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Reg. No. : .....

Code No. : 10012 E

Sub. Code : SACH 11/  
AACH 11

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

First/Third Semester

Chemistry — Allied

ALLIED CHEMISTRY — I

(For those who joined in July 2017–2020)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

- The shape of  $\text{BF}_3$  molecule is  
(a) hexagonal (b) trigonal  
(c) tetrahedral (d) 'V' shaped
- Maximum electrons present in 'd' orbital is  
(a) 2 (b) 4  
(c) 6 (d) 10

- Which one among the following is not an electrophile?  
(a)  $\text{BF}_3$  (b)  $\text{AlCl}_3$   
(c)  $\text{SO}_3$  (d)  $\text{NH}_3$
- Free radicals are  
(a) Positively charged  
(b) Negatively charged  
(c) Neutral  
(d) All of these
- Which one among the following is light emission due to chemical reactions?  
(a) Thermoluminescence  
(b) Chemiluminescence  
(c) Bioluminescence  
(d) Fluorescence
- $3\text{O}_2 \rightarrow 2\text{O}_3$   
The quantum yield of the above reaction is  
(a) 2.0 (b)  $10^2$   
(c)  $10^3$  (d) 0.01
- Which one among the following is thermoplastic?  
(a) Nylon (b) Terelyene  
(c) Orlon (d) Polystyrene

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8. The monomer of neoprene rubber is  
(a) acrylic acid (b) methyl acrylate  
(c) chloroprene (d) acrylonitrile
9. The raw material used in the preparation of moth ball is  
(a) turpentine (b) benzene  
(c) naphthalene (d) toluene
10. Synthetic lubricating oil does not possess  
(a) easily inflammable  
(b) high flash point  
(c) high viscosity index  
(d) high thermal stability

PART B — (5 × 5 = 25 marks)

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

Each answer should not exceed 250 words.

11. (a) Distinguish between electrovalent bond and covalent bond.  
Or  
(b) Write the electronic configuration of the following elements.  
(i) Nitrogen (At.no.7)  
(ii) Phosphorous (At.no.15)  
(iii) Calcium (At.no.20)  
(iv) Chromium (At.no.24)  
(v) Copper (At.no.29)

12. (a) Write notes on electrophiles and nucleophiles with suitable examples

Or

- (b) Explain carbonium ion and free radicals with examples

13. (a) Explain the following :

- (i) Stark-Einstein law  
(ii) Quantum yield.

Or

- (b) What is quantum yield? Give any two examples for the reactions having high and low quantum yield.

14. (a) How is polyporpylene prepared? Give its two uses.

Or

- (b) Name the monomers used in the making of phenol resins. Write any four uses of phenol resins.

15. (a) What are lubricants? Explain their types with examples.

Or

- (b) Write down the preparation of the following :

- (i) Tooth paste  
(ii) Moth balls

PART C — (5 × 8 = 40 marks)

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

16. (a) What is hydrogen bonding? Explain the types of hydrogen bonding. Write down its consequences.

Or

- (b) Write notes on :

- (i) Aufbau principle
- (ii) Hund's rule
- (iii)  $sp^3d$  hybridisation.

17. (a) Explain the following reactions with suitable equations.

- (i) Addition reactions
- (ii) Elimination reactions
- (iii) Substitution reactions.

Or

- (b) Explain the following with suitable examples

- (i) Free radicals
- (ii) Homolytic and heterolytic cleavage

18. (a) Compare the thermal and photochemical reactions.

Or

- (b) Distinguish between fluorescence and phosphorescence by giving two examples each.

19. (a) What are polymers? How are they classified? Explain briefly any two of these polymers?

Or

- (b) How are Buna-N and Buna-S rubbers prepared? Write down their uses.

20. (a) Explain the preparation of the following

- (i) Nail polish
- (ii) Tooth powder.

Or

- (b) (i) Explain the criteria of a good lubricating oil.  
(ii) Write the advantages of solid lubricants.

