

(Please write your Exam Roll No.)

Exam Roll No. 0911905167

END TERM EXAMINATION

SECOND SEMESTER [B.TECH] JULY 2023

Paper Code: BS-104

Subject: Engineering Chemistry II

Time: 3 Hours

Maximum Marks: 75

Note: Attempt any five questions including Q.No.1 which is compulsory.
Select one question from each unit. Scientific calculator may be allowed.

- Q1 a) Explain the following terms: (1x5=5)
- Caustic embrittlement
 - Non-conventional sources of energy
 - Auxochromes
 - PVC
 - Omega-6- fatty acids
- b) Answer the following questions: (2x5=10)
- Explain the lime soda process used for softening of water.
 - Differentiate between addition and condensation polymers.
 - What are carbon nanotubes?
 - Write the cyclic and open chain structure of Glucose?
 - Distinguish between the following on the basis of IR Spectroscopy.
(a) $\text{CH}_3\text{CH}_2\text{CHO}$ (b) CH_3COCH_3

UNIT-I

- Q2 a) On burning 0.96 g of a fuel in a bomb calorimeter, the temperature of 4400g of water increased from 25.1°C to 29.7°C ; water equivalent of calorimeter and latent heat of steam are 484 and 587 cal/g, respectively. Fuel contains 0.9% H, calculate gross calorific value and net calorific value. (5)
- b) Write short notes on: (2x5=10)
- Priming and foaming
 - Conventional sources of energy
 - Producer gas
 - Advantages and disadvantages of ion-exchanger method
 - Write the complete name with structure of EDTA and EBT?
- OR
- Q3 a) 50 ml of standard hard water containing 1 mg pure CaCO_3 per ml consumed 20 ml of EDTA. 50 ml of a water sample consumed 25 ml of same EDTA solution, using EBT. Calculate the permanent, temporary and total hardness of water sample in ppm. (6)
- b) Distinguish between: (3x3=9)
- Permanent and temporary hardness
 - Scales and sludge formed in boilers
 - Gross and net calorific values

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UNIT-II

- Q4 a) State the Beer's law. What are the factors responsible for deviation of this law? (3)
- b) Discuss the different types of vibrational transitions in IR Spectroscopy. (3)
- c) Answer the following questions: (3×3=9)
- Write short notes on Chromophore with suitable examples?
 - Discuss the applications of XRD.
 - Predict the number of signals by the following compounds in ¹H NMR spectroscopy.

a) Benzene	b) Cyclohexane	c) Ethanol
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- OR**
- Q5 a) What is the principle and the chemical shift of NMR spectroscopy? Explain the role of reference compound with shielding and deshielding effects in NMR spectroscopy? (6)
- b) Write short notes on: (3×3=9)
- Finger printing in IR spectroscopy
 - Discuss the applications of SEM and TEM
 - Distinguish between $\pi \rightarrow \pi^*$ and $n \rightarrow \pi^*$ transitions

UNIT-III

- Q6 a) What is the role of benzyl peroxide in polymerization of ethane? (3)
- b) Why the numbers 6, 6 and 6 are put in the name of nylon-6, 6 and nylon-6? (3)
- c) Write short notes on: (3×3=9)
- Conductive polymer
 - Vulcanization
 - Natural rubber
- OR**
- Q7 a) Describe the weight average molecular weight (M_w) in case of polymers. (3)
- b) Distinguish between Thermoplastic and Thermosetting polymers. (3)
- c) Write the chemical representation and uses of the following polymers: (3×3=9)
- Bakelite
 - Nylon 6,6
 - Teflon

UNIT-IV

- Q8 a) What are nanomaterials? Give an account of the different types of nanomaterials. (3)
- b) What happen when an amino acid is treated with Ninhydrin? (3)

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- c) Answer the following questions: (3×3=9)
- i) Differentiate between DNA and RNA
 - ii) Differentiate between disaccharides and polysaccharides.
 - iii) What is saponification? State the soap and its preparation?

OR

- Q9 a) What are essential amino acids? Name any two essential amino acids with their structures. (3)
- b) Write short notes on **any four**: (3×4=12)
- i) Explain Nucleoside and Nucleotide
 - ii) What is ATP? Draw the structure of ATP.
 - iii) Fat and oil
 - iv) Catabolism and anabolism
 - v) Applications of Nanotechnology

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