

(6 pages)

Reg. No. :

Code No. : 20402 E Sub. Code : CACH 11

B.Sc. (CBCS) DEGREE EXAMINATION,
NOVEMBER 2022.

First/Third Semester

Chemistry — Allied

ALLIED CHEMISTRY – I

(For those who joined in July 2021 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. Select the shape of d-orbital
(a) spherical (b) elliptical
(c) dumb-bell (d) ring
2. Calculate the bond order of N_2 molecule
(a) 2 (b) 3
(c) 1 (d) 0

3. Select the electrophile from the following:
(a) NH_3 (b) CN^-
(c) NO_2^+ (d) OH^-
4. Focus the ion which acts as a nucleophile
(a) BF_3 (b) NO_2^+
(c) Br^- (d) H^+
5. Identify the kinetic gas equation from the following:
(a) $PV = (1 - 3)mNc^2$ (b) $P_1V_1 = P_2V_2$
(c) $E = mc^2$ (d) $\lambda = h/p$
6. Indicate the force which is defined as the force of friction between two layers of a liquid moving past one another with different velocities
(a) Viscosity (b) Surface tension
(c) Kinetic energy (d) Potential energy
7. Predict the type of glass which has the composition of silica 45%, sodium oxide 4%, potassium oxide 3% and lead oxide 44%
(a) Jena glass (b) Soda glass
(c) Pyrex glass (d) Flint glass

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8. Identify the substance which is not explosive
(a) RDX (b) TNT
(c) Pyrex glass (d) Nitroglycerine
9. Predict the use of penicillin
(a) Sedatives
(b) Diabetes
(c) Antibiotic
(d) Anaesthetics
10. Choose the drug which is used as an antipyretic
(a) Aspirin
(b) Diclofenac
(c) Ibuprofen
(d) All of them

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 shapes of atomic orbitals.

Or

- (b) Analyse the MO diagram of O₂ molecule.

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12. (a) Illustrate briefly the heterolytic and homolytic cleavage with examples.

Or

- (b) Explain in details the addition and elimination reactions with suitable examples.

13. (a) Summarise the postulates of kinetic theory of gases.

Or

- (b) Discuss briefly the conductors, insulators and semiconductors.

14. (a) Explain briefly the manufacture of glass.

Or

- (b) Describe the preparation of TNT, picric acid and gunpowder.

15. (a) Analyse the mode of action of sulpha drugs. How are prontosil and sulphadiazine prepared?

Or

- (b) Judge the uses of penicillin, chloramphenicol and streptomycin.

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PART C — (5 × 8 = 40 marks)

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

Each answer should not exceed 600 words.

16. (a) State and explain the concept of VSEPR theory. Using the theory, explain the structure of H_2O and NH_3 molecules.

Or

- (b) Describe briefly the MO diagrams of N_2 and HF molecules.

17. (a) Differentiate briefly the carbonium ions, carbanions and free radicals. How are they prepared?

Or

- (b) Distinguish between substitution and polymerisation reactions with suitable examples.

18. (a) Derive the vander Waals gas equation.

Or

- (b) (i) Explain the Trouton's rule and its significance.

- (ii) Explain briefly surface tension. (6+4)

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19. (a) Discuss the manufacture of cement.

Or

- (b) Explain briefly how the optical glass, coloured glass and lead glass are prepared.

20. (a) Summarise the cause and treatment of diabetes and cancer.

Or

- (b) Choose one example and define the following:

- (i) Analgesics
 - (ii) Antipyretics
 - (iii) Hypnotics
 - (iv) Sedatives
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