Basavarajeswari Group of Institutions

BALLARI INSTITUTE OF TECHNOLOGY & MANAGEMENT

(Autonomous Institute under Visvesvaraya Technological University, Belagavi)

USN										Course Code	2	2	C	H	E	C	12	/	22

First Semester B.E. Degree Examinations, April/May2023

CHEMISTRY FOR CIVIL ENGINEERING STREAM

Duration: 3 hrs **Max. Marks: 100**

Note: *1. Answer any* **FIVE** *full questions, choosing* **ONE** *full question from each module.*
2. Missing data, if any, may be suitably assumed

O. No		Question	Marks	(RBTL:CO: PI)
		MODULE – 1		
1.	**a.**	Explain properties and applications of iron and its alloys.	**06**	2:1:1.2.1
	b.	Calculate GCV & NCV from the following data: Weight of the fuel taken = 0.95g, Water equivalent of stirrer, bomb etc., = 450g, Weight of the water in the calorimeter = 3500g, increase in the temperature of the water = 2.5^{o}C, % of hydrogen = 5%, Specific heat of water= 4.187KJ/Kg/^{o}C, latent heat of steam = 2454 KJ/Kg.	**08**	3:1:1.2.1
	c.	Explain synthesis of Bio-diesel. List the advantages of biodiesel.	**06**	2:1:1.2.1
		OR		
2.	**a.**	Explain composition and properties of cement.	**06**	2:1:1.2.1
	b.	Calculate HCV & LCV from the following data: Weight of the fuel taken = 0.95g, Water equivalent of stirrer, bomb etc., = 450g, Weight of the water in the calorimeter = 3500g, initial temperature 24.5 ^{0}C, final temperature 27.5 ^{0}C % of hydrogen = 5%, Specific heat of water= 4.187KJ/Kg/^{o}C, latent heat of steam = 2454KJ/Kg.	**08**	3:1:1.2.1
	c.	Explain production of hydrogen by electrolysis of water.	**06**	2:1:1.2.1
		MODULE – 2		
3.	**a.**	Define solar cell. Explain construction and working of PV cell.	**06**	2:2:1.2.1
	b.	Define metal finishing. Mention technological importance of metal finishing.	**06**	2:2:1.2.1
	c.	Define corrosion. Apply electrochemical theory of corrosion for steel in	**08**	3:2:1.2.1
		OR		
4.	**a.**	Define fuel cell. Explain construction and working of methanol-oxygen fuel cell.	**06**	2:2:1.2.1
	b.	What is anodization? Explain anodization of aluminium.	**06**	2:2:1.2.1
	c.	Distinguish between electroplating and electroless plating.	**08**	3:2:1.2.1
		MODULE – 3		
5.	**a.**	Explain determination of temporary, permanent and total hardness of water by EDTA method.	**06**	2:3:1.2.1
	b.	Define COD. In a COD determination 29.5 ml and 20 ml of 0.05N Ferrous ammonium sulphate were required for blank and sample titration respectively. Volume of water sample taken is 25 ml. Calculate COD of	**08**	3:3:1.2.1

Note: (**RBTL - Revised Bloom's Taxonomy Level: CO - Course Outcome: PI - Performance Indicator)**

the water sample.

	c.	Explain reverse Osmosis process.	**06**	2:3:1.2.1
		OR		
6.	**a.**	Define COD. Explain determination of COD of waste water.	**06**	2:3:1.2.1
	b.	A sample of water found to contain fallowing dissolved salts in mg/L $Mg(HCO_3)_2$=73, $CaCl_2$=111, $Ca(HCO_3)_2$=81, $MgSo_4$=40, and $MgCl_2$=95 calculate Temporary, Permanent and Total Hardness of water. Given that mol wt of $Mg(HCO_3)_2$=146, $CaCl_2$=111, $Ca(HCO_3)_2$=162, $MgSo_4$=120, and $MgCl_2$=95	**08**	3:3:1.2.1
	c.	Define nanomaterial. Explain synthesis of nanomaterial by Sol-Gel process	**06**	2:3:1.2.1
		MODULE – 4		
7.	**a.**	Explain Addition and condensation polymerisation with reactions.	**06**	2:4:1.2.1
	b.	A polymer sample consisting of 1,3,5,7 polymer chains of molecular weights of $1x10^5$, $3x10^5$, $5x10^5$, $7x10^5$, respectively. Calculate number average and weight average molecular weight of the polymer.	**08**	3:4:1.2.1
	c.	Explain synthesis, properties and applications of Kevlar.	**06**	2:4:1.2.1
		OR		
8.	**a.**	Explain synthesis, properties and applications of Epoxy resin.	**06**	2:4:1.2.1
	b.	A polymer sample consisting of 1,2,3,4 polymer chains of molecular weights of 1000, 2000, 3000, 4000, respectively. Calculate number average and weight average molecular weight of the polymer.	**08**	3:4:1.2.1
	c.	Explain synthesis, properties and applications of Teflon.	**06**	2:4:1.2.1
		MODULE – 5		
9.	**a.**	Define Phase rule and explain the terms phase, components, and degree of freedom with examples.	**08**	2:5:1.2.1
	b.	List the advantages of Instrumental methods of analysis.	**06**	2:5:1.2.1
	c.	Explain theory and instrumentation of conductometric sensors.	**06**	2:5:1.2.1
		OR		
10.	**a.**	Explain Phase diagram for lead – silver system.	**08**	2:5:1.2.1
	b.	Explain theory and instrumentation of potentiometric sensors.	**06**	2:5:1.2.1
	c.	Explain theory and instrumentation of colorimetric sensors.	**06**	2:5:1.2.1

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