



UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program /Eighth Semester – 2019

Paper: Analytical Chemistry (Sp. Theory-II)

Course Code: CHEM-432 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)

- (i) Which one of the following is example of tunable laser?
(a) CO₂ Laser (b) Dye Laser
(c) Excimer Laser (d) All of them
- (ii) Fundamental process for laser action is
(a) Absorption (b) Stimulated emission
(c) Spontaneous emission (d) all of above
- (iii): Excimer laser is
(a) Optically pumped solid state laser (b) Liquid laser
(c) Gas laser (d) Semiconductor laser
- (iv) Spin quantum number of ¹⁹F is?
(a) 1 (b) 1/2 (c) zero (d) 3/2
- (v) The frequency of ¹H as compared to ¹³C in the same field strength is
(a) Less (b) More (c) Same (d) None of the above
- (vi) The transition of nucleus from α spin to β spin state is called
(a) Spin flipping (b) Spin relaxation
(c) Metastable state (d) Spin precession
- (vii) Which of the proton is maximum deshielded?
(a) Alkyl (b) CH₂ (c) Benzene (d) OH
- (viii) To avoid thermal decomposition sample are introduced by:
(a) Cold inlet system (b) Heated inlet system
(c) Direct insertion probe (d) Jet spray system
- (ix) Alexandrite laser produces laser in the range of?
(a) 300-500 nm (b) 450-600 nm (c) 700-815 nm (d) None
- (x) Protons of benzene are deshielded due to?
(a) Magnetic anisotropy (b) Resonance (c) Inductive effect (d) Isotropy



ATTEMPT THIS (SUBJECTIVE) ON THE SEPARATE ANSWER SHEET PROVIDED

Section-I

Q no 2: Attempt all the following Question

(2x10=20)

- (a) Describe ring Nitrogen Rule with suitable examples.
- (b) Write a note on Fast Atom Bombardment (FAB) in Mass Spectrometry.
- (c) What is difference between single focusing and double focusing analyzer?
- (d) Define coupling constant. How it is calculated?
- (e) Briefly describe principle of NMR.
- (f) What is spin-spin relaxation?
- (g) Write down different parts of NMR Spectrometer.
- (h) What is population inversion in laser?
- (i) Describe four level lasers with diagram.
- (j) Why TMS is used as internal standard in NMR.

Section II

Attempt all the following long Questions.

Q no 3:

(a) Describe two applications of Mass Spectrometer. (5)

(a) Prove that: $\frac{m}{e^+} = \frac{H^2 R^2}{2V}$ (5)

Q no 4:

(a) Describe McLafferty Rearrangement with example. (5)

(b) Describe different factors affecting coupling constant? (5)

Q no 5:

(a) Discuss methods of excitation/population inversion in laser. (5)

(b) Describe the working of Alexandrite Laser. (5)