SS – 329

V Semester B.Sc. Examination, Nov./Dec. 2018
(CBCS) (F+R) (2016-17 and Onwards)
CHEMISTRY – V
Organic Chemistry

Time : 3 Hours Max. Marks : 70

Instructions : 1) *The question paper has* ***two*** *parts. Answer* ***both*** *the parts.*
2) ***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. Write R and S configuration of 2-amino propanoic acid.
2. What are the necessary conditions for a cyclic compounds to exhibit geometrical isomerism ?
3. How is acetone converted into isopropyl amine ?
4. Methanamine is more basic than ammonia, give reason.
5. How is pyrrole prepared from ammonium mucate ?
6. Mention one medicinal use of :
   i) Ephedrine
   ii) Caffeine.
7. State "Isoprene rule".
8. Why TMS uses as reference in NMR spectroscope ?
9. Mention the electronic transition that takes place when UV radiation is passed through acetone.

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10. What are auxochromes ? Give an example.

11. What are direct dyes ? Give an example.

12. What are tranquilizers ? Give an example.

PART – B

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

13. a) Explain optical isomerism in lactic acid.

    b) Give the structure of 2, 3 - dichloro butane showing the plane of symmetry. **(4+2)**

14. a) Explain chemical method of resolution of racemic mixture.

    b) Mention the any two differences between enantiomers and diastereomers. **(4+2)**

15. a) How to distinguish between maleic acid and fumaric acid by cyclisation method ?

    b) How do you distinguish cis and trans isomers by dipole moment ? **(4+2)**

16. a) What is Hinsberg reagent ? How is it used to distinguish between primary, secondary and tertiary amines ?

    b) Explain Sandmeyer's reaction with an example. **(4+2)**

17. a) Explain the aromaticity of thiophene.

    b) How is Benzene diazonium chloride is converted into phenyl hydrazine ? Give the reaction. **(4+2)**

18. a) Discuss the general mechanism of electrophilic substitution of pyrrole.

    b) What happens when quinoline is nitrated ? Give equation. **(4+2)**

19. a) Write general characteristics of alkaloids.

    b) How would you prove that α-terpineol contains one double bond ? (4+2)

20. a) How is glucose converted to fructose ?

    b) Write the Haworth structure of lactose. (4+2)

21. a) Describe the synthesis of nicotine from succinamide.

    b) Write the structure of zingiberene. (4+2)

22. a) How do you prove the presence of six membered ring in glucose by periodic acid oxidation method ?

    b) Write the structure of dichlofenac and mention its use. (4+2)

23. a) Explain the effect of conjugation on the UV spectra of organic compounds with an example.

    b) How is IR spectrum used to distinguish between free –OH and hydrogen bonded –OH groups ? (4+2)

24. a) Explain the graphical representation (interpretation) of IR spectra of benzoic acid.

    b) Mention the number of signals and multiplicity of the signals in the NMR spectrum of 1, 1, 2 trichloroethane. (4+2)

25. a) Give the synthesis of ibuprofen.

    b) Give any two principles of green chemistry. (4+2)

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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. Give any two limitations of standard hydrogen electrode.
2. What is liquid junction potential ? How it is eliminated ?
3. What is salt bridge ? What is its function in galvanic cell ?
4. Calculate the electrode potential (half cell potential) at 298 K for a reaction $Cu^{2+} + 2e^- \rightarrow Cu$. Given $[Cu^{2+}] = 5$ moles, $E^0_{Cu} = 0.34V$.
5. Why is the transport number of cadmium ion in cadmium iodide abnormal at high concentration ?
6. What is the effect of temperature on degree of hydrolysis ?
7. Explain induced dipole moment with an example.
8. Define force constant, mention its significance.
9. State Franck-Condon principle.
10. What is halfwave potential ? Give its significance.
11. State Born-Oppenheimer approximation.
12. N_2 molecule fails to exhibit rotational spectra, but CO exhibits why ?

P.T.O.

PART – B

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

13. a) How is molar conductance of 0.1 M $NaNO_3$ determined experimentally ?

    b) The molar conductance of CH_3COONa, HCl and NaCl at infinite dilution are 9.20×10^{-3}, 4.272×10^{-2} and 12.85×10^{-3} Sm^2/mol respectively. Calculate the molar conductance of acetic acid at infinite dilution. **(4+2)**

14. a) Explain Asymmetric effect and electrophoretic effect of strong electrolytes based on Debye-Huckel theory.

    b) Write any two advantages of conductometric titration. **(4+2)**

15. a) With Neat labeled diagram, explain working of calomel electrode.

    b) The limiting ionic conductance of Na^+ ion is 4.929×10^{-3} Sm^2/mol. Calculate the Ionic mobility of Na^+ ion. **(4+2)**

16. a) How pH of a solution is determined using glass electrode ?

    b) Calculate the specific conductance of the solution of an electrolyte having the resistance of 220 ohm at 298 K. Given cell constant = 80 m^{-1}. **(4+2)**

17. a) Derive Nernst equation for single electrode potential. (Free energy concept).

    b) Write any two limitations of quinhydrone electrode. **(4+2)**

18. a) Explain the acid-base theory of indicators by taking phenolphthalein as an example.

    b) Write two biological applications of buffer solutions. **(4+2)**

19. a) What is Seebeck effect ? Explain why CO_2 has zero dipole moment and SO_2 has positive dipole moment.

    b) Explain the term Piezoelectricity. **(4+2)**

20. a) What are paramagnetic and diamagnetic substances ? Give two examples for each type.

    b) Pure rotational spectrum of CO has lines spaced at 384.2 m^{-1}. Calculate its moment of inertia. (Given $h = 6.627 \times 10^{-34}$ Js, $c = 3 \times 10^8$ m/s) **(4+2)**

21. a) Derive the relationship between moment of inertia and inter nuclear distance of a diatomic molecule.

    b) Write selection rules for pure rotational and vibrational transitions of a molecule AB. **(4+2)**

22. a) State Hook's law. Derive an expression for frequency of simple harmonic oscillator.

    b) Force constant of HF molecule is 860 Nm^{-1}. Calculate the fundamental vibrational frequency and zero point energy. [$h = 6.627 \times 10^{-34}$ Js, $\mu = 0.1566 \times 10^{-26}$ Kg]. **(4+2)**

23. a) Give any four general characteristics of Raman lines.

    b) Mention any two advantages of Raman spectra over IR spectra. **(4+2)**

24. a) Mention the different types of currents obtained at the Dropping Mercury Electrode (DME).

    b) Calculate the total number of modes of vibrations for CO_2 and H_2O molecule. **(4+2)**

25. a) Write Ilkovic equation. Mention its applications.

    b) What is cyclic voltamogram ? **(4+2)**