QPC: RA19BTECH087 AR 19 Reg. No

GIET UNIVERSITY, GUNUPUR – 765022

B. Tech (First Semester) Examinations, April – 2021

BBSBS1022 - ENGINEERING CHEMISTRY

(Common to all branches)

Time: 3 hrs Maximum: 70 Marks

Answer ALL Questions

The figures in the right hand margin indicate marks.

PART – A: (Multiple Choice Questions) **(1 x 10 = 10 Marks)**

Q.1. Answer ***ALL*** questions [CO#] [PO#]

a. The correct expression for energy of a particle in 1D box of length a is [CO1] [PO1]

(i) $nh/8ma^2$ (ii) $n^2h/8ma^2$

(iii) $nh^2/8ma^2$ (iv) $n^2h^2/8ma^2$

b. The wavelength of green light is at 5.20×10^{-5} cm. Calculate the frequency. [CO1] [PO2]

(i) 5.77×10^{14} Hz. (ii) 6.77×10^{14} Hz.

(iii) 4.77×10^{16} Hz. (iv) 5.77×10^{18} Hz.

c. What is the most common used coagulant? [CO2] [PO1]

(i)Alum (ii)Ferric sulphate

(iii)lime stone (iv)Coal

d. Soda lime is used in water treatment to remove Hardness from water. This process is known as? [CO2] [PO1]

(i)Haber process (ii) Clark's process

(iii) Phase separation process (iv) Pyroprocess

e. Select the incorrect statement from the following option. [CO3] [PO1]

(i) Corrosion causes contamination of product (ii) Replacement of corroded equipment is time-consuming

(iii) Corrosion increases the electrical conductivity of metals (iv) Corrosion causes leakage of toxic liquid or gases

f. This occurs any time two dissimilar metals make electrical contact in the presence of an electrolytes [CO3] [PO1]

(i) Stress Corrosion (ii) Pitting Corrosion

(iii) Galvanic Corrosion (iv) Types of Corrosion

g. Chemical action during corrosion converts metal into metallic component as _____ [CO3] [PO1]

(i) Hydroxide (ii) Oxide

(iii) Sulphate (iv) All

h. In condensation of polymerization, monomers are involved which contain functional groups of [CO4] [PO1]

(i)same kind (ii)different kind

(iii)all groups (iv)compounds

i. Following is not the main form of polymer deterioration

(i) Corrosion (ii) Swelling and Dissolution [CO4] [PO1]

(iii) Weathering (iv) Scission

j. The following influences deterioration of polymers

(i) Weather (ii) Radiation [CO4] [PO1]

(iii) Temperature (iv) All

PART – B: (Short Answer Questions) **(2 x 10 = 20 Marks)**

Q.2. Answer ***ALL*** questions		[CO#]	[PO#]
a.	Explain Eigen value and Eigen function?	[CO1]	[PO1]
b.	He_2 doesn't exist, Explain	[CO1]	[PO1]
c.	What are the disadvantages of Lime-Soda process?	[CO2]	[PO1]
d.	Mention any two coagulants used in cold lime soda process?	[CO2]	[PO1]
e.	How Ion-Exchange is better the Lime-Soda Process	[CO2]	[PO1]
f.	Why do metals corrode and what are the consequences of corrosion?	[CO3]	[PO1]
g.	Define passivity.Which one is the most passive metal?	[CO3]	[PO1]
h.	Name the important properties of plastics	[CO4]	[PO1]
i.	Write two uses of PMMA.	[CO4]	[PO1]
j.	Write the monomers of nylon-66.	[CO4]	[PO1]

PART – C: (Long Answer Questions) **(10 x 4 = 40 Marks)**

Answer ***ALL*** questions		Marks	[CO#]	[PO#]
3. a.	Find out the lowest 4 Eigen functions and Eigen values of electron moving in 1D box.	10	[CO1]	[PO1]
b.	Calculate wavelength associated with an e^- involves from 2nd to 3rd shell having nuclear distance 10nm.	5	[CO1]	[PO2]
	(OR)			
c.	Compare the stability, bond dissociation energy, bond strength & bond length of CO, CO^+, CO^- also predict their magnetism.	10	[CO1]	[PO1]
d.	Differentiate Atomic Orbitals and Molecular orbitals	5	[CO1]	[PO2]
4. a.	Discuss the demineralization method of water softening in details	10	[CO2]	[PO1]
b.	Explain Phosphate Conditioning and Carbonate Conditioning	5	[CO2]	[PO1]
	(OR)			
c.	Calculate the quantity of lime and soda required for softening of 10^6 litre of water containing the following salts per litre $Ca(HCO_3)_2$= 81mg $Mg(HCO_3)_2$ =73mg $CaSO_4$= 136mg $MgSO_4$=120mg $CaCl_2$=111mg $MgCl_2$= 95mg, Na_2SO_4 = 25mg, Fe_2O_3 = 50mg.	10	[CO2]	[PO2]
d.	Distinguish between scale and sludge	5	[CO2]	[PO1]
5. a.	Discuss the role metal oxide formed in oxidation corrosion with the help of Pilling Bed worth rule.	8	[CO3]	[PO1]
b.	How is cathodic protection of iron different from galvanization?	7	[CO3]	[PO1]
	(OR)			
c.	What is meant by differential aeration corrosion? Illustrate with two suitable examples	10	[CO3]	[PO2]
d.	Write short notes on Coating	5	[CO3]	[PO1]
6. a.	Explain the preparation, properties and uses (i) HDPE(ii) LDPE	8	[CO4]	[PO1]
b.	Explain the preparation, properties and uses Teflon	7	[CO4]	[PO1]
	(OR)			
c.	Explain the preparation, properties and uses of Bakelite	8	[CO4]	[PO1]
d.	Explain the classification of polymer based on tacticity.	7	[CO4]	[PO1]

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