



UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Eighth Semester – 2020

Paper: Organic Chemistry (Sp. Theory-I)

Course Code: CHEM-428 Part – I (Compulsory)

Time: 15 Min. Marks: 10

Roll No. in Fig.

Roll No. in Words.

Signature of Supdt.:

ATTEMPT THIS PAPER ON THIS QUESTION SHEET ONLY.

Division of marks is given in front of each question.

This Paper will be collected back after expiry of time limit mentioned above.

Q.1. Encircle the correct option.

(10x1=10)

1. Ionization caused by high energy beam of neutral atoms striking a solid sample in mass spectrometer is called
(a) Electron impact (b) Chemical ionization
(c) Fast atom bombardment (d) Field ionization
2. Alkylbenzenes give an intense peak, usually base peak at m/z 91 due to
(a) Phenyl cation (b) Benzyl cation (c) Tropylium ion (d) Hexyl cation
3. Index of hydrogen deficiency in pyridine is
(a) 2 (b) 4 (c) 6 (d) 8
4. Which of the following gives molecular ion peak, as base peak?
(a) Phenol (b) Toluene (c) Benzyl alcohol (d) Benzoic acid
5. In 1-chloropropane, methyl hydrogen's peak is splitted into _____ due to hydrogens present on adjacent carbon.
(a) 1 (b) 2 (c) 3 (d) 4
6. $M+2$ peak for alkyl bromide is almost in intensity to the molecular ion peak.
(a) One third (b) one forth
(c) Equal (d) Half
7. A proton H_b is coupled to two equivalent protons H_a . The multiplicity and the relative intensity of lines in the signal H_b is
(a) Doublet, 1:1 (b) Triplet, 1:2:1
(c) Quartet, 1:3:3:1 (d) Quintet, 1:4:6:4:1
8. In 1H NMR spectra, protons of 1,4-Dinitrobenzene appear as
(a) Singlet (b) Doublet (c) Triplet (d) Quartet
9. Which of the following is a terpenoid?
(a) Quinine (b) Androgen (c) α -Amyrin (d) Cholesterol
10. Ursolic acid is
(a) Alkaloid (b) Terpenoid
(c) Flavonoid (d) Alkyl halide



ATTEMPT THIS (SUBJECTIVE) ON THE SEPARATE ANSWER SHEET PROVIDED

Q.2. Give short answers to the following questions. (10x2=20)

- What is difference between spin-spin relaxation and spin-lattice relaxation? [3]
- Why the intensity of ^{13}C signals is less than the intensity of ^1H signals? [2]
- Calculate chemical shift in parts per million (δ) for a proton that has resonance at 128 Hz downfield from TMS on a spectrometer that operates at 60 MHz. [5]
- How would you distinguish between mass spectrum of Pentane, 2-Methylbutane and 2,2-Dimethylpropane? [5]
- What are steroids? Give three examples. [3]
- What is metastable ion peak? [2]

Answers to the following questions. (3x10=30)

Q. NO. 3. Predict the chemical shift positions and splitting pattern for the protons of the following compounds in ^1H NMR. [3 + 3 + 4]

- $\text{CH}_3\text{COCH}_2\text{CH}_3$
- $\text{CH}_3\text{CH}_2\text{COOCH}_2\text{CH}_3$
- $\text{CH}_3\text{CH}_2\text{COOCH}=\text{CH}_2$

Q. NO. 4.

- The mass spectrum of ethylamine shows base peak at m/z 30. Explain which ionic fragment is responsible for this peak? [2]
- Predict the major peaks in the mass spectrum of each of the following compounds. [8]
 - 2-pentanol
 - Benzyl alcohol

Q. NO. 5.

- Write a short note on alkaloids. Also explain the general methods for the structure determination of alkaloids. [8]
- What is isoprene rule? [2]