BIT SINDRI

Engineering Chemistry-I

B. Tech. Second Semester

Second Mid Semester Examination 2019

Time allotted: $1\frac{1}{2}$ hrs Max. Marks: 20

Answer any five questions.

All Questions carry equal marks

All the Questions in Question No.1 are multiple choices with one correct answer

Q.1. (i)The different types of energies associated with a molecule are

(a) Electronic energy (b) Vibrational energy (c) Rotational energy (d) All of the mentioned

(ii)The region of electromagnetic spectrum for nuclear magnetic resonance is

(a) Microwave (b) Radio frequency (c) Infrared (d) UV-rays

(iii) Real gases will approach the behaviour of ideal gas at

(a) Low temperature and low pressure (b) High temperature and low pressure

(c) High temperature and high pressure (d) Low temperature and high pressure

(iv) Which one of the following gases has the highest Critical temperature?

(a) Nitrogen (b) Ammonia (c) Water vapour (d) Carbon dioxide

Q.2. Explain in detail the principle and application of Infrared spectroscopy? Write difference between UV-Vis and IR Spectroscopy?

Q.3. Describe Principle and application of NMR Spectroscopy. What is Chemical Shift? How is it measured relative to TMS?

Q.4 What are various surface characterization techniques. Explain any one method of surface Characterisation with example

Q.5. Explain the terms Critical temperature, Critical pressure and Critical volume. Explain why beyond a certain temperature gases cannot be liquefied whatever the pressure may be.

Q.6. Define an ionic bond. Discuss the factors affecting the formation of ionic bond. Explain giving suitable examples why ions with three positive or three negative charges are rare.

Q.7. write notes on any two of the following:

(a) Potential Energy surfaces of H3

(b) Spin-Spin Coupling

(c) Selection rule

(d) Vanderwaal's forces