Registration No.: | | | | | | | | | | |

Total Number of Pages: 02 **Course: B.Tech**
Sub_Code: RCH2A002

2nd Semester Back Examination: 2024-25
SUBJECT: Chemistry
BRANCH(S): AUTO, CIVIL, CSE, CSEAIML, CSEDS, CSIT, CST, ECE, EEE, ELECTRICAL, ELECTRICAL & C.E, ETC, MANUTECH, MECH, METTA, MINING, PLASTIC
Time: 3 Hours
Max Marks: 100
Q.Code: S386

Answer Q1 (Part-I) 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) State the significance of wave function Ψ.
b) State Lambert Beer's law.
c) State Gibb's phase rule.
d) Define calorific value.
e) What is power alcohol?
f) What is cracking?
g) Give one example of stress corrosion.
h) What is cathodic protection?
i) What is galvanizing?
j) What are nanomaterials?

Part-II

Q2 **Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve)** **(6 x 8)**

a) Write a short note on the effect of conjugation on chromophores.
b) Discuss main features of the phase diagram of water system, explaining especially why the slope of solid-liquid line is negative for water.
c) How G.C.V. and N.C.V. of a fuel is calculated?
d) What is the difference between producer gas and water gas.
e) Classify the nano materials based on the size of particles and distinguish between 0D, 1D, and 2D nano materials.
f) Write the basic postulates of quantum mechanics.
g) Discuss Schrodinger wave equation for a particle in a one-dimensional box.
h) Discuss the principles and application of vibrational spectroscopy.
i) Explain phase diagram of sulfur system.
j) Write a short note on gaseous fuel.
k) Discuss different types of corrosion.
l) Discuss the application of nano materials in electronic devices.

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four) **(16 x 2)**

Q3 What is condensed phase rule? Discuss the phase diagram of eutectic Bi-Cd system. **(16)**

Q4 Explain electrochemical theory of corrosion with a suitable example. What are the conditions for electrochemical corrosion? **(16)**

Q5 Give a brief account on the classification of fuel. Define calorific value of a fuel. State and explain Dulong's formula for theoretical determination of calorific value of a fuel. Differentiate between H.C.V. and L.C.V. of the fuel. **(16)**

Q6 Explain top-down and bottom-up approaches of nanomaterial synthesis. Give one method of synthesis of nanomaterials via green synthetic route. **(16)**