QP Code: R251A008 | Reg. No | | | | | | | | | | | AY 23

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

B. Tech (First Semester - Regular) Examinations, December 2025

25FYBS10004 – Applied Chemistry

(Common to Biotech and CSE(AIML))

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.	Draw the Molecular orbital diagram of B_2 and calculate the bond order.	CO4	K4
b.	Differentiate between temporary and permanent hardness.	CO2	K2
c.	Write Nernst equation.	CO3	K3
d.	Draw the resonating structure of Nitrobenzene.	CO3	K3
e.	Write Beer and Lamberts law.	CO1	K1

PART – B **(10 x 5 = 50 Marks)**

Answer ***ALL*** the questions

		Marks	CO #	Blooms Level
2. a.	Compare O_2, O_2^+, O_2^-,O_2^{2-} in the increasing order of the stability, bond strength and bond length.	5	CO3	K3
b.	Difference between bonding and antibonding molecular orbital.	5	CO2	K2
	(OR)			
c.	Calculate the energy of a particle in a 1D box and draw the energy level diagram.	5	CO5	K5
d.	Write some postulates of valence bond theory.	5	CO3	K3
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	CO4	K4
b.	Explain hot lime soda process.	5	CO2	K2
	(OR)			
c.	Explain the softening of water by ion-exchange process.	5	CO2	K2
d.	Calculate the quantity of lime and soda required for softening of 10^6 liter of water containing the following salts per liter $Ca(HCO_3)_2$= 54mg $Mg(HCO_3)_2$ =73mg $CaSO_4$= 13.6mg $MgSO_4$=12mg $CaCl_2$=11.1 $MgCl_2$= 95	5	CO4	K4
4.a.	Calculate EMF of the given cell $Zn/Zn^{+2}{}_{(0.1M)}$ // $Cu^{+2}{}_{(0.01M)}/Cu$ at 298 K given that $EOZn_{/Zn}{}^{+2}$ = 0.76 V and $EOCu^{+2}{}_{/Cu}$ = 0.34 V.	5	CO4	K4
b.	Differentiate between dry and wet corrosion.	5	CO3	K3
	(OR)			
c.	Explain Pilling bed worth rule.	5	CO1	K1

d.	Explain the Fuel cell and its working principle, and applications, also discussed.	5	CO3	K3
5.a.	Explain the mechanism of Friedelcraft acylation reaction	5	CO4	K4
b.	Discuss the mechanism of the Nitration reaction.	5	CO2	K2
	(OR)			
c.	Briefly explain ortho-para directing and meta directing groups.	5	CO5	K5
d.	Provide brief description on Elimination reactions.	5	CO3	K3
6.a.	What is Chromophore and give examples of some chromophore groups with colour.	5	CO3	K3
b.	Discuss various electronic transition in UV-visible spectroscopy.	5	CO2	K2
	(OR)			
c.	Write various synthesis procedure of Nanomaterials.	5	CO5	K5
d.	Discuss bathochromic, hypochromic, hyperchromic and hypochromic shift.	5	CO1	K1

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