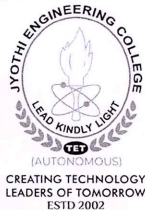


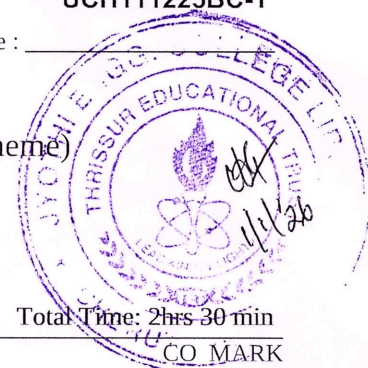
Reg No.: _____

Name : _____



Jyothi Engineering College(Autonomous)

B.Tech Degree S1 (R) Examination, December 2025 (2025 Scheme)

25CHT101- CHEMISTRY FOR INFORMATION
SCIENCE AND ELECTRICAL SCIENCE

Total Mark: 60

Total Time: 2hrs 30 min

CO MARK

PART A

(Answer All Questions. Each question carries 3 marks)

1. Write any three differences between electroplating and electroless plating. CO1 (3)
2. Sketch the Glass electrode and write down the cell representation. CO1 (3)
3. What is quantum computing? Mention the materials used in quantum computing technologies. CO2 (3)
4. Name any two reducing agents used in the chemical reduction method and one example of a metal nanoparticle prepared by this method. CO2 (3)
5. Arrange the following molecules in the increasing order of wavelength of absorption.
a) Cyclohexane, b) Naphthalene, c) Benzene CO3 (3)
6. Calculate the number of vibrational modes present in the following molecules.
a) Methane b) Ammonia c) Acetylene CO3 (3)
7. Explain with an example how temporary hardness can be removed. CO4 (3)
8. What does COD stand for, and why is it important in assessing water quality? CO4 (3)

PART B

(Answer any one full question from each module, each question carries 9 marks)

Module - 1

9. a) With the help of a neat diagram, explain the construction and working of calomel electrode. CO1 (5)
 - b) Calculate the cell potential at 25°C for the galvanic cell:
Al | Al³⁺ (0.1 M) || Sn⁴⁺ (0.1 M) | Sn²⁺ (0.01 M) CO1 (4)
Given: E°(Al³⁺/Al) = -1.66 V and E°(Sn⁴⁺/Sn²⁺) = +0.15 V
- OR**
10. a) Discuss the origin of single electrode potential based on Helmholtz's model of the electrical double layer. How does charge separation occur at the interface? CO1 (5)
 - b) Calculate the single electrode potential of a calomel electrode at 25°C when the concentration of KCl = 0.1 M CO1 (4)

Module - 2

11. a) Discuss in detail the biomedical applications of graphene, Fullerene, and CQDs. CO2 (5)
- b) Give any four applications of Polyaniline (PANI). CO2 (4)

OR

12. a) Explain the synthesis and properties of Polypyrrole. CO2 (5)

b) Differentiate between supercapacitors and batteries. CO2 (4)

Module - 3

13. Draw the molecular energy level diagrams of ethene, 1,3-butadiene, and 1,3,5-hexatriene. What is the significance of the increase in the number of double bonds on the UV-Visible absorption spectrum? CO3 (9)

OR

14. Explain the principle, instrumentation and working of SEM. CO3 (9)

Module - 4

15. a) Explain the disadvantages of hard water in domestic and industrial use. CO4 (5)

b) Calculate the hardness of a 0.1 N CaSO_4 solution and a 0.02 M CaCl_2 solution in terms of equivalent CaCO_3 concentration. CO4 (4)

OR

16. a) What is dissolved oxygen and what are the factors that affect its concentration in sewage water? CO5 (5)

b) List any four SDGs where chemistry plays a crucial role. CO5 (4)
