

Gandhi Institute of Engineering and Technology University, Odisha, Gunupur (GIET University)



B. Tech (Second Semester - Regular) Examinations, April 2026

25FYBS10004 – Applied Chemistry

(CHEM, CV, MECH)

Time: 3 hrs

Maximum: 60 Marks

Answer ALL questions
(The figures in the right hand margin indicate marks)

PART – A

(2 x 5 = 10 Marks)

Q.1. Answer **ALL** questions

	CO #	Blooms Level
a. Define Normalized and Orthogonal wave function.	CO1	K1
b. Differentiate between temporary and permanent hardness.	CO2	K1
c. Explain Faraday's first law of electrolysis	CO3	K1
d. Find out the product when benzene reacts with nitric acid in the presence of sulphuric acid.	CO5	K1
e. Write the range of various IR regions.	CO6	K1

PART – B

(10 x 5 = 50 Marks)

Answer **ALL** the questions

	Marks	CO #	Blooms Level
2. a. Write some postulates of quantum mechanics.	5	CO1	K2
b. Write the Schrodinger wave equation with different operator.	5	CO1	K4
(OR)			
c. Draw the energy level diagram of B ₂ & NO and predict their bond order and magnetism.	5	CO1	K4
d. Difference between bonding and antibonding molecular orbital.	5	CO1	K3
3.a. 0.1g of CaCO ₃ dissolved in 1liter distilled water. 50ml of SHW consumed 25ml of EDTA.100ml of water sample consumed 20ml of EDTA.100ml of boiled water consumed 15ml of EDTA. Calculate the Temporary, permanent and total hardness	5	CO2	K5
b. Explain the working and construction of cold lime soda process.	5	CO2	K2
(OR)			
c. Calculate the amount of lime and soda required to soften 10,000 liters of water containing the following ions per liter. Mg ⁺² =4.8mg; Ca ²⁺ =16.0mg;HCO ₃ ⁻ =73.2mg	5	CO2	K5
d. Explain the softening of water by ion-exchange process.	5	CO2	K3
4.a. Write Nernst equation.	5	CO4	K2
b. Calculate EMF of the given cell Zn/Zn ⁺² (0.1M) // Cu ⁺² (0.01M)/Cu at 298 K given that E ⁰ _{Zn/Zn⁺²} = 0.76 V and E ⁰ _{Cu⁺²/Cu} = 0.34 V.	5	CO3	K4
(OR)			
c. Explain the working, construction, principle and application of Fuel cell.	5	CO4	K6
d. Calculate emf of the cell if standard E ⁰ _{Mg⁺²/Mg} = - 2.36 & E ⁰ _{Al³⁺/Al} = - 1.66	5	CO3	K2
5.a. Briefly explain meta directing groups.	5	CO5	K2
b. Provide a brief description of Elimination reactions.	5	CO5	K3

(OR)

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| c. Draw the resonating structure of benzaldehyde and phenol. | 5 | CO5 | K4 |
| d. Explain the mechanism, when benzene reacts with sulphuric acid in presence of heat. | 5 | CO5 | K5 |
| 6.a. Discuss red and blue shift. | 5 | CO6 | K6 |
| b. Write various synthesis procedure of Nanomaterials. | 5 | CO6 | K4 |

(OR)

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| c. Explain the different types of electronic transitions observed in UV–Visible spectroscopy. | 5 | CO6 | K3 |
| d. What is Chromophore and give examples of some chromophore groups with colour. | 5 | CO6 | K2 |

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