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2019

M.Pharm. 1<sup>st</sup> Semester End-Term (Regular)  
Examination

MODERN PHARMACEUTICAL ANALYTICAL  
TECHNIQUES

(New Regulation)

(w.e.f. 2017-2018)

Full Marks – 75

Time – Three hours

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The figures in the margin indicate full marks  
for the questions.

1. Answer any *ten* question. (10 × 2 = 20)
- (a) Why acetylene-nitrous oxide flame is suitable for elements such as Al, Be and rare earth metals?
- (b) How will you differentiate between the following pairs of compounds using IR spectra?
- (i)  $\text{CH}_3\text{CH}_2\text{COOH}$
- (ii)  $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$
- (c) Write the difference in the techniques of GSC and GLC.
- (d) Define spin-spin coupling and coupling constant.
- (e) Write about the types of thermogravimetric analysis.

[Turn over

- (f) Explain the splitting pattern in the NMR spectrum of 1,1 di bromo pentanol.
- (g) Write about the various types of electronic relaxation process in NMR.
- (h) Point out the factors affecting column efficiency in column chromatography.
- (i) Explain the nitrogen rule in Mass Spectroscopy.
- (j) Write a note on Gel electrophoresis.
- (k) State the reasons for deviation of Beer-Lambert law.
- (l) Write about the various types of pump used in HPLC

2. Answer any *seven* questions. (7 × 5 = 35)

- (a) Define Chemical shift. Explain the factors affecting chemical shift.
- (b) Write the electronic transitions of UV visible spectrometry.
- (c) Explain the basic principle and application of ELISA.
- (d) Discuss about the types of 2D NMR. With suitable example write about equivalent and non equivalent proton.
- (e) Write about the mobile phase selection and detectors of HPLC.
- (f) Write about the principle of working and instrumentation of DTA
- (g) Discuss Woodward-Fieser rule, Calculate the  $\lambda_{\max}$  of 1,3 pentadiene.



- (h) With proper diagram explain Jablonski theory for fluorescence and Phosphorescence.
- (i) Explain about the various types of ions produced in a Mass spectrometer.

3. Answer any *two* questions.  $(2 \times 10 = 20)$

- (a) Write about the basic principle of mass spectrometry. Explain various ionisation techniques in mass spectroscopy. With example write about McLafferty rearrangement.

[3+4+3=10]

- (b) What is column efficiency? Write the various factors affecting column efficiency. Explain the types of ion exchange techniques in ion exchange chromatography. Write about the various detector used in GC. [2+2+2+4=10]

- (c) Write different vibrations of IR spectroscopy. With diagram explain the working of FTIR instrument. (5+5=10)

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