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RCH-003

**M. Phil./Ph. D. PROGRAMME IN
CHEMISTRY (M. Phil. Chem./
Ph. D. Chem.)**

Term-End Examination**December, 2019**

**RCH-003 : ANALYTICAL TECHNIQUES IN
CHEMISTRY—II**

*Time : 3 Hours**Maximum Marks : 100*

Note : Answer all the questions given below.

1. Explain the principle of gas chromatography.
Give a schematic illustration showing the various
components of a gas chromatography. 10
2. How does the flow rate of a carrier gas affect
the separation of compounds by gas
chromatography ? Explain, how can an
appropriate rate flow be maintained. 10

3. Describe in brief various phases used in HPLC. What is the basis of choosing, a stationary phase in HPLC ? 10
4. Describe the process of sample injection into the column in HPLC. What is the amount of sample injected for the best results ? 10
5. Draw the ESR spectrum for the following with justification : 10
 - (a) Cyclooctatetraene anion
 - (b) $\text{VO}(\text{acac})_2$ (I for vanadium is $7/2$)
6. Write the basic principle of Mössbauer spectroscopy. Give the weaknesses of this technique. 10
7. What is meant by anisotropy in ESR ? Give an example. 10
8. Elaborate on how to analyse data for X-ray diffraction and infer whether the crystal is fcc, bcc or hcc. 15

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9. Give the full form of the following terms pertaining to the analytical techniques in chemistry and write their working principle : 15

(a) LEED

(b) AES

(c) XANES