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Total No. of Pages: 02
Total No. of Questions: 09

B.Tech (Sem.-1st & 2nd)
ENGINEERING CHEMISTRY
Subject Code: BTCH-101
Paper ID: [A1106]

Time: 3 Hrs.

Max. Marks: 60

INSTRUCTIONS TO CANDIDATES:

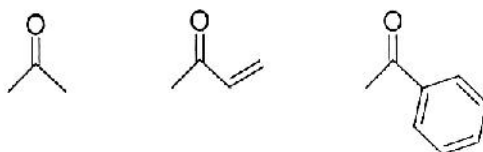
- (i) Section –A, is Compulsory consisting of Ten questions carrying Two marks each.
(ii) Attempt five questions from Section-B and Section-C, at least two questions each section-B and Section C

SECTION –A

(10 x 2=20)

Q.1. Short Answer Questions:-

- (a) Explain the selection rules of UV-vis Spectroscopy.
- (b) Explain Beer- Lambert Law.
- (c) What is the difference between fluorescence and phosphorescence?
- (d) The presence of carbon dioxide in boiled fed water should be avoided. Why?
- (e) What type of reaction vessels are used in microwave reaction?
- (f) Why rusting of iron in saline water is quicker than ordinary water.
- (g) Differentiate between addition and condensation polymer.
- (h) Why nanoparticles show better catalytic activity than the bulk metals?
- (i) What are the properties of natural gas?
- (j) Which of the following will absorb at higher wave number for C=O stretching

**Section –B**

- Q.2.** (a) “IR spectra is often characterized as molecular finger prints.” Justify this statement. (3)
- (b) Calculate the number of vibrational degrees of freedom in following compounds: (3)
- (i) CO₂ (ii) SO₂ (iii) CH₄
- (c) Which of the following molecules will show IR spectra and why (2)
- H₂, HCl, CH₄, CO₂, H₂O
- Q.3.** Draw a well labeled Jablonski diagram and explain (4+4)
- (a) Intersystem crossing

(b) Phosphorescence

- Q.4.** What do you understand by conditioning of boiled fed water? Explain different types of conditioning. (8)
- Q.5.** Write down twelve basic principle of green chemistry? Explain 3 principles with example.(8)

Section –C

- Q.6.** Explain the electrochemical mechanism of rusting of iron in humid atmosphere. Mention any four factors that affect the rate of corrosion. (8)
- Q.7.** Explain detailed synthesis, properties and uses of epoxy resins. (8)
- Q.8.** (a) Explain pros and cons of top-down vs. Bottom-up production processes. (4)
- (b) Describe two examples of processes involving self-assembly or self-organization at the nanoscale. (4)
- Q.9.** Discuss in details the production process of ethylene and propylene. (8)

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