



JK Lakshmipat University Jaipur
INSTITUTE OF ENGINEERING AND TECHNOLOGY

End Term Examination 2015

B. Tech. I year, II Semester CH-201 (Back Paper)

Roll No.....

CH 201: ENGINEERING CHEMISTRY-II

Time: 3.00 hours

Max. Marks: 100

Instructions to students:

1. Do not write anything other than your roll number on question paper.
2. Assume suitable data wherever required and mention it clearly.
3. Writing appropriate units, nomenclature, and drawing neat sketches/schematics/ flow chart wherever, required are an integral part of the answer.

Q.1 Objective type (1 marks each)

10

- i. Write the formula to Calculate % of S and % N in analysis of Coal.
- ii. Give the number of phases, component and degree of freedom in water system.
- iii. Write the chemical formula of Rust.
- iv. Give the formula to calculate the theoretical value of higher and lower calorific value of a fuel sample.
- v. What is Zero order reaction?
- vi. Give the formula to calculate the rate constant of first order reaction and its half-life.
- vii. What are two types of liquid crystals?
- viii. Write the Arrhenius equation to calculate the activation energy.
- ix. Write the Bragg's equation.
- x. Write the formula to calculate the density of a cubic unit cell.

Q.2 Short answer type questions (2.5 marks each)

10

- i. Give the classification of Fuel.
- ii. What is the difference between rate and order of a reaction?
- iii. Calculate relation between Edge length (a) and radius (r) for FCC unit cell.
- iv. Explain the crevice corrosion.

Q.3A Write short notes on (i) PASSIVITY and (ii) PITTING Corrosion.

5

Q.3B Define the HCV and LCV for any fuel.

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Q.4A What is optical Fiber? Give the structural properties and its applications.

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Q.4B Explain the proximate analysis of coal with formula.

5

Q.5A Calculate the distance between two parallel planes of a crystal which shows 'second order' reflection at an angle 30° with X-ray of wavelength $2 \times 10^{-10}\text{m}$.

5

Q.5B Explain the structure, properties and application of Graphite.

5

- Q.6A A BCC element of density **10.3gm/cm³** has a cell edge of **314 pm**, calculate the atomic mass of the element. (Given $N_A = 6.023 \times 10^{23}$) 5
- Q.6B What is Fullerenes? Explain the structural features and application of fullerene. 5
- Q.7A Draw the neat diagrams of **SCC**, **FCC** and **BCC** unit cell and calculate the number of atoms per unit cell. 5
- Q.7B What is Carbon Nano Tubes (CNT)? Give the types of CNTs and their applications. 5
- OR
- Q.7B Define the Activation Energy? Derive the relation to calculate E_a when the rate constants of a reaction are given at two different temperatures? 5
- Q.8 Give the mechanism of Oxidation corrosion. How continuous corrosion depend on the nature of oxide film explain with examples. 10
- OR
- Q.8 Give the application of Phase rule to water system with neat diagram in detail with explanation of areas, curves and triple point. 10
- Q.9 For a first order reaction, the rate constant is found to be 7.0×10^{-7} at 70°C and 9.0×10^{-4} at 57°C . Calculate the energy of activation of the reaction ($R = 8.314 \text{ J mol}^{-1} \text{ K}^{-1}$) 10
- OR
- Q.9 What is liquid crystalline state? Give the classification and application of liquid crystals. 10
- Q.10 A sample of coal was tested for its calorific value in Bomb calorimeter the following results were obtained: Wt. of coal burned = **0.90 gm**, wt. of water in calorimeter = **2500 gm**, water equivalent of bomb calorimeter = **440 gm**, Rise in temperature = **2.42°C**, Acid correction **50 calories**, Cooling correction **0.52°C**, Fuse wire correction = **10 calories**. If fuel contain 6% Hydrogen and latent heat of steam is equal to **600 cal/gm** then calculate HCV and LCV in calories/g. 10

