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**GN-224**

102163

V Semester B.Sc. Examination, December - 2019  
(CBCS) (F+R) (2016-17 and Onwards)

**CHEMISTRY**  
**Organic Chemistry Paper - V**



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. **8x2=16**

1. Write the geometrical isomers of 2-butene.
2. Write R and S configurations of glyceraldehyde.
3. Explain Sandmeyer's reaction with an examples.
4. What are equivalent and non-equivalent protons in NMR spectroscopy ?
5. How is thiophene prepared from acetylene ?
6. Give any one method for the preparation of furan.
7. Write the Haworth structure of lactose.
8. Mention one use each for morphine and menthol.
9. State Isoprene rule.
10. Mention the number of signals in the NMR spectra of  $\text{CH}_3\text{CH}_2\text{Cl}$ .
11. What are auxochromes ? Give an example.
12. Give any one use of chloramphenicol and sulphanilamide.

**P.T.O.**

**PART - B**

Answer **any nine** of the following questions. Each question carries **six** marks.

13. (a) How do you distinguish between maleic acid and fumaric acid by cyclisation method ? 4+2  
(b) Write the E and z configurations of 1-bromo-2-chloroethene.
14. (a) Explain the optical activity of biphenyl derivatives with an example. 4+2  
(b) Draw the conformers of decalin.
15. (a) Explain the chemical method of resolution of a racemic mixture. 4+2  
(b) How acetaldehyde is converted to ethylamine ? Give equation.
16. (a) What is Hinsbergs reagent ? How is it used to distinguish between primary, secondary and tertiary amines ? 4+2  
(b) How is aniline prepared from nitrobenzene.
17. (a) How do you convert benzene diazonium chloride into : 4+2  
(i) P-hydroxy azobenzene  
(ii) Phenyl hydrazine ? Give equations.  
(b) What happens when indole is nitrated ? Give equation.
18. (a) Discuss the general mechanism of electrophilic substitution of pyrrole. 4+2  
(b) Discuss basic strength of piperidine and pyridine.
19. (a) Starting from methylheptenone explain the process of synthesis of citral. 4+2  
(b) Write the structure of camphor.
20. (a) How is glucose converted into fructose ? 4+2  
(b) Write the structure of zingiberene.
21. (a) Write the synthesis of nicotine. 4+2  
(b) Give one use each of ephedrine and atropine.
22. (a) What is chemical shift ? TMS is used as reference compound in NMR Spectroscopy. Give reasons. 4+2  
(b) Mention the type of bending modes of vibrations in IR Spectroscopy.
23. (a) Write the advantages of spectroscopic techniques. 4+2  
(b) What is blue shift ?
24. (a) Write the synthesis of indigo from aniline. 4+2  
(b) What are tranquilizers ? Give an example.
25. (a) What is chemotherapy ? How are drugs classified based on treatment of diseases due to infection ? 4+2  
(b) Write two uses of dichlofenac.



**GN-225**

**102022**

V Semester B.Sc. Examination, December - 2019  
(CBCS) (F+R) (2016-17 and Onwards)

**CHEMISTRY**

**Physical Chemistry Paper - VI**



Time : 3 Hours

Max. Marks : 70

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

**PART - A**

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

1. What is Transport number of ion ?
2. What are concentration cells ?
3. Mention two advantages of conductometric titration.
4. The specific conductance of 0.1 M solution of an electrolyte at a given temperature is  $0.5092 \Omega^{-1}\text{m}^{-1}$ . Calculate its molar conductance.
5. Give two limitations of standard hydrogen electrode.
6. Write clausius-Mosotti equation and explain the terms involved in it.
7. Write the selection rule for rotational and vibrational transitions.
8. What is solubility product of a sparingly soluble salt ?
9. Name the region of electromagnetic spectrum in which rotational spectrum and vibrational spectrum occur.
10. State Hooke's Law.
11. What are inelastic collisions ?
12. Give any two applications of polarography.

**P.T.O.**

**PART - B**

Answer **any nine** of the following questions. Each question carries **six** marks. **9x6=54**

13. (a) Describe the principle involved in the conductometric titration of strong acid versus weak base graphically. **4+2**  
(b) The Molar conductance of infinite dilution for NaCl,  $\text{NH}_4\text{Cl}$  and NaOH are  $12.6 \times 10^{-3}$ ,  $15.0 \times 10^{-3}$  and  $24.81 \times 10^{-3} \text{ S m}^2 \text{ mol}^{-1}$  respectively. Calculate the  $\lambda_\infty$  of  $\text{NH}_4\text{OH}$ .
14. (a) State Kohlrausch's Law. Describe the determination of solubility of AgCl from conductance measurement. **4+2**  
(b) Define standard electrode potential.
15. (a) Mention any four limitations of Arrhenius theory. **4+2**  
(b) The transport number of  $\text{NO}_3^-$  ion at infinite dilution in  $\text{AgNO}_3$  is 0.52. The molar conductivity of  $\text{AgNO}_3$  at infinite dilution is  $12.0 \times 10^{-3} \text{ S m}^2 \text{ mol}^{-1}$ . Calculate the ionic conductance of  $\text{NO}_3^-$  ion at infinite dilution.
16. (a) Describe the determination of pH of a solution using quinhydrone electrode. **4+2**  
(b) What is liquid junction potential ? How it is eliminated ?
17. (a) The emf of a cell  $\text{Ag}|\text{AgCl(s)}, 0.01\text{M KCl}||0.01\text{M AgNO}_3|\text{Ag}$  was found to be 0.455 V at 298 K. Calculate the solubility product and solubility of AgCl. **4+2**  
(b) Write Nernst equation for single electrode potential and explain the terms.
18. (a) Derive Henderson - Hasselbakh equation for acidic buffer. **4+2**  
(b) Explain why phenolphthalein is not a suitable indicator in the titration of ammonium hydroxide and hydrochloric acid.
19. (a) Define : **4+2**  
(i) Pyroelectricity (ii) Piezoelectricity  
(iii) Peltier effect (iv) Seebeck effect  
(b) Mention any two applications of semiconductors.
20. (a) What are paramagnetic and diamagnetic substances ? Give two examples for each type. **4+2**  
(b) State Born-Oppenheimer approximation.



21. (a) The separation of rotational spectral lines occurred  $332 \text{ m}^{-1}$  for NO molecule. Calculate the internuclear distance.  
Reduced mass of NO =  $1.24 \times 10^{-26} \text{ kg}$   $h = 6.626 \times 10^{-34} \text{ Js}$   
 $C = 3 \times 10^8 \text{ ms}^{-1}$ . 4+2
- (b)  $\text{H}_2$  does not show rotation spectrum while HCl shows rotation spectrum. Give reason.
22. (a) Derive an expression for vibrational energy levels of SHO (Simple Harmonic Oscillator). 4+2
- (b) Define zero point energy of a vibrating molecule. Give its equation.
23. (a) Write any four advantages of Raman spectroscopy over IR spectroscopy.
- (b) The reduced mass of a diatomic molecule is  $2.5 \times 10^{-26} \text{ kg}$  and its vibrational frequency is  $29 \times 10^4 \text{ m}^{-1}$ . Calculate its force constant. 4+2
24. (a) Explain in brief : stokes and antistokes lines. 4+2
- (b) Give any two applications of Raman spectroscopy.
25. (a) Define the terms : (i) Diffusion current 4+2  
(ii) Half wave potential
- (b) Write two advantages of using Dropping Mercury Electrode (DME).