

Roll No.

TCH-101

**B. TECH. (FIRST SEMESTER)
END SEMESTER EXAMINATION, 2019**

(All Branches)

ENGINEERING CHEMISTRY

Time : Three Hours

Maximum Marks : 100

Note : (i) All questions are compulsory.

(ii) Answer any *two* sub-questions among (a), (b) and (c) in each main question.

(iii) Total marks for each main question are **twenty**.

1. Attempt any *two* parts of choice from (a), (b) and (c). (2×10=20 Marks)

(a) Enumerate the difference between S_N1 and S_N2 reactions. Illustrate the stereochemical implication of S_N1 and S_N2 reactions with respect to *tert*-butyl bromide. [CO6]

(b) Draw the structure of paracetamol and aspirin and mention *two* applications of each. [CO6]

(c) Explain the structure of SO_2 and XeF_4 with the help of VSEPR theory. [CO1]

2. Attempt any *two* parts of choice from (a), (b) and (c). (2×10=20 Marks)

(a) Write short notes on the following : [CO3]

(i) PMMA

(ii) Nylon-6, 6

(b) Enumerate the difference between thermoplastics and thermosetting resins with suitable examples. [CO3]

(2)

(c) Discuss the principle of UV-Vis spectroscopy and the various types of electronic transitions involved in this spectroscopy. [CO4]

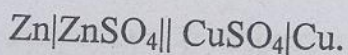
3. Attempt any *two* parts of choice from (a), (b) and (c). (2×10=20 Marks)

(a) Write the applications of the following : [CO5]

(i) Electrochemical series

(ii) Nernst equation

(b) Calculate the standard EMF of the following cell at 25°C; writing its half cell reaction and net cell reaction :



Standard potentials of Cu and Zn electrodes are + 0.34 and – 0.76 V respectively.

[CO5]

(c) Explain the mechanism of free radical addition polymerization reaction.

[CO3]

4. Attempt any *two* parts of choice from (a), (b) and (c). (2×10=20 Marks)

(a) Differentiate between temporary and permanent hardness. 100 mL of a water sample has a hardness equivalent of 12 mL of 0.08 N MgSO_4 . What is its hardness in ppm ?

[CO2]

(b) Give the principle of ion exchange process for water softening. [CO2]

(c) Differentiate between Galvanic Cell and Electrolytic Cell with suitable examples.

[CO5]

5. Attempt any *two* parts of choice from (a), (b) and (c). (2×10=20 Marks)

(a) Give the principle of NMR spectroscopy. Predict the number of signals and singlets in the NMR spectrum of :

[CO4]

(i) $\text{CH}_3 - \text{CH}_2 - \text{OH}$

(ii) $\text{CH}_2 - \text{Cl} - \text{CH}_2 - \text{Cl}$

(iii) $\text{CH}_3 - \text{CH}_2 - \text{CH}_3$

(b) Define the corrosion of metals and differentiate between dry and wet corrosion.

[CO5]

(c) State the basic principle of IR spectroscopy. Describe the various molecular vibrations in this technique.

[CO4]

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