US – 337

IV Semester B.Sc. Examination, May 2017
(CBCS) (2015 – 16 and Onwards)
(Fresh + Repeaters)
CHEMISTRY – IV

Time : 3 Hours Max. Marks : 70

Instruction : *The question paper has* ***two*** *Parts. Answer* ***both*** *Parts. Write equations,* ***wherever*** *necessary.*

PART – A

Answer **any eight** of the following questions. **Each** question carries **two** marks. **(8×2=16)**

1. Explain the principle involved in the desilverisation of lead by Pattinson's method.
2. How many components are present in
   i) S (Rhombic) $\longrightarrow$ S (Monoclinic)
   ii) $CaCo_3$ (S) $\longrightarrow$ CaO (S) + Co_2 (g) ?
3. Give any two applications of liquid crystals.
4. Name any two chemical and biological impurities present in water.
5. Complete the following nuclear reactions
   i) $^{239}_{94}Pu + ^{4}_{2}He \longrightarrow ^{242}_{96}Cm + \ldots.$
   ii) $^{59}_{27}Co + ^{2}_{1}H \longrightarrow ^{60}_{27}Co + \ldots.$
6. State group displacement law.
7. What are alloy steels ? Give an example.
8. Explain Rosenmund's reduction reaction with an example.

P.T.O.

9. Explain Perkin condensation with an example.

10. p-nitrobenzoic acid is stronger than benzoic acid why ?

11. Explain Keto-enol tautomerism with an example.

12. What are the harmful effects of acid rain ?

PART – B

Answer **any nine** of the following questions. **Each** question carries **six** marks. **(9×6=54)**

13. a) Draw a labelled phase diagram for water system indicate the triple points and curves.

    b) State phase rule. Mention the terms involved. **(4+2)**

14. a) Derive Bragg's equation $\eta\lambda = 2d\sin\theta$.

    b) Sketch the unit cell of Caesium chloride and indicate the Caesium ions. **(4+2)**

15. a) Define the following terms :

    i) Axis of symmetry

    ii) Plane of symmetry

    iii) Centre of symmetry.

    b) What are high temperature super conductors ? Give an example. **(3+3)**

16. a) Explain the process of demineralisation of water by reverse Osmosis method.

    b) What is powder metallurgy ? Mention its advantages. **(4+2)**

17. a) Write a neat diagram of a nuclear reactor and mention the role of control rods and moderators.

    b) What is C^{14} dating ? **(4+2)**

18. a) Mention the applications of radioactive isotopes in the field of
    i) Agriculture
    ii) Medicine

    b) Calculate the half life of a radioactive element whose decay constant is 1.64×10^{-2} year^{-1}. (4+2)

19. a) Describe the production of tungsten powder from wolframite.

    b) What is the action of heat on oxalic acid ? Write equation. (4+2)

20. a) Write a note on the following :
    i) Ferrite
    ii) Cementite

    b) What are the advantages of heat treatment of steel ? (4+2)

21. a) Explain the mechanism of aldol condensation.

    b) How are ketones prepared from nitriles ? (4+2)

22. a) Discuss the effect of substituents on the acidity of aliphatic carboxylic acids.

    b) How does acetyl chloride react with ammonia ? Give equation. (4+2)

23. a) Explain the mechanism of benzoin condensation.

    b) What is Mannich reaction ? Give an example. (4+2)

24. a) How are the following conversions effected ?
    i) ethylaceto acetate into butanone.
    ii) diethylmalonate into cinnamic acid.

    b) How is ethyl aceto acetate prepared ? (4+2)

25. a) Describe the different stages of sewage treatment.

    b) What are the consequences of green house effect ? (4+2)
