

PE-265-CV-19

M.Sc. CHEMISTRY (2nd Semester)

Examination, June 2022

SPECTROSCOPY & COMPUTER FOR CHEMISTS

Time : Three Hours]

[Maximum Marks : 80

[Minimum Pass Marks : 29

Note : Answer from both the Sections as directed. The figures in the right-hand margin indicate marks.

Section-A

1. Answer the following short answer questions: 1x10=10
- (a) Give spectroscopic state of atom by using spectral notation, $n=4, L=2, s=0$
 - (b) How do you find the number of microstates?
 - (c) What is photo electric effect?
 - (d) What is nuclear spin?
 - (e) What is Miller indices?
 - (f) Write Bragg's equation?
 - (g) Indicate the types of protons in $CH_3 - \underset{CL}{C} = CH_2$
 - (h) What is operating system?
 - (i) Write one use of MS-Excel.
 - (j) What is output device?
2. Answer the following short type questions: 2x5=10
- (a) Explain emission spectra.
 - (b) Explain zero field splitting in ESR.
 - (c) The reflecting plane of LiF analyzing crystal has an inter planar distance of $4A^0$.
Calculate the wave length of second order angle 30^0 ($\sin 30^0 = \frac{1}{2}$)
 - (d) Write short notes on Algorithm and flowchart.
 - (e) Explain the use of computer package MS-Word.

Section-B

12x5=60

Answer the following Long-Answer questions:

3. Describe the basic principle and instrumentation of photo electronic spectroscopy.
OR
Discuss the spectra of alkali metal with suitable examples.
4. Describe the basic principle of photo acoustic spectroscopy. Write the application of PAS for gases and condensed system.
OR
Write note on Nuclear Quadrupole resonance spectroscopy.
5. Describe Debye-Scherrer and Lane method for identification of crystal structure by X-ray structures analysis.
OR
Discuss the procedure for X-ray structure analysis and absolute configuration of molecules.
6. Discuss the various types of computer languages and principle of programming.
OR
Discuss the use of "goto" statement in 'C' programming. Write some important point related to goto statement in 'C'.
7. Wrote a program in 'C' for the calculation of pH.
OR
Write a programme in 'C' for radioactive decay.