

68/2015

(Pages : 4)

Maximum : 200 marks

Time : 1½ hours

**PART I**

(Each answer shall be limited to one sentence)

A. Write the full form of the following acronyms :

1. DDT
2. EPR
3. FCC
4. EAN
5. SEM.

B. Fill in the blanks :

6. The catalyst used in Haber process is \_\_\_\_\_.
7. The metal cation present in chlorophyll is \_\_\_\_\_.
8. Monazite sand contains phosphates of \_\_\_\_\_ metals.
9. Conversion of an optically active compound to an optically inactive form is known as \_\_\_\_\_.
10. Chemical name of water glass is \_\_\_\_\_.
11. Hofmann's Bromamide reaction is used for the preparation of \_\_\_\_\_.
12. The major component of bio gas is \_\_\_\_\_.
13. Chemical name of bleaching powder is \_\_\_\_\_.
14. Pattinsons process is used for \_\_\_\_\_.

[P.T.O.]

15. Mixture of liquids boils at constant temperature without change in composition is known as \_\_\_\_\_.
16. The material used in packaging pharmaceuticals to extend shelf life is \_\_\_\_\_.
17. Binary compounds formed by halogens amongst themselves are called \_\_\_\_\_.
18. Macrocyclic polyethers are known as \_\_\_\_\_.
19. First synthesized organic compound is \_\_\_\_\_.
20. Number of oxygen atoms present in 16g of carbondioxide molecule is \_\_\_\_\_.

C. Choose the correct answer :

21. Number of alpha and beta particles emitted during the conversion,  ${}_{92}\text{U}^{238} \rightarrow {}_{82}\text{Pb}^{206}$
- (a) 4 alpha and 6 beta (b) 6 alpha and 6 beta  
(c) 8 alpha and 6 beta (d) 8 alpha and 10 beta
22. Among the following which has the diagonal relationship?
- (a) Li, Al (b) Be, Al  
(c) Al, Mg (d) Al, B
23. The first compound in the homologous series of dicarboxylic acid is
- (a) Benzoic acid (b) Malonic acid  
(c) Salicylic acid (d) Oxalic acid
24. Number of degrees of freedom for the system in which solid ice is in equilibrium with liquid water is
- (a) One (b) Two  
(c) Three (d) Zero
25. The set of (n,l,m) quantum numbers for the valence electron of chromium is
- (a) (3,1,1) (b) (4,1,0)  
(c) (3,0,0) (d) (4,0,0)

26. Bond order of  $N_2^+$  ion is
- (a) 1.5 (b) 2.0  
(c) 2.5 (d) None
27. Type of hybridization of I in  $IF_5$  is
- (a)  $sp^3$  (b)  $sp^3d$   
(c)  $sp^3d^2$  (d)  $sp^3d^3$
28. How many NMR signal will get for isopropanol?
- (a) 4 (b) 5  
(c) 2 (d) 3
29. The halogen which shows non-basic character is
- (a)  $F_2$  (b)  $Cl_2$   
(c)  $Br_2$  (d)  $I_2$
30. Compound A reacts with HCN gives B, which on hydrolysis gives lactic acid. What is A?
- (a) Acetone (b) Acetaldehyde  
(c) Acetic anhydride (d) Acetic acid (30 × 4 = 120)

## PART II

Answer the following question, shall be limited to one paragraph.

31. Write a note on different types of hydrogen bonding possible in molecules, providing suitable examples. What are the consequences of hydrogen bonding?
32. Explain the experimental determination lattice energy using Born-Haber cycle.
33. Explain Hinsberg's method for the separation of primary, secondary and tertiary amines.
34. Explain the deviation of real gases from ideal behavior and write the Van der Waals correction for the same.

35. Derive the integrated rate equation for the first order reactions. Show that half life period of a first order reaction is independent of the initial concentration of the reactant.
36. The freezing point of a solution containing 0.248 g of a solute in 7.8 g of solvent is 351.6 K. Calculate the molecular mass of the solute. Freezing point of pure solvent is 353 K.  $K_f$  for the solvent is  $6.92 \text{ K kg mol}^{-1}$ .
37. Write the mechanism of  $\text{SN}_1$  and  $\text{SN}_2$  reactions.
38. Explain the following :
- (a) Reimer-Tiemann reaction
  - (b) Cannizaro reaction
  - (c) Aldol condensation
  - (d) Friedel-Crafts reaction.

(8 × 10 = 80)