



SE – 159

IV Semester B.Sc. Examination, September 2020
(CBCS) (F + R) (2015-16 and Onwards)
CHEMISTRY – IV

Time : 3 Hours

Max. Marks : 70

- Instructions :** 1) The question paper has **two** Parts.
2) Answer **both** the Parts.
3) Write equations and diagrams **wherever** necessary.

PART – A

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

1. State phase rule.
2. What is triple point ?
3. Sketch the unit cell for bcc space lattice.
4. Name any two colloidal impurities of water.
5. What is a freezing mixture ? Give an example.
6. Define mass defect.
7. Write the principle of demineralisation of water.
8. Give the influence of chromium and tungsten on the properties of steel.
9. How does acetaldehyde react with hydroxyl amine ?
10. Why formic acid is stronger than acetic acid ?
11. How do you prepare barbituric acid from diethylmalonate ? Write the equation.
12. Write a note on green-house effect.

PART – B

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

13. a) Draw a neat labelled diagram of Pb-Ag system. Identify the eutectic point.
What is the composition at this point ?
- b) Explain the principle of desilverisation of lead by Pattison's process. (4+2)

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14. a) Construct the phase diagram of sulphur system and explain areas, curves and triple point.
b) State the law of constancy of interfacial angles. (4+2)
15. a) What are Miller indices ? The Weiss indices of a plane are $(1, \infty, \infty)$. What are its Miller indices ?
b) Define centre of symmetry. (4+2)
16. a) Complete the following nuclear reactions :
i) ${}_{13}^{27}\text{Al} + {}_2^4\text{He} \rightarrow {}_{15}^{30}\text{P} + \underline{\hspace{2cm}}$
ii) ${}_{12}^{24}\text{Mg} + \underline{\hspace{2cm}} \rightarrow {}_{14}^{27}\text{Si} + 1\text{}^1_0\text{n}$
iii) ${}_{14}^{27}\text{Si} \rightarrow {}_{13}^{27}\text{Al} + \underline{\hspace{2cm}}$
iv) ${}_{11}^{23}\text{Na} + {}_2^4\text{He} \rightarrow {}_{12}^{26}\text{Mg} + \underline{\hspace{2cm}}$
b) What are isotopes ? Mention the radioactive isotopes of carbon. (4+2)
17. a) Explain the role of control rods and coolants in nuclear reactors with suitable examples.
b) Calculate the half-life of a radioactive element whose decay constant is $1.35 \times 10^{-4} \text{ year}^{-1}$. (4+2)
18. a) Explain any two techniques of production of metal powders.
b) Mention any two differences between nuclear fission and nuclear fusion. (4+2)
19. a) Describe the manufacture of ferrosilicon.
b) Explain quenching of steel. (4+2)
20. a) Describe the mechanism of Perkin's reaction.
b) Explain Rosenmund's reaction with an example. (4+2)
21. a) Give the equation for
i) Clemmensen's reduction.
ii) General reaction between aldehyde and alcohol.
b) How are ketones synthesized from nitriles ? Write the equation. (4+2)



22. a) Explain :
- i) hydrolysis of acid anhydride.
 - ii) alkaline hydrolysis of esters.
- b) How is tartaric acid converted into maleic acid ? (4+2)
23. a) What is meant by
- i) Austenite
 - ii) Cementite ? Give one property for each.
- b) Between acetic acid and monochloro acetic acid, which is stronger and why ? (4+2)
24. a) How are the following preparations made :
- i) diethylmalonate from acetic acid.
 - ii) ethylacetoacetate from ethylacetate.
- b) Write the keto-enol tautomerism of ethylacetoacetate. (4+2)
25. a) Explain the causes and consequences of depletion of ozone layer.
- b) What are the remedial measures for acid rain ? (4+2)

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