

(164 & A-36)

SEAT No. _____

No. of Pages: 02

SARDAR PATEL UNIVERSITY
M.Sc. Organic Chemistry
Semester – III, External Examination
October 23, 2018 Tuesday
Time: 02:00 pm - 05:00 pm
Spectroscopy-I [PS03CORC01]

[Total Marks – 70]

N.B. Figures to the right indicate full marks

Q.1 Select the correct answer from the following. 08

1	AFM is able to achieve superior resolution because of the extremely _____ probe forces involved. (a) High (b) Medium (c) Small (d) None of all	
2	ESCA can be used to assay all elements in periodic table except _____ (a) Li & Sc (b) Ar & Ne (c) H & He (d) C & N	
3	The concentration of atoms in flame can be maintained at relatively high value by keeping the volume of flame as _____ as possible. (a) Small (b) Medium (c) Long (d) None of all	
4	In internal conversion process, the potential energy of overlap vibrational energy levels of both excited singlet state are _____ (a) Equal (b) Different (c) None of these (d) All of above	
5	The time required to obtain spectrum with AC Spark is about _____ (a) 1 Sec (b) 10 Sec (c) 0.1 Sec (d) 0.01 Sec	
6	In fluorescence, molar absorptivity of $\Pi - \Pi^*$ transition is _____ (a) 1000 (b) 10000 (c) 100 (d) 10	
7	The process in which atoms or ions are ejected from a surface by beam of charged particle is called _____ (a) scattering (b) Nebulization (c) Excitation (d) Sputtering	
8	Direct line fluorescence and step wise fluorescence, fluoresced radiation has wavelength that is greater than the absorb radiation called _____ fluorescence. (a) fermi (b) Antistock (c) Sensitization (d) Stock	

Q.2 Write the answer of the following in short.(Any Seven) 14

1. Discuss in detail about cylindrical mirror analyzer used in ESCA.
2. Give detail of Spherical electrostatic analyzer used in ESCA.
3. Aniline gives fluorescence but nitro benzene does not give fluorescence. Why?
4. Explain how structural rigidity affects the fluorescence?
5. AAS is more preferable then AES is the easiest method for quantitative analysis of

(1)

(P.T.O.)

- metal in presence of interference.
6. Write the spectral line λ used in atomic absorption measurement for following atom: Na, K and Li.
 7. Explain the basic principle of AFM.
 8. Explain the detail about tip and cantilever used in AFM.
 9. Give neat and labeled diagram of STM instrument.
- Q.3** (A) Draw neat and 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.4** (A) Draw neat and labeled diagram of Atomic emission spectro-photometer and mention the function of each component. 06
- (B) Write an application of AAS. 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.5** (A) Write a note on mechanism of fluorescence
(I) E-type delayed Fluorescence
(II) P-type delayed Fluorescence 06
- (B) Explain Fluorescence, Phosphorescence and Chemiluminescence. 06
- OR**
- (B) Explain the theory of Photoluminescence. 06
- Q.6** (A) Describe the importance of surface analysis in science and technology. 06
- (B) Explain the two analytical application of ESCA. 06
- OR**
- (B) 1. Discuss in detail any two analytical applications of auger electron spectroscopy. 06
2. Describe the mechanism for LMM Auger electron formation.
2. Write a note on Collisional deactivation and Collisional activation process.

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(2)