

Roll No :

Total No. of Questions : 11]

[Total No. of Printed Pages : 3

SP-675

M.Sc. (Final) Examination, 2021

CHEMISTRY

Paper - V (CH-501)

(Spectroscopy Photochemistry and Computer in Chemistry)

Time : 1½ Hours]

[Maximum Marks : 75

Section-A

(Marks : 2 × 10 = 20)

Note :- Answer all *ten* questions (Answer limit **50** words). Each question carries **2** marks.

Section-B

(Marks : 5 × 5 = 25)

Note :- Answer all *five* questions. Each question has internal choice (Answer limit **200** words). Each question carries **5** marks.

Section-C

(Marks : 10 × 3 = 30)

Note :- Answer any *three* questions out of five (Answer limit **500** words). Each question carries **10** marks.

Section-A

2 each

- (i) What is difference between molecular ion peak and base peak in mass spectrometry ?
- (ii) What do you mean by distortion of chromophore ?

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- (iii) How is wavelength of absorption shifted in conjugated dienes ?
- (iv) What is difference between fluorescence and phosphorescence ?
- (v) What is Hooke's Law ?
- (vi) What is spin-spin and spin-lattice relaxation ?
- (vii) What is Geminal Coupling ?
- (viii) What is Photo-Fries rearrangement ?
- (ix) What is nitrogen rule ?
- (x) Calculate the energy in joules per quantum of wavelength 3000 Å.

Section-B

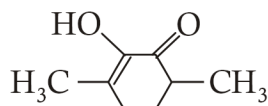
5 each

2. Explain McLafferty rearrangement giving suitable example.

Or

Determine the structure of the compound which shows the m/e peaks at 88, 70, 55, 42, 31 (much intense) and 29.

3. Calculate λ_{\max} for the given structure :



Or

Explain electronic transitions for charge-transfer complexes.

4. How will you distinguish following types of compounds with the help of IR spectroscopy ?
- (i) Primary, secondary and tertiary alcohols
 - (ii) Axial and equatorial O—H group

Or

Describe with examples the various factors which affect the magnitude of the chemical shift.

5. Write down basic principles involved in electron spin resonance spectroscopy.

Or

Explain chemical shift in ^{13}C nmr.

6. What are various types of Photochemical reactions ?

Or

Explain various Laws of Photochemistry.

Section-C

10 each

7. What is Mass Spectrum ? Write what you know about the formation and the stability of the molecular ion ?
8. Describe the Woodward-Fieser rules for calculating the absorption maximum in dienes. Do these rules obey strictly on all dienes ? If not why ?
9. What is quantum yield ? Explain various factors affecting quantum yield.
10. Explain various features of MS Word and MS Excel. How are they helpful to a Chemistry student.
11. (a) Explain clearly spin-spin coupling. Why does a peak for a particular set of protons split into a multiplet ? Give examples.
- (b) Write a note on the use of solvent in nmr spectroscopy.