Registration No : | | | | | | | | | | |

Total Number of Page : 01 **M.Sc**

MCYE204

2nd Semester Back Examination 2017-18
ANALYTICAL TECHNIQUES
BRANCH : M.Sc.(AC)
Time : 3 Hours
Max Marks : 70
Q.CODE : C607

Question No.1 which is compulsory and any five from the rest
The figures in the right hand margin indicate marks.
Answer all parts of a question at a place.

Q1 **Answer the following questions :** **(2 x 10)**

a) Write the selection rules for electronic transitions.
b) What is the effect of polar solvent on $n \rightarrow \pi^*$ transition?
c) What is Fermi resonance in IR spectroscopy?
d) What is the NOE_{max} observed for a proton decoupled ^{13}C spectrum?
e) How many cross peaks are observed in the COSY-spectrum of 2-nitro propane?
f) What is the difference between molecular ion peak and base peak in mass spectrometry?
g) What is the spin selection rule in EPR spectroscopy?
h) What is FRET?
i) What do you mean by static and dynamic TGA?
j) What do you mean by retention factor in chromatography?

Q2 **a)** What types of electronic transitions are possible for each of the following compounds? **(6)**
(i) Dimethyl ether, (ii) Triethylamine, (iii) Acetaldehyde
b) The UV spectrum of acetone shows absorption maxima at 166, 189 and 279 nm. What type of transition is responsible for each of these bands? **(4)**

Q3 Explain the instrumentation of IR spectrometer with block diagram. **(10)**

Q4 Describe the applications of ^{1}H and ^{13}C NMR spectroscopy. **(10)**

Q5 **a)** What is Nitrogen rule? **(5)**
b) Explain with example the McLafferty rearrangement. **(5)**

Q6 **a)** What are Kramer's rule and zero field splitting? **(7)**
b) How many EPR signals are observed in methyl free radical? **(3)**

Q7 Write the basic principle and instrumentation of a CD spectrometer. **(10)**

Q8 **Write short notes on :** **(5 x 2)**

a) Gas Chromatography
b) High performance Liquid Chromatography (HPLC)