

(7 pages)

Reg. No. : .....

Code No. : 20327 E Sub. Code : CACH 11

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

First/Third Semester

Chemistry – Allied

ALLIED CHEMISTRY

(For those who joined in July 2021-2022 only)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. Out of the following hybrid orbitals the one which forms the bond angle  $120^\circ$  is
  - (a)  $d^2 sp^3$
  - (b)  $sp^3$
  - (c)  $sp^2$
  - (d)  $sp$

2. The molecules having bond order of 3 is
  - (a)  $H_2$
  - (b)  $N_2$
  - (c)  $O_2$
  - (d)  $He^{2+}$
3. Heterolysis of carbon-chlorine bond produces
  - (a) Two free radicals
  - (b) Two carbonium ions
  - (c) Two carbanions
  - (d) One cation and one anion
4. The shape of carbanion is \_\_\_\_\_
  - (a) Linear
  - (b) Planar
  - (c) Pyramidal
  - (d) None of the above
5. Vander Walls equation, at very low pressures \_\_\_\_\_
  - (a)  $a/V^2$  approaches zero
  - (b)  $b$  is negligible compared to  $V$
  - (c) Vander Walls equation reduces to  $PV=RT$
  - (d) All the above

6. Addition of a trace of boron to silicon gives rise to \_\_\_\_\_

- (a) n-type semiconductor
- (b) p-type semiconductor
- (c) metallic conductor
- (d) intrinsic semiconductor

7. Setting of cement is an \_\_\_\_\_

- (a) Exothermic reaction
- (b) Endothermic reaction
- (c) Neither exothermic nor endothermic
- (d) None of the above

8. The colour producing substance used to impart green colour glass is \_\_\_\_\_

- (a)  $\text{Cu}_2\text{O}$                       (b)  $\text{CdS}$
- (c)  $\text{MnO}_2$                       (d)  $\text{Cr}_2\text{O}_3$

9. Barbituric acid and its derivatives are well known \_\_\_\_\_

- (a) antipyretics              (b) analgesics
- (c) antiseptics              (d) tranquilisers

10. An antipyretic is \_\_\_\_\_

- (a) quinine                      (b) paracetamol
- (c) luminal                      (d) piperazine

PART B — (5 × 5 = 25 marks)

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

Each answer should not exceed 250 words.

11. (a) Explain Molecular Orbital diagram of  $\text{N}_2$  molecule and calculate its bond order.

Or

(b) Describe the overlapping of atomic orbital s-s, s-p and p-p.

12. (a) What are nucleophiles? Explain the different types of nucleophiles with examples.

Or

(b) Explain the formation and stability of Free radical.

13. (a) Explain the basic gas laws.

Or

- (b) Write a note on
- (i) Surface tension
  - (ii) Trouton's rule.

14. (a) Write short note on various types of glass.

Or

(b) Explain the preparation and chemistry of picric acid.

15. (a) Define the following with suitable examples.

- (i) Analgesics
- (ii) Anaesthetics.

Or

(b) What are antibiotics? Write the uses of penicillin and streptomycin.

Page 5 Code No. : 20327 E

PART C — (5 × 8 = 40 marks)

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

16. (a) Using VSEPR theory discuss the shapes of the following molecules
- (i)  $\text{BF}_3$
  - (ii)  $\text{NH}_3$ .

Or

(b) Explain  $\text{sp}^3$  and  $\text{sp}^2$  hybridisation with suitable example.

17. (a) Describe substitution and polymerisation reaction with specific example.

Or

(b) Explain the preparation, properties and the relative stability of carbonium ion with examples.

18. (a) Explain the postulates of kinetic theory of gases.

Or

(b) Write short notes on conductors, insulators and semiconductors.

Page 6 Code No. : 20327 E

19. (a) Explain the wet process and dry process for manufacture of cement.

Or

- (b) Write a note on lead azide, Nitroglycerine and Nitrocellulose.

20. (a) Explain the preparation, uses and mode of action of sulphadiazine.

Or

- (b) Write briefly about causes and treatment of cancer.
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