

[52]

SEAT No. _____

No of Printed pages: 02

SARDAR PATEL UNIVERSITY
M.Sc. (Organic Chemistry) Semester-III (NC) Examination
Tuesday, 19th March-2019
PS03CORCO1: Spectroscopy-I

Time: 2:00 pm to 05:00pm

Total Marks: 70

Q.1 Select the correct answer from the following.

08

1. Analytically useful wavelength range for AAS is _____.
(a) uv -visible (b) uv-IR (c) IR- visible (d) None of these
2. _____ is decrease in the intensity of EMR after passing through sample.
(a) Absorbance (b) Path length (c) Intensity (d) Transmittance
3. Interaction of micro waves with matter result into change in direction of resultant electron spin called _____.
(a) ESR (b) NMR (c) X-ray (d) IR
4. In AAS, _____ is a continuous source which emits radiation over a wide range of wavelength.
(a) Laser (b) Xe-lamp (c) Hg vapor lamp (d) Hollow cathode lamp
5. The temperature of oxy-acetylene flame is about _____.
(a) 3800°C (b) 3100°C (c) 1200°C (d) 800°C
6. Fluorescence more commonly found in compounds in which lowest energy transition is _____.
(a) $\sigma - \sigma^*$ (b) $n - \Pi^*$ (c) $n - \sigma^*$ (d) $\Pi - \Pi^*$
7. The probability of emission of auger electron decrease with _____ atomic number of the emitting element.
(a) Increasing (b) Decreasing (c) Both a & b (d) None of all
8. _____ is energetic level at which the attraction of particular atom becomes identical to its attraction to other atom in solid.
(a) Fermi level (b) Conduction band (c) Valence band (d) None of these

Q.2 Write the answer of the following in short.(Any Seven)

14

1. AAS is more preferable then AES is the easiest method for quantitative analysis of metal in presence of interference.
2. Write the spectral line λ used in atomic absorption measurement for following atom: Na, K and Li.
3. The Aniline gives fluorescence but nitro benzene does not give fluorescence. Why?
4. How structural rigidity affects the fluorescence? Explain.

(P.T.O.)

5. Write about cylindrical mirror analyzer used in ESCA.
6. Give detail of Spherical electrostatic analyzer used in ESCA.
7. Explain the basic principle of AFM.
8. Explain the detail about tip and cantilever used in AFM.
9. Draw labeled diagram of STM instrument.
- Q.3** A. Discuss the two analytical application of ESCA. 06
- B. (i) Explain the mechanism for LMM Auger electron formation. 06
(ii) Explain the importance of surface analysis in science and technology.
- OR**
- B. Discuss in detail any two analytical applications of auger electron spectroscopy. 06
- Q.4** A. Draw the labeled diagram of typical design of atomic force microscope and explain the applications of AFM. 06
- B. Give the detail about the instrumentation of AFM. 06
- OR**
- B. Write a short note on Scanning tunneling microscopy. 06
- Q.5** A. Write an application of AAS. 06
- B. Draw neat and labeled diagram of Atomic Emission Spectro-photometer and mention the function of each component. 06
- OR**
- B. Write a note on (I) Inductively Coupled Plasma (ICP) and its merit and demerits over other atomizer (II) Direct Coupled Plasma 06
- Q.6** A. Explain Fluorescence, Phosphorescence and Chemiluminescence. 06
- B. Write a note on mechanism of fluorescence 06
(I) E-type delayed Fluorescence
(II) P-type delayed Fluorescence
- OR**
- B. (I) Write a note on theory of Photoluminescence. 06
(II) Write a note on Collisional deactivation and Collisional activation process.

—X—

(2)