(7 pages) **Reg. No. :**.....

Code No. : 20369 E **Sub. Code : EMCH21/ FCCH 21**

B.Sc. (CBCS) DEGREE EXAMINATION, NOVEMBER 2025.

Second Semester

Chemistry — Core

GENERAL CHEMISTRY – II

(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. A common ion effect can
   (a) Increase the dissociation of an acid
   (b) Decrease the dissociation of an acid
   (c) Have no effect on dissociation
   (d) Cause the solution to become more basic

2. Buffer solutions resist changes in pH because they contain
   (a) Only strong acids
   (b) Only strong bases
   (c) A weak acid and its conjugate base
   (d) None of the above

3. Which compound is commonly known as caustic soda and is extensively used in industries such as soap making and paper manufacturing?
   (a) NaOH (b) Na_2CO_3
   (c) KBr (d) $KClO_3$

4. Choose the correct statement.
   (a) Peroxides contain the O–O– linkage, while superoxides contain the O^{2-} ion
   (b) Both peroxides and superoxides are strong oxidizing agents
   (c) Peroxides are more stable than superoxides
   (d) There is no difference between peroxides and superoxides

5. Which halogen exhibits peculiarities such as its high electronegativity and small atomic size?

(a) Chlorine (b) Bromine

(c) Fluorine (d) Iodine

6. Noble gases are generally unreactive because

(a) They have a full valence shell

(b) They are highly electronegative

(c) They readily form ionic bonds

(d) They are strong oxidizing agents

7. What is the primary purpose of cracking in the petroleum industry?

(a) To increase the viscosity of crude oil

(b) To decrease the yield of gasoline

(c) To convert heavier fractions into lighter, more valuable products

(d) To remove sulfur impurities from crude oil

8. What is the primary function of vulcanization in the rubber industry?

(a) To increase the solubility of rubber

(b) To decrease the elasticity of rubber

(c) To increase the strength and durability of rubber

(d) To decrease the molecular weight of rubber

9. How many π electrons does benzene have?

(a) 8 (b) 3

(c) 6 (d) 4

10. Which of the following statements is true about the Elbs reaction?

(a) It involves the condensation of two benzene rings

(b) It requires a catalyst like palladium

(c) It is a radical-initiated reaction

(d) It produces a mixture of isomers

PART B — (5 × 5 = 25 marks)

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

Each answer should not exceed 250 words.

11. (a) Discuss the common ion effect.

Or

(b) Explain the mechanism of buffer action in both acidic and basic buffer solutions.

12. (a) Discuss the diagonal relationship of Li with Mg.

Or

(b) Explain the chemistry of borax.

13. (a) How will you prepare hydrazine? Explain their properties.

Or

(b) Write a note on Caro's and Marshall's acids.

14. (a) Explain the stability of conjugated dienes.

Or

(b) What is ozonolysis? Explain with examples.

15. (a) Define Huckel's rule. Explain the stability of benzene.

Or

(b) Give the substitution reactions of anthracene.

PART C — (5 × 8 = 40 marks)

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

Each answer should not exceed 600 words.

16. (a) (i) Explain the Arrhenius concept of acids and bases.

(ii) Describe the theory of acid-base indicators.

Or

(b) Define solubility product. How is it determined? Give its applications.

17. (a) Give a comparative study of the alkali metals with respect to their compounds.

Or

(b) Discuss the preparation and structure of diborane.

18. (a) Explain in detail the structures of xenon fluorides and oxy flourides.

Or

(b) Explain the preparation, properties and structure of inter halogen compounds.

19. (a) Discuss the following with examples.

(i) Hofmann's rule for elimination reactions

(ii) Markownikoff's rule for addition reactions.

Or

(b) Explain the stability of cycloalkanes with Baeyer's strain theory and give its limitations.

20. (a) Explain the nitration and sulphonation reactions of benzene with mechanism.

Or

(b) Discuss the synthesis of naphthalene and its chemical properties.
