**III Semester B.Sc. Examination, November/December 2018
(CBCS)
(2015 – 16 & Onwards) (F + R)
CHEMISTRY – III**

Time : 3 Hours

Max. Marks : 70

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

PART – A

Answer **any eight** of the following questions. Each question carries **two** marks.

(8×2=16)

1. What is energy of activation ?

2. Give the limitations of I law of thermodynamics.

3. Define heat capacity at constant volume and at constant pressure.

4. Calculate the work done when one mole of an ideal gas expands isothermally and reversibly at 27°C from a volume of 15 dm³ to 25 dm³.

   (Given R = 8.314 JK⁻¹ mol⁻¹)

5. Write the equation for Langmuir adsorption isotherm and explain the terms involved in it.

6. Give an expression for number average molecular weight of a polymer.

7. Name an important ore of uranium. Give its composition.

8. What is Lucas reagent ? Where it is used ?

9. What are thiols ? Give an example.

10. What is the function of K in plant nutrient ?

11. Why organolithium compounds are more reactive than organomagnesium compounds ?

12. What are epoxides ? Give an example.

PART – B

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

13. a) Derive an expression for the velocity constant of a second order reaction.

    $A + B \rightarrow$ Products when a = b.

    b) Define temperature co-efficient of a reaction. (4+2)

14. a) Explain Lindemann hypothesis of unimolecular reaction.

    b) The rate constants of a reaction at 25°C is 3.46×10^{-5} and at 35°C is 4.87×10^{-3} respectively. Calculate the energy of activation. (4+2)

15. a) Derive an expression for the work done in reversible isothermal expansion of an ideal gas.

    b) State II law of thermodynamics in terms of entropy. (4+2)

16. a) Explain spontaneous and nonspontaneous processes with example.

    b) Give the Kirchoff's equation and explain the terms involved. (4+2)

17. a) Describe the structure of diborane.

    b) Calculate the efficiency of heat engine working between 300°C and 100°C. (4+2)

18. a) Explain the mechanism of intermediate compound formation theory of catalysis.

    b) What are adsorption indicators ? Give an example. (4+2)

19. a) How is thorium extracted from monazite sand ?

    b) How are fertilizers classified ? Give example for each class.   **(4+2)**

20. a) Explain salient features of Ellingham's diagram.

    b) Write two differences between organic and inorganic polymers.   **(4+2)**

21. a) How alcohols are distinguished by oxidation reaction ?

    b) What happens when glycerol is heated with Con. H_2SO_4 ?   **(4+2)**

22. a) Write the mechanism of reaction of glycols with HIO_4.

    b) How does thiols react with metallic Na ?   **(4+2)**

23. a) Write the mechanism of Riemer-Tiemann reaction.

    b) Phenols are more acidic than alcohols. Justify the statement.   **(4+2)**

24. a) Explain Williamson's ether synthesis with an example.

    b) Give a method of preparation of epoxides.

    c) Give an equation to show that ether acts as a Lewis base.   **(2+2+2)**

25. a) Explain the manufacture of super phosphate of lime.

    b) Give one synthetic application of Grignard reagent.   **(4+2)**

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