

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

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

25FYBS10004 – Applied Chemistry

(Aeronautical Engineering)



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 | K2 |
| b. Differentiate between temporary and permanent hardness. | CO2 | K1 |
| c. Explain Faraday's first law of electrolysis | CO3 | K1 |
| d. Draw the resonating structure of Phenol. | 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 | K3 |
| b. Write the Schrodinger wave equation with different operator. | 5 | CO1 | K4 |
| (OR) | | | |
| c. Compare O_2 , O_2^+ , O_2^- , O_2^{2-} in the increasing order of the stability, bond strength & bond length. | 5 | CO1 | K4 |
| d. Difference between BMO and ABMO. | 5 | CO1 | K2 |
| 3.a. 0.28g of $CaCO_3$ is dissolved in 1lit of distilled water to prepare 1lit SHW. 35ml of EDTA is consumed for 50ml of SHW. 50ml of hard water sample consumed 25ml of EDTA. 50ml of boiled water consumed 21ml of EDTA. Calculate the temporary and permanent hardness. | 5 | CO2 | K5 |
| b. Explain the working and construction of cold lime soda process. | 5 | CO2 | K2 |
| (OR) | | | |
| c. Explain the softening of water by ion exchange process. | 5 | CO2 | K5 |
| d. A sample of water on analysis has been found to contain following in ppm.
$Ca(HCO_3)_2 = 4.86$ $Mg(HCO_3)_2 = 5.84$ $CaSO_4 = 6.8$ $MgSO_4 = 8.4$ $CaCl_2 = 11$ $MgCl_2 = 9.5$ Calculate the temporary and permanent hardness. | 5 | CO2 | K3 |
| 4.a. Explain the working, construction, principle and application of Fuel cell. | 5 | CO4 | K3 |
| b. Explain Pilling bed worth rule. | 5 | CO3 | K4 |
| (OR) | | | |
| c. Calculate EMF of the given cell $Zn/Zn^{+2}_{(0.1M)} // Cu^{+2}_{(0.01M)}/Cu$ at 298 K given that $E^O_{Zn/Zn^{+2}} = 0.76 V$ and $E^O_{Cu^{+2}/Cu} = 0.34 V$. | 5 | CO4 | K6 |
| d. Differentiate between dry and wet corrosion. | 5 | CO3 | K2 |
| 5.a. Explain the mechanism of Friedelcraft acylation reaction | 5 | CO5 | K2 |
| b. Discuss the mechanism of the Nitration reaction. | 5 | CO5 | K3 |

(OR)

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|---|---|-----|----|
| c. Briefly explain ortho-para directing and meta directing groups. | 5 | CO5 | K4 |
| d. Provide brief description on Elimination reactions. | 5 | CO5 | K5 |
| 6.a. Discuss the various characterisation techniques for nanomaterials. | 5 | CO6 | K6 |
| b. Explain the different types of electronic transitions observed in UV–Visible spectroscopy. | 5 | CO6 | K4 |

(OR)

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|--|---|-----|----|
| c. Write various synthesis procedure of Nanomaterials. | 5 | CO6 | K3 |
| d. Discuss bathochromic, hypsochromic, hyperchromic and hypochromic shift. | 5 | CO6 | K2 |

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