SM – 353

IV Semester B.Sc. Examination, May/June 2018
(CBCS) (2015-16 and Onwards)
(Fresh + Repeaters)
CHEMISTRY – IV

Time : 3 Hours Max. Marks : 70

Instructions : 1) *The question paper has* ***two*** *Parts. Answer both the Parts.*
2) *Draw diagrams and write chemical equations* ***wherever*** *necessary.*

PART – A

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

1. State the condensed phase rule and indicate the terms.
2. Mention the number of phases in the following systems :
   i) $CaCO_{3(s)} \longrightarrow CaO_{(s)} + CO_{2(g)}$
   ii) $2\,KClO_{3(s)} \longrightarrow 2KCl_{(s)} + 3O_{2(g)}$.
3. State law of constancy of interfacial angles.
4. Name any two chemical and biological impurities present in water.
5. Complete the following nuclear reactions.
   i) ${}_4Be^9 + {}_1H^2 \longrightarrow {}_5B^{10} + ...$
   ii) ${}_{12}Mg^{24} + {}_1H^2 \longrightarrow ..... + 2He^4$.
6. Define mass defect.
7. What is tempering of steel ? Mention its effect on property of steel.
8. Give the reaction of acetone with hydroxylamine.
9. Explain Aldol condensation with an example.
10. Write the structural formula of citric acid and give its basicity.

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11. Explain Keto-enol tautomerism with an example.

12. What is photochemical smog ?

PART – B

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

13. a) Explain the phase diagram of water system.
    b) What are eutectic mixtures ? Give an example. **(4+2)**

14. a) Derive Bragg's equation : $n\lambda = 2d \sin\theta$.
    b) Write a note on smectic liquid crystals. **(4+2)**

15. a) Draw a labeled phase diagram of Lead-Silver system. Identify the eutectic point. Give the composition at this point.
    b) What are high temperature super conductors ? Give an example. **(4+2)**

16. a) Describe the production of tungsten powder from Wolframite.
    b) Write a note on hardness of water. **(4+2)**

17. a) Distinguish between nuclear fission and nuclear fusion.
    b) Write a note on radioactive carbon dating. **(3+3)**

18. a) Write a neat diagram of a nuclear reactor and mention the role of coolant, control rods and moderators.
    b) State Group displacement law. **(4+2)**

19. a) Explain Iron-Carbon phase diagram.
    b) Write a note on HVZ reaction. **(4+2)**

20. a) Describe the manufacture of ferrosilicon.
    b) How is nitriding of steel carried out ? **(4+2)**

21. a) Explain the following reaction with mechanism knoevenagel condensation.
    b) Explain Rosenmund's reduction with an example. **(4+2)**

22. a) Explain the mechanism of Perkin's reaction.
    b) Write Gattermann Koch aldehyde synthesis. (4+2)

23. a) Describe the action of heat on the following :
        i) Oxalic acid
        ii) Adipic acid.
    b) Arrange the following in the increasing order of acid strength.
    CH_3COOH, $Cl_2CHCOOH$, $ClCH_2COOH$, Cl_3CCOOH. (4+2)

24. a) How is diethyl malonate prepared from acetic acid ?
    b) How is butanone prepared from ethyl acetoacetate ? (4+2)

25. a) What are the causes for the depletion of ozone layer ? Give the remedial measures.
    b) What is Stone Leprosy ? (4+2)
