QPC: RS20BTECH213 AR 19 Reg. No

GIET UNIVERSITY, GUNUPUR – 765022

B. Tech (Second Semester – Regular) Examinations, September – 2021

BBSBS1022 – Engineering Chemistry

(Common to all branches)

Time: 2 hrs Maximum: 50 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. Which among the following species does not exist (i)He_2 (ii) Be_2 (iii) Ne_2 (iv)All	**CO1**	PO1
b. The bond order of the given species are such that (i) $O_2^- > O_2^+ > O_2^{2-} > O_2$ (ii) $O_2^+ > O_2 > O_2^- > O_2^{2-}$ (iii) $O_2 > O_2^+ > O_2^- > O_2^{2-}$ (iv) $O_2^{2-} > O_2 > O_2^+ > O_2^-$	CO1	PO1
c. What is the total energy in 1.5 x 10^{13} photons of gamma radiation having λ = 3.0 x 10^{-12} m (i)10J (ii) 1.0 J (iii)100J (iv)0.1J	CO1	PO2
d. Select the incorrect statement from the following option. (i) Permanent hardness is due to dissolved chlorides and sulphates of calcium and magnesium (ii) The difference between the total hardness and the alkaline hardness gives the non-alkaline hardness (iii) It is also known as non-alkaline hardness (iv) It can be removed by mere boiling of water	CO2	PO1
e. 1ppm = (i)0.07^{o}Fr (ii) 0.7^{o}Fr (iii) 0.1^{o}Fr (iv) 0.01^{o}Fr	CO2	PO1
f. The standard reduction potential E^o for half reactions are $Zn \longrightarrow Zn^{2+} + 2e$ E^o = +0.76 V $Fe \longrightarrow Fe^{2+} + 2e$ E^o = + 0.41 V The EMF of the cell reaction $Fe^{2+} + Zn \longrightarrow Zn^{2+} + Fe$ is (i) -0.35V (ii) 0.35V (iii) +1.17V (iv) -1.17V	CO3	PO2
g. Corrosion can be prevented by (i) alloying (ii) tinning (iii) galvanizing (iv) all of the above	CO3	PO1
h. Select the incorrect statement from the following option. (i) Thermosets are formed by condensation polymerisation reactions (ii) Thermosets have 3-D, cross-linked network structure (iii) Thermosets soften on heating and stiffen on cooling (iv) Thermosets are generally insoluble in any solvent	CO4	PO1
i. Condensation Polymerisation of _____ produces bakelite (i) Urea & Formaldehyde (ii) Pyrol & Formaldehyde	CO4	PO1

(iii) Phenol & Formaldehyde (iv)
(v) Phenol & Acetaldehyde

j. Which of the following polymer is not classified under the category of configuration? CO4 PO1

(i) Syndiotactic (ii) Isotactic
(iii) Crosslinked (iv) Atactic

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

Q.2. Answer ***ALL*** questions [CO#] [PO#]

a. Calculate the energy and frequency of red light having a wavelength of 6.80×10^{-5} cm CO1 PO2

b. What happens to hard water when it is heated? Explain it with a balanced chemical equation? CO2 PO1

c. Calculate the hardness in $CaCO_3$ equivalent at given water sample. CO2 PO2

$CaCO_3$=10ppm, $CaSO_4$=13.6ppm, $MgCl_2$=95ppm , $MgSO_4$= 12ppm

d. How Ion-Exchange is better the Lime-Soda Process? CO3 PO1

e. Is –[-CH_2-$CH(C_6H_5)$-]n – a homoplymer or copolymer? Write the name of monomer. CO4 PO1

PART – C: (Long Answer Questions) (6 x 5 = 30 Marks)

Answer ***ANY FIVE*** questions Marks [CO#] [PO#]

3. Write-down the different form of Schrodinger wave equation and mention its applications (6) CO1 PO1

4. Draw the energy level diagram for CO, CO^+ and CO^- and compare the stability, bond dissociation energy & bond length? (6) CO1 PO2

5. 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. (6) CO2 PO2

6. Explain demineralization process with a neat labeled diagram. (6) CO2 PO1

7. Derive Nernst's equation and explain the terms involved in the equation. Write its application? (6) CO3 PO1

8. Find out the potential for the cell (6) CO3 PO2

Cr $|Cr^{3+}(0.1\ M)|\ |Fe^{2+}(0.01\ M)|$ Fe

Given $E^o_{Cr+/Cr} = -0.72$ V, $E^o_{Fe+/Fe} = -0.42$ V.

9. Explain the synthesis of polyacetylene Write its properties and uses. (6) CO4 PO1

10. Explain in brief (a) biodegradable polymer (6) CO4 PO7

(b)non-biodegradable polymer.

--- End of Paper ---