IV Semester B.Sc. Examination, May 2016
(CBCS) (2015-16 and Onwards) (Fresh)
Paper – IV : CHEMISTRY

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. Define phase rule. Give the significance of the terms.

2. Mention two methods of treatment of water for domestic and industrial purposes.

3. State law of constancy of interfacial angles.

4. What are isotopes ? Mention the radioactive isotope of hydrogen.

5. How is nitriding of steel carried out ?

6. What are ferroalloys ? Mention the application of ferromanganese.

7. Explain Wolff-Kishner reduction with an example.

8. Define the term 'mass defect'.

9. What is photochemical smog ?

10. Explain Hell-Volhard-Zelinsky reaction with an example.

11. How is butanone prepared from ethyl acetoacetate ?

12. What is aldol condensation ?

PART – B

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

13. a) Construct the phase diagram of sulphur system and explain the main features.

    b) Mention the number of phases in the following systems :
       i) Ice and water
       ii) Ice, liquid water and water vapour.   (4+2)

14. a) What is the principle involved in desilverisation of argentiferous lead by Pattinson's method ?

b) Give the meaning of the "term degrees of freedom" of a system.   (4+2)

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

b) In a diffraction experiment, x-ray of wave length 0.134 nm gave first order diffraction when the value of θ was 10.5°. Calculate the distance between the planes in the crystal parallel to the surface examined.   (4+2)

16. a) Write a note on classification of liquid crystals.

b) Mention two causes for hardness of water.   (4+2)

17. a) Explain any two methods for obtaining metal powders.

b) Define half life period of a radioactive element.   (4+2)

18. a) Complete the following nuclear reactions :

   i) $^{9}_{4}Be + ^{4}_{2}He \rightarrow ... + ^{1}_{0}n$

   ii) $^{27}_{31}Al + ^{2}_{1}H \rightarrow ... + ^{4}_{2}He$

   iii) $^{14}_{7}N + ... \rightarrow ^{17}_{8}O + ^{1}_{1}H$

   iv) $^{24}_{12}Mg + ^{2}_{1}H \rightarrow ... + ^{4}_{2}He$

b) What is meant by reverse osmosis ?   (4+2)

19. a) Differentiate nuclear fission from nuclear fusion.

b) What is radiocarbon dating ?   (4+2)

20. a) Give a brief account on influence of silicon and manganese on the properties of steel.

b) What are carbon steels ? How are they classified ?   (4+2)

21. a) What are the causes and remedial measures taken for depletion of ozone layer in the stratosphere ?

b) Name any two gases that cause green house effect.   (4+2)

22. a) How is diethyl malonate prepared from acetic acid ?

b) Write the keto-enol forms of ethyl acetoacetate.   **(4+2)**

23. a) Discuss the mechanism of Perkin condensation.

b) Explain Clemmensen reduction with an example.   **(4+2)**

24. a) Write the mechanism of knoevenagel condensation.

b) Explain Gattermann Koch aldehyde synthesis.   **(4+2)**

25. a) What is the action of heat on the following :

    i) Malonic acid

    ii) Adipic acid

b) Compare the acid strength of formic acid and acetic acid based on Pka values.   **(4+2)**

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