pm$) Lactic acid mixture is known as

   (a) Meso mixture   (b) Racemic mixture

   (c) Simple mixture   (d) Complex mixture

7. $P\alpha\dfrac{1}{V}$ at constant temperature. This is

   (a) Boyle's law   (b) Charle's law

   (c) Gay Lussac's law   (d) Avogadro's law

8. The SI unit for surface tension is

   (a) kgS^{-2} (b) NSm^{-2}

   (c) Nm^{-1} (d) P_aS

9. NMR Spectrum is observed in

   (a) Radio frequency region

   (b) Microwave region

   (c) IR region

   (d) Electronic transition

10. The selection rule for Rotational Spectroscopy is

    (a) $\Delta J = \pm 1$ (b) $\Delta J = 0$

    (c) $\Delta \gamma = \pm 1$ (d) $\Delta \gamma = 0$

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Explain

    (i) Isotopes

    (ii) Isobars

    (iii) Isotones.

    Or

    (b) What is meant by Covalent radius, Ionic radius? How does it vary along a group and in a period?

12. (a) Explain Ionic bond.

    Or

    (b) Explain hybridisation in PCl_5.

13. (a) What is Isomerism? Explain any two.

    Or

    (b) Write Aliphatic Compounds of Hydrocarbons with examples.

14. (a) State Boyle's law, Charle's law and Avagadro's law.

Or

(b) Write the characteristics of solids.

15. (a) Explain the General Characteristics of wave.

Or

(b) Write short notes on :
(i) Wavelength
(ii) Frequency
(iii) Amplitude
(iv) Wave number.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Discuss the classification as s, p, d of block elements.

Or

(b) Explain the four quantum numbers.

17. (a) Discuss the postulates of Valence Bond Theory.

Or

(b) Explain the magnetic properties of substances.

18. (a) Explain
(i) Geometrical isomerism
(ii) Enantiomers.

Or

(b) Write short notes on :
(i) Optical Isomerism
(ii) Achiral molecule.

19. (a) Explain Kinetic theory of gases.

Or

(b) Explain the method for Linde's Liquification of gases.

20. (a) Explain Born-Oppenheimer approximation and Energy Level diagram.

Or

(b) Discuss the types of spectroscopy.

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