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SEAT No. \_\_\_\_\_

No of printed pages: 02

SARDAR PATEL UNIVERSITY

M.Sc. (Semester III) Organic Chemistry Examination

Monday, 18<sup>th</sup> November-2019

PS03CORC01- Spectroscopy-I

Time: 02:00 pm to 05:00 pm

Total Marks: 70

- N.B. (1) Figures to the right indicate marks.  
(2) Attempt all questions.

**Q.1 Choose the correct option from the following.**

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- Which of the following is a line source?  
(a) Hollow cathode lamp (b) Xe-lamp  
(c) D<sub>2</sub>-lamp (d) Hg-lamp
- Laminar flow burner is also called as...  
(a) Jet burner (b) premix burner  
(c) total consumption (d) Bunsen burner
- The molecules in the excited singlet state may emit radiation as ultraviolet or visible light photon. This process is called...  
(a) phosphorescence (b) chemi-luminescence  
(c) fluorescence (d) bio-luminescence
- The molecules with relatively stable excited state may undergo transition to a meta stable triplet state and after some time returns to the ground state by emission of an ultraviolet or visible photon. This process is called...  
(a) fluorescence (b) bio-luminescence  
(c) chemi-luminescence (d) phosphorescence
- In XPS the secondary beam is made up of...  
(a) X-Ray (b) electron  
(c) photon (d) neutron
- In UPS electron spectroscopy, "U" and "P" stands for...  
(a) Ultraviolet Photoelectron (b) Ultra Power  
(c) Ultraviolet Photon (d) Ultimate Photoelectron
- In which of the following technique, measures the electrical conductance between probe tip and the surface?  
(a) AES (b) AFM  
(c) TEM (d) STM
- The tunneling current is measured in \_\_\_\_\_ method.  
(a) STM (b) AFM  
(c) TEM (d) AES

**Q.2 Answer the following questions. (Any seven)**

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- Explain (i) Fuel-Rich flame and (ii) Lean flame
- Explain the Doppler Broadening.
- Draw the Jablonski diagram.
- List the steps of atomization.
- Draw the Schematic diagram of a fluorometer.
- What is the fundamental difference between electron spectroscopy (XPS and AES) and the other types of spectroscopy?
- Write the principle of UPS.
- Draw the neat diagram for SEM instrument.
- Explain electron beam interaction in electron microscopy.

①

(P.T.O.)

- Q.3** **A** Explain the role of detector in AAS and give a brief note on Photomultiplier tube. **06**
- B** Write a note on Total consumption burner and premix burner. **06**
- OR**
- B** What are the different sources used in atomic spectroscopy? Explain Electrodeless Discharge Lamp in detail. **06**
- Q.4** **A** Give the difference between Fluorometer and Spectrofluorometer. **06**
- B** Explain in detail "the factors affecting on fluorescence." **06**
- OR**
- B** Discuss the various applications of fluorometric analysis. **06**
- Q.5** **A** Explain the basic principle of ESCA. **06**
- B** Discuss the Characteristic and principle of Auger electron spectroscopy. **06**
- OR**
- B** Discuss in detail: various types of photoelectron spectroscopy. **06**
- Q.6** **A** Give a brief note on Scanning electron microscopy (SEM). **06**
- B** How does scanning tunneling microscopy (STM) work? Explain. **06**
- OR**
- B** Discuss Atomic force microscopy (AFM). **06**

X  
②