V Semester B.Sc. Examination, Nov./Dec. 2017
(Semester Scheme)
(CBCS) (F+R) (2016-17 and Onwards)
CHEMISTRY – V
Organic Chemistry

Time : 3 Hours

Max. Marks : 70

Instructions : i) *The question paper has **two** Parts. Answer **both** the Parts.*
ii) *Draw diagrams and **chemical** equations **wherever** necessary.*

PART – A

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

1. Define centre of symmetry with an example.

2. What are mesocompounds ? Why they are optically inactive ?

3. How is aniline prepared from nitrobenzene ?

4. Explain 2° amines are more basic than 1° amines.

5. Explain chichibabin reaction.

6. Write the Haworth structure of α-maltose.

7. Piperidine is more basic than pyridine. Give reason.

8. Give the evidence to prove the presence of five hydroxyl groups in glucose.

9. What are auxochromes ? Give an example.

10. How is Furan prepared from Furfural ?

11. What are equivalent and non-equivalent protons in NMR spectroscopy ?

12. What are mordant dyes ? Give an example.

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PART – B

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

13. a) Write the stereo isomers of 2, 3 dichloro butane. Identify a pair of enantiomers and diastereomer's.
    b) Draw the conformers of 1,4 dimethylcyclohexane. (4+2)

14. a) How is Benzenediazonium chloride converted into
       i) Phenyl hydrazine   ii) Phenol
    b) How is ethyl amine prepared by Gabriels Phthalimide synthesis ? (4+2)

15. a) Explain the optical activity of biphenyl derivatives with an example.
    b) Write R and S configuration of lactic acid. (4+2)

16. a) Discuss the aromaticity of Furan.
    b) What happens when nicotinic acid is heated ? (4+2)

17. a) What are epimers ? Give an example.
    b) Explain the conversion of fructose to glucose. (2+4)

18. a) Describe the synthesis of α -citral.
    b) Mention two uses of morphine. (4+2)

19. a) Give a reaction to show that nicotine has pyridine and pyrolidine ring system in its structure.
    b) Write the structure of camphor. (4+2)

20. a) Explain shielding and deshielding of protons in NMR spectroscopy.
    b) Mention the type of bending modes of vibrations in IR spectroscopy. (4+2)

21. a) i) What is spin-spin splitting ?

       ii) Why is TMS used as a reference compound in NMR spectroscopy ?
    b) Mention the electronic transition that takes place when uv radiations are passed through acetaldehyde. (4+2)

22. a) Write the advantages of spectroscopic techniques.
    b) Explain geometrical isomerism with an example. (4+2)

23. a) Write the synthesis of indigo from aniline.
    b) What are analgesics ? Give an example. (4+2)

24. a) Describe the synthesis of paracetamol from phenol.
    b) What are tranquillizers ? Give an example. (4+2)

25. a) Explain how the ring size of glucose in determined by HIO_4 oxidation method.
    b) What is diazotisation ? (4+2)

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V Semester B.Sc. Examination, November/December 2017
(Semester Scheme) (CBCS) (F + R) (2016-17 and Onwards)
CHEMISTRY
Physical Chemistry (Paper – VI)

Time : 3 Hours   Max. Marks : 70

Instructions : 1) *The question paper has* **two** *Parts. Answer* **both** *the Parts.*

2) **Draw** *diagrams and write chemical equation* **wherever** *necessary.*

PART – A

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

1. Define ionic mobility.

2. State Kohlrausch law of independent migration of ions.

3. Give any two limitations of Arrhenius theory .

4. How is the cell constant of a given conductivity cell determined ?

5. The standard electrode potentials of zinc and copper electrodes in their salt solutions are – 0.76 V and +0.34 V respectively. Calculate e.m.f. of the Daniel cell.

6. Name a primary and secondary reference electrode.

7. Explain induced dipole moment with an example.

8. Define zero point energy of a vibrating molecule. Give its equation.

9. Mention any two advantages of Dropping Mercury Electrode (D.M.E.).

10. State Franck-Condon principle.

11. Give any two applications of Raman Spectroscopy.

12. What is the selection rule for pure vibration and pure rotational transitions ?

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PART – B

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

13. a) Describe the principle involved in the conductometric titration of a strong acid verses strong base graphically.

    b) The molar conductances at infinite dilution for NaCl, NH$_4$Cl and NaOH are 12.6×10^{-3}, 15.0×10^{-3} and 24.81×10^{-3} S.m^2 mol^{-1} respectively. Calculate the λ_∞ of NH$_4$OH. **(4+2)**

14. a) Explain the determination of transport number of H$^+$ and Cl$^-$ ions in hydrochloric acid by moving boundary method.

    b) Write Debye-Huckel Onsanger equation and indicate the terms involved. **(4+2)**

15. a) Derive Nernst equation for the electrode potential thermodynamically.

    b) The Standard reduction potentials of Ag$^+$|Ag and Cu^{+2}|Cu electrodes are 0.8 V and 0.34 V respectively. Represent the cell symbolically and calculate the emf of the cell. **(4+2)**

16. a) Explain the construction of glass electrode and represent it symbolically.

    b) A hydrogen electrode was immersed in the solution and coupled with a colomel electrode, the emf of the cell was found to be 0.4 V. Calculate pH of the solution, given E^0_{Cal} = 0.2415 volts. **(4+2)**

17. a) How is the EMF of a cell experimentally determined by Pogendroff's compensation method ?

    b) Differentiate between single electrode and standard electrode potential. **(4+2)**

18. a) Derive Henderson's equation for calculating pH of an acidic buffer.

    b) Give any two analytical applications of buffer solutions. **(4+2)**

19. a) What is Seebeck effect ? Explain why carbon dioxide has a zero dipole moment and sulphur dioxide has a positive dipole moment.

    b) What are ferro magnetic and diamagnetic substances ? **(4+2)**

20. a) i) Write Clausius-Mossotti equation and indicate the terms involved in it.

  ii) What are semiconductors ? Give an example.

 b) Chlorine is microwave inactive, where as hydrogen chloride is active. Why ?

(4+2)

21. a) Name the different types of molecular spectra. Mention the regions of the electromagnetic spectrum in which they appear.

 b) Calculate the reduced mass of Hcl molecule. Given atomic masses of hydrogen and chlorine are 0.001 and 0.0355 respectively. N = 6.023×10^{23}. (4+2)

22. a) Give any four differences between Raman Spectra and IR Spectra.

 b) Calculate the number of modes of vibrations for carbondioxide and water molecules. (4+2)

23. a) Explain in brief : Stokes and anti Stoke's lines.

 b) State Hooke's law. (4+2)

24. a) How is rotational spectral data of a diatomic molecule used to determine the moment of inertia and bond length of the molecule ?

 b) The force constant for HF molecule is 870 N/m. Calculate the fundamental vibrational frequency. Given C = 3×10^8 m.s^{-1} and reduced mass of HF; μ = 0.1566×10^{-26} kg. (3+3)

25. a) Mention the different types of currents obtained at the Dropping Mercury Electrode (D.M.E.).

 b) Give any two applications of polarography. (3+3)

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