

(6 pages)

Reg. No. :

Code No. : 30762 E Sub. Code : EECH 12/
FECH 12

B.Sc. (CBCS) DEGREE EXAMINATION,
NOVEMBER 2024.

First/Third Semester

Chemistry

Elective — CHEMISTRY FOR BIOLOGICAL
SCIENCES – I

(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. What is the bond order of a diatomic nitrogen molecule (N_2) based on molecular orbital theory?

- (a) 1 (b) 2
(c) 3 (d) 0

2. Which of the following processes powers stars like the sun?

- (a) Nuclear fission
(b) Nuclear fusion
(c) Radioactive decay
(d) Alpha particle emission

3. CNG stands for

- (a) Compressed nitrogen gas
(b) Compressed natural gas
(c) Carbureted nitrogen gas
(d) Carbureted natural gas

4. Which property makes silicones useful as sealants and lubricants?

- (a) High reactivity
(b) High thermal stability
(c) Low viscosity
(d) Solubility in water

5. The hybridization of carbon in ethane (C_2H_6) is

- (a) sp (b) sp^2
(c) sp^3 (d) sp^3d

6. In Friedel-Craft alkylation, the catalyst used in typically
- (a) H_2SO_4 (b) AlCl_3
 (c) NaOH (d) FeCl_3
7. Chloramphenicol is used as a/an
- (a) Antipyretic (b) Antibiotic
 (c) Anaesthetic (d) Artificial sweetener
8. What is the main function of ibuprofen?
- (a) Pain relief and fever reduction
 (b) Antibacterial treatment
 (c) Artificial sweetener
 (d) Anaesthetic
9. A titration involves the slow addition of one solution to another in order to determine
- (a) The molecular structure of the compound
 (b) The color of the compound
 (c) The concentration of a solution
 (d) The boiling point
10. What is the principle behind distillation?
- (a) Differential solubility
 (b) Difference in boiling points
 (c) Difference in melting points
 (d) Difference in densities

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PART B — (5 × 5 = 25 marks)

Answer ALL questions choosing either (a) or (b).
 Each answer should not exceed 250 words.

11. (a) Explain the group displacement law in the context of radioactive decay.
- Or
- (b) What are isotopes, isobars? Provide examples of each.
12. (a) What is water gas? Discuss its composition and main applications.
- Or
- (b) What are silicones, and how are they synthesized?
13. (a) Discuss the hybridization and bonding in acetylene (C_2H_2).
- Or
- (b) Describe the mechanism of nitration of benzene.
14. (a) Discuss the structure and use of streptomycin in treating bacterial infections.
- Or
- (b) What is chloroform, and how does it function as an anaesthetic?

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[P.T.O.]

15. (a) Explain the principle of extraction as a separation technique.

Or

(b) What is the principle of thin-layer chromatography (TLC)?

PART C — (5 × 8 = 40 marks)

Answer ALL questions choosing either (a) or (b).
Each answer should not exceed 600 words.

16. (a) Explain the bond order and magnetic properties of the nitrogen molecule (N_2) using Molecular orbital theory.

Or

(b) Discuss the applications of radioisotopes.

17. (a) Discuss the composition and uses of LPG and CNG in detail.

Or

(b) Describe the uses of urea, potassium nitrate and ammonium sulphate as fertilizers.

18. (a) Explain the concept of hyperconjugation with example.

Or

(b) Discuss the chemical properties of pyrrole.

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19. (a) Describe the structure and mechanism of action of Penicillin.

Or

(b) Discuss the structure and uses of artificial sweeteners in the food and beverage industry.

20. (a) Describe the process of crystallization as a purification method.

Or

(b) Describe the process of column chromatography.

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