

1<sup>st</sup> Semester Regular/Back Examination: 2022-23

Chemistry

BRANCH(S): AE, AEIE, AERO, AG, AUTO, BIOMED, BIOTECH, CHEM, CIVIL, CSE, CSEAI, CSEAIME, CSEDS, CSIT, CST, ECE, EEE, ELECTRICAL, ELECTRICAL & C.E, ELECTRONICS & C.E, ETC, IT, MANUTECH, MECH, MINERAL, MINING, MME

Time : 3 Hour

Max Marks : 100

Q.Code : L658

Answer Question No.1 (Part-1) which is compulsory, any eight from Part-II and any two from Part-III.

The figures in the right hand margin indicate marks.

Part-I

- Q1 Answer the following questions : (2 x 10)
- a) What are Chromophores?
  - ⓐ b) What is galvanizing?
  - c) What are nanomaterials?
  - ⓐ d) What is power alcohol?
  - ⓐ e) Give one example of stress corrosion.
  - ⓐ f) Write the Schrodinger wave equation.
  - g) What is cracking?
  - h) What is producer gas?
  - i) State phase rule.
  - j) What are solid fuels?

Part-II

- Q2 Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve) (6 x 8)
- ⓐ a) Discuss the principles and application of vibrational spectroscopy.
  - b) Write a short note on gaseous fuel.
  - ⓐ c) Write a short note on cathodic protection.
  - d) Explain phase diagram of sulfur system.
  - e) Write the basic postulates of quantum mechanics.
  - f) Calculate the energy of a particle in one dimensional box of length 'a'. Also set up the Schrodinger wave equation for the same.
  - g) Write a short note on effect of conjugation on chromophores.
  - ⓐ h) Discuss the application of nano materials in electronic devices.
  - i) Classify the nano materials based on the size of particles and distinguish between 0D, 1D and 2D nano materials.
  - ⓐ j) What is the difference between producer gas and water gas?
  - k) What is calorific value of a fuel? How it is determined by Dulong's formula?

- ✓ I) How G.C.V. and N.C.V. of a fuel is calculated? ✓

### Part-III

#### Only Long Answer Type Questions (Answer Any Two out of Four)

- Q3 Explain top-down and bottom-up approaches of nanomaterial synthesis. Give one method of synthesis of nanomaterials via green synthetic route. (16)
- Q4 Explain electrochemical theory of corrosion with suitable example. What are the conditions for electrochemical corrosion? (16)
- ✓ Q5 Discuss the phase diagram of Pb-Sn system. (16)
- ✍ Q6 Briefly discuss the Lambert Beer's law and discuss its application in analyzing samples by UV-Visible spectroscopy. (16)