Reg.No.									

INTERNATIONAL CENTRE FOR APPLIED SCIENCES

(Manipal University)

IV SEMESTER B.S. DEGREE EXAMINATION – OCT. / NOV. 2017

SUBJECT: TECHNICAL CHEMISTRY-III (CH 242)

(BRANCH: CHEMICAL)

Friday, 03 November 2017

Time: 3 Hours **Max. Marks: 100**

- ✓ **Answer ANY FIVE full Questions.**
- ✓ **Missing data, if any, may be suitably assumed**

1A. Explain the following terms:
i) Electromagnetic spectrum ii) Line spectrum
iii) Wavelength iv) Wave number

1B. Describe the following:
i) Modes of vibrations in polyatomic molecules
ii) Sampling of solids by KBR pellet technique for IR studies

1C. Give reasons:
i) Absorption band for saturated hydrocarbons is observed in the far UV region.
ii) HCl molecule is IR active but H_2 and Cl_2molecule are not.

(8+8+4)

2A. Derive the mathematical expression for the following.
i) Moment of inertia for the rotating rigid diatomic molecule
ii) Beer-lambert's Law

2B. Describe the following
i) DTA apparatus
ii) Flame ionization detector

2C. Write a note sources of UV radiation

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3A. Explain the following
i) Bathochromic shift ii) Distribution constant
iii) Capacity factor iv) R_f value

3B. Give an account of the following
i) Applications of Raman spectroscopy
ii) Limitations of Beer's law

3C. Give reasons:
i) All mode of vibrations of H_2O molecule are Raman active
ii) CH_4 molecule is microwave inactive

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4A. What is Raman shift? Explain the classical theory of Raman effect.

4B. Discuss the various factors affecting TGA curve.

4C. Give any four important differences between IR and Raman spectroscopy

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5A. Discuss the various factors affecting the conductivity of electrolytes.
5B. Explain the following:
i) Methods of detection of end point in potentiometric titrations.
ii) Limitations of Glass electrode
5C. With a schematic diagram explain the working of double beam UV-Visible spectrophotometer.

(8+8+4)

6A. Derive the expression for the frequency of transition for fundamental and overtone bands of anharmonically vibrating diatomic molecule
6B. Explain the principle and working of GLC. Mention four applications of GLC
6C. Explain the methods of evaluation of chromatogram in TLC.

(8+8+4)

7A. With a neat diagram explain the working of HPLC. What is the effect of temperature in HPLC?
7B. Derive the expression for the relation between
i) Retention time and distribution constant
ii) Electrode potential of glass electrode and P^H of a solution.
7C. Discuss the characteristics of Raman lines

(8+8+4)

8A. Derive the expression for the frequency of transition between the energy levels of a rotating non-rigid diatomic molecule.
8B. Draw and explain the simultaneous DTA-TGA diagram of the decomposition of calcium oxalate monohydrate in air and in carbon dioxide atmosphere
8C. Discuss the following conductometric titrations:
i) Acetic acid Vs. Sodium hydroxide
ii) Potassium chloride Vs. Silver nitrate.

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