



MS – 271

IV Semester B.Sc. Examination, May/June 2014
(NS) (Semester Scheme)
(F+R) (2012-13 and Onwards)
Paper – IV : CHEMISTRY

Time : 3 Hours

Max. Marks : 70

Instruction : The question paper has **two** Parts. Answer **both** the Parts.

PART – A

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

1. What is mass defect ?
2. State the modified phase rule.
3. Differentiate between accuracy and precision.
4. Explain the mechanism of homogeneous catalysis on the basis of intermediate compound formation theory.
5. Give any two advantages of powder metallurgy.
6. What is tempering of steel ?
7. What are the harmful effects of acid rain ?
8. Write (n, α) and (d, p) transmutation of $^{27}_{13}\text{Al}$.
9. What is keto-enol tautomerism ? Give an example.
10. What happens when citric acid is treated with fuming sulphuric acid ? Write the equation.
11. What is Knoevenagel condensation ?
12. Give a method of preparation of ketones using metal alkyls.

PART – B

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

13. a) Draw the phase diagram of water system and explain its salient features.
b) What is meant by Eutectic mixture ? Give an example. (4+2)
14. a) Define the terms phase, component and degrees of freedom. Calculate the degrees of freedom when a pure liquid is in equilibrium with its vapour.
b) What is the principle behind desilverisation of argentiferous lead by Pattinson's method ? (4+2)

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15. a) Derive the mathematical expression for the Langmuir adsorption isotherm.
b) What is autocatalysis ? Give an example. (4+2)
16. a) Describe the estimation of Fe(II) by colorimetric method.
b) How do the elements chromium and tungsten modify the properties of steel ? (4+2)
17. a) What is powder metallurgy ? Explain any one technique of production of metal powders.
b) What is photochemical smog ? Mention any two ill-effects of it ? (3+3)
18. a) What are the advantages of using EDTA in quantitative analysis ? Write the structure of magnesium oxinate.
b) What are the causes for the depletion of the ozone layer ? (4+2)
19. a) Describe the manufacture of ferromanganese.
b) What are cementite and pearlite ? (4+2)
20. a) What is meant by half-life of a radioactive element ? Derive a relationship between half-life and decay constant.
b) Write a note on nuclear fusion. (4+2)
21. a) Explain the role of control rods and coolant in the nuclear reactors with suitable examples.
b) Calculate the number of α and β particles emitted during the decay of ${}_{92}^{238}\text{U}$ to ${}_{82}^{206}\text{Pb}$. (4+2)
22. a) Explain the mechanism of benzoin condensation.
b) What is Clemmenson reduction ? (4+2)
23. a) What are acetals ? Give the mechanism for the formation of acetals.
b) How does propanol react with hydroxylamine ? Write the equation. (4+2)
24. a) Give one method of preparation of diethyl malonate. How is it converted to barbituric acid ?
b) What is Hell-Volhard-Zelenskii reaction ? Write the equation. (4+2)
25. a) Define p^{ka} . Explain why is p-nitrobenzoic acid stronger than benzoic acid.
b) What is the action of heat on adipic acid ? (4+2)
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