OS – 199

III Semester B.Sc. Examination, October/November 2012
(Semester Scheme) (N.S.) (2012-13 and Onwards)
CHEMISTRY (Paper – III)

Time : 3 Hours Max. Marks : 70

Instructions *: The question has* ***two*** *Parts. Answer* ***both*** *the Parts.*

PART – A

Answer **any eight** of the following questions. **Each** question carries **two** marks. **(8x2=16)**

1. Explain esterification reaction with an example.
2. Write Arrhenius equation for the velocity constant of a reaction and explain the terms.
3. Write two uses of dithianes.
4. Define :
   i) Axis of symmetry
   ii) Plane of symmetry
5. Why are organolithium compounds more reactive than Grignard reagents ?
6. How does a positive catalyst affect the rate of a reaction ?
7. Why are phenols more acidic than alcohols ?
8. Explain Frenkel defect.
9. Give reason "The plot of ΔG° Vs T for the formation of CO_2 from carbon is a straight line parallel to x-axis".

P.T.O.

www.onlinebu.com

www.onlinebu.com

10. Define :
    i) Mean freepath
    ii) Collision frequency

11. Give the synthesis of propane from the Grignard reagent.

12. Name an important ore and give its composition of
    i) Uranium
    ii) Nickel

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 where the initial concentrations of the reactants are same (a = b).
    b) The half change time for a second order reaction is 80 min when the initial concentration of the reactants is 0.92 mol/dm^3. Calculate the value of rate constant of the reaction. **(4+2)**

14. a) Explain Lindemann's hypothesis of unimolecular reactions.
    b) Explain how the order of a reaction is determined by half life period method. **(4+2)**

15. a) Derive Bragg's equation.
    b) Write a note on gemstones. **(4+2)**

16. a) What are liquid crystals ? Bring out the differences between Smectic liquid crystals and nematic liquid crystals.
    b) Write a note on Schottky defect. **(4+2)**

17. a) How are critical pressure and critical temperature of a substance determined experimentally ?
    b) Calculate the most probable velocity of O_2 at STP. **(4+2)**

18. a) i) What is Joule-Thomson effect ?
        ii) Define Inversion temperature.
    b) State the law of corresponding states. **(4+2)**

www.onlinebu.com

www.onlinebu.com
http://www.onlinebu.com

19. a) i) Distinguish between addition polymerisation and condensation polymerisation.
    ii) Define number average molecular weight of a polymer.
    b) Give two differences between Inorganic polymer and organic polymer. **(4+2)**

20. a) Explain the following properties of d-block elements :
    i) Variable oxidation states
    ii) Formation of interstitial compounds
    b) Why are f-block elements called inner transition elements ? **(4+2)**

21. a) Describe the separation of lanthanides by ion-exchange method.
    b) Give reason "La exhibits only (+3) oxidation state". **(4+2)**

22. a) Describe the extraction of Thorium from monazite sand.
    b) What are Ellingham diagrams ? **(4+2)**

23. a) Explain Lucas test to distinguish between primary, secondary and tertiary alcohols.
    b) How is ethyl mercaptan prepared from ethyl alcohol ? **(4+2)**

24. a) How does Glycerol reacts with ?
    i) Periodic acid
    ii) Concentrated sulphuric acid
    b) Explain Williamson's ether synthesis. **(4+2)**

25. a) Explain the mechanism of Reimer-Tiemann reaction.
    b) Explain auto-oxidation reaction of an Ester. **(4+2)**

www.onlinebu.com

www.onlinebu.com

OS – 199

III Semester B.Sc. Examination, October/November 2012

(OS) (Prior to 2012-13)

CHEMISTRY (Paper – III)

Time : 3 Hours

Max. Marks : 60

Instructions *: 1) The question paper has* ***two*** *Parts, answer* ***both*** *Parts.*

2) Write chemical equations ***wherever*** *necessary.*

PART – A

Answer **any six** of the following questions, **Each** question carries **two** marks. **(6×2=12)**

1. What is Joule-Thomson effect ?
2. Give one example and one use of a synthetic rubber.
3. Calculate the magnetic moment of Fe^{3+} (Atomic number of Fe=26)
4. Mention any two ores of the following :
   i) Chromium
   ii) Nickel
5. Give any two uses of glycerol.
6. Write the structure of the following :
   i) Resorcinol
   ii) Pyrogallol

www.onlinebu.com

www.onlinebu.com
http://www.onlinebu.com

7. Name the following compounds by IUPAC method.

   i) $CH_3 - CH_2 - O - CH_3$

   ii) $CH_3 - CH_2 - SH$

8. Mention any **two synthetic** applications of Grignard reagent.

9. **State Third Law** of Thermodynamics.

10. **Write the** expression for **the** velocity constant of a first order reaction and **mention** its unit.

PART – B

Answer any eight of the following questions. **Each** question carries **six** marks. **(8x6=48)**

11. a) Describe the experimental determination of T_C and P_C of a gas.

b) Define root mean square velocity of a gas. **(4+2)**

12. a) Describe viscosity method for determination of molecular weight of a polymer.

b) How is polyvinyl chloride manufactured ? **(4+2)**

13. a) Describe the extraction of Uranium from Pitchblende.

b) What are Ellingham Diagrams ? **(4+2)**

14. a) Explain ion-exchange method for the separation of Lanthanides.

b) f-block elements are called inner-transition elements. Why ? **(4+2)**

15. a) Explain how alcohols are distinguished by Lucas Test.

b) Give the synthesis of glycerol from oils and fats. **(4+2)**

www.onlinebu.com

www.onlinebu.com

16. a) Discuss the mechanism of Reimer-Tiemann reaction.

b) What are

i) Thermoplastics and

ii) Thermosetting plastics

Give an example for each. **(4+2)**

17. a) Explain how the following compounds are prepared from methyl magnesium iodide.

i) 2-propanol

ii) acetone **(4+2)**

b) Explain Williamson's ether synthesis with a suitable example.

18. a) Derive an expression for the efficiency of Carnot's engine. **(4+2)**

b) Give the mathematical expression for Van't Hoff reaction isochore.

19. a) i) What are spontaneous and non-spontaneous processes ? Give one example for each.

ii) State Nernst Heat Theorem.

b) The equilibrium constant of a reaction at 298 K is 1.7×10^4. Calculate the standard free energy change ($R = 8.314\ JK^{-1}\ mol^{-1}$). **(4+2)**

20. a) Explain the following terms with an example.

i) Zero order reaction

ii) Pseudo unimolecular reaction.

b) Describe the half-life period method for the determination of order of a reaction. **(4**

www.onlinebu.com

www.onlinebu.com
http://www.onlinebu.com

21. a) What is Bakelite ? How is it manufactured ? Mention any two of its uses.

    b) Transition metals exhibit variable oxidation states. Explain. **(4+2)**

22. a) Derive an expression for the rate constant of the second order reaction $A + B \rightarrow$ products, where $[A] = [B]$.

    b) Write a note on Alumino-Thermite process. **(4+2)**

.o.

www.onlinebu.com

www.onlinebu.com