(7 pages) **Reg. No. :** .....

Code No. : 7880 **Sub. Code : PCHM 31**

M.Sc. (CBCS) DEGREE EXAMINATION, NOVEMBER 2019.

Third Semester

Chemistry – Core

ORGANIC CHEMISTRY – III

(For those who joined in July 2017 onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. $(CH_3)_3C - Cl + O\overline{H} \xrightarrow{H_2O} (CH_3)_3C - OH + C\overline{l}$

This is an example for ———— reaction.

(a) S_Ni (b) S_N2

(c) S_N1 (d) E_1

2. The geometry of the intermediate involved in S_N2 mechanism is ———— and the product has ———— configuration.

(a) trigonal planar, inverted

(b) tetrahedral, retention

(c) trigonal planar, mixture

(d) tetrahedral, inverted

3. Using ———— method we can illustrate the structure of complex molecules.

(a) ^{13}C – NMR (b) ^{1}H NMR

(c) 2D NMR (d) DEPT

4. The number of H^1–NMR pecks for p–xylene is

(a) 1 (b) 2

(c) 3 (d) 4

5. The most intense peak in mass spectrum is?

(a) metastable peak (b) base peak

(c) isotopic peak (d) satellite peak

6. The mass spectrum of 2–chloropropane has a base peak at m | z = 43. What fragment is responsible for the peak?

(a) 130 and 101 (b) 130 and 57

(c) 130 and 45 (d) 130 and 115

7. In sigmatropic rearrangement,

(a) both σ and π bonds migrate

(b) only σ bond migrates

(c) only π bonds migrates

(d) an acyclic compound becomes a cyclic one

8. Photolytic conversion of organic nitrites intonitroso alcohol is known as

(a) Ritter reaction

(b) Birch reduction

(c) Barton reaction

(d) Paterno – Buchi reaction

9. Inoble undergo electrolytical reduction in the presence of Sn/HCl to give

(a) Octahydroindole (b) 3-nitro indole

(c) Indigotin (d) Indoline

10. ———— is found mainly in malt liquors.

(a) Glucose (b) Sucrose

(c) Lactose (d) Maltose

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Describe the E_1 CB mechanism of elimination. What type of substrate undergo this elimination? What are the evidences for this mechanism.

Or

(b) State and explain Saytzeff rule with an example.

12. (a) What do you mean by proton exchange reaction and explain its use?

Or

(b) Write down the principle of ^1H NMR spectroscopy.

13. (a) Write in detail the general fragmentation modes in mass spectroscopy.

Or

(b) What do you understand by base peak, isotopic peak and metastable peaks? Describe its importance.

14. (a) State Woodward Hoffmann rules and discuss their applications in pericydic reactions.

Or

(b) Define the term photosensitization. Explain the Jablonski diagram with a neat sketch.

15. (a) Describe the structure of Lactose.

Or

(b) Explain the synthesis and any three important reactions of coumarins.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Explain the mechanism of S_N1, S_N2 and S_Ni reactions with suitable examples.

Or

(b) (i) Explain the mechanism of cope elimination reactions. What are the factors influencing elimination reactions?

(ii) Distinguish between elimination and substitution reactions.

17. (a) Define chemical shift. What are the factors that influencing chemical shift? Explain in detail.

Or

(b) (i) Compare C^{13} spectroscopy with H^1 NMR spectroscopy.

(ii) Give a brief account on COSY and INADEQUATE spectra.

18. (a) (i) State and explain Nitrogen rule.

(ii) Identify the compound with molecular formula C_3H_7NO which shows.

UV : 238 nm ε_{max} 10500, IR : 3428(m), 2940 – 2855(W), 1681(S) and 1452 cm^{-1}(W).

NMR : 1.87 τ singlet (1 H)$_1$ 7.30 τ singlet (3H), and 8.1 τ singlet (3H).

Or

(b) An organic compound with molecular weight 108 is not acidic in nature but can be easily oxidised to a crystalline compound (m.p : 122° C). It gives the following spectral data : UV : λ_{max} 255 $m\mu$ ε_{max} 202.

IR : 3402 (s, b), 306 (w), 2288 (m), 1499 (w, sh) and 1455 NMR : 2.74 τ (singlet 24.5 squares), 5.4 τ (singlet 9.5 squares) cm^{-1} (m).

19. (a) Describe the Norrish type–I and Norrish type–II reactions.

Or

(b) (i) Explain the selection rule for 1,3 sigmatropic shift by thermal and photochemical process.

(ii) How the stereo specificity in cyclo addition reaction is explained by using FMO approach?

20. (a) Write the synthesis of Oxazole, Imiosazole and Anthocyanins. Explain their important reactions.

Or

(b) (i) Describe the Pyranose and Furanose forms of aldohexoses and Ketohexoses.

(ii) Write the biosynthesis of Flavonoids.