CBCS SCHEME

BCHEC102/202

First/Second Semester B.E./B.Tech. Degree Supplementary Examination, June/July 2024
Applied Chemistry for Civil Engineering Stream

Time: 3 hrs.   Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. VTU Formula Hand Book is permitted.
3. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	What is glass? Describe the preparation of soda lime glass.	07	L2	CO1
	b.	Explain the testing of element by EDTA method.	07	L2	CO1
	c.	Write the properties and applications of stainless steel and duralumin.	06	L2	CO1
		OR			
Q.2	a.	Discuss the production of cement by wet process.	07	L2	CO1
	b.	Define Refractories. Mention the properties and applications of refractory materials.	07	L2	CO1
	c.	Explain the properties and applications of Aluminium and its alloys.	06	L2	CO1
		Module – 2			
Q.3	a.	Explain the electrochemical corrosion of steel in concrete.	07	L2	CO2
	b.	Illustrate the construction and working of photovoltaic cell.	07	L2	CO2
	c.	Discuss the following type of corrosion: (i) Differential metal corrosion (ii) Differential aeration corrosion	06	L2	CO2
		OR			
Q.4	a.	Define secondary batteries. Explain construction and working of Li-ion battery.	07	L2	CO2
	b.	What is anodizing? Explain the anodizing of aluminium.	07	L2	CO2
	c.	Explain the construction and working of Methanol-Oxygen fuel cell.	06	L2	CO2
		Module – 3			
Q.5	a.	100 ml of sample water required 20 ml of 0.01 M EDTA for titration using EBT indicator. In another experiment 100 ml of the sample of water was boiled and precipitate was removed by filtration required 8.0 ml of 0.01 M EDTA using EBT indicator. Calculate: (i) Total Hardness (ii) Permanent Hardness (iii) Temporary Hardness	07	L2	CO3
	b.	What is desalination? Describe the desalination of water by electrodialysis method with a neat labelled diagram.	07	L2	CO3
	c.	Explain the following size dependent properties of nanomaterials: (i) Surface area (ii) Catalytic property	06	L2	CO3
		OR			
Q.6	a.	What are hard waters? Discuss the estimation of total hardness of using EDTA solution.	07	L2	CO3
	b.	Define COD. In a COD test, 28 cm^3 and 16 cm^3 of 0.05 N FAS solutions are required for a blank and sample titration respectively. The volume of sample used was 25 cm^3. Find the COD of a sample solution.	07	L2	CO3
	c.	Define nanomaterial. Explain the synthesis of nanomaterials by sol-gel method.	06	L2	CO3

Module – 4					
Q.7	a.	Describe the synthesis, properties and applications of polyethylene.	07	L2	CO4
	b.	Define biodegradable polymer. Explain the synthesis and applications of polylactic acid.	07	L2	CO4
	c.	What are polymer composites? Mention the properties and application of FRP (Fiber Reinforced Polymer).	06	L2	CO4
OR					
Q.8	a.	What are adhesives? Give the synthesis, properties and applications of epoxy resin.	07	L2	CO4
	b.	A polymer sample contains 50 molecules of molecular mass 1000 g/mols, 100 molecules of molecular mass 2000 g/mols and 150 molecules of molecular mass 3000 g/mols. Calculate the number average and weight average molecular masses of the polymer.	07	L3	CO4
	c.	Mention the properties and applications of geopolymer concrete.	06	L2	CO4
Module – 5					
Q.9	a.	Describe the Lead-Silver system with the help of neat phase diagram.	07	L2	CO5
	b.	Describe the instrumentation and applications of conductometric sensors in the estimation of acid mixture.	07	L2	CO5
	c.	Describe the estimation of FAS using potentiometric sensors.	06	L2	CO5
OR					
Q.10	a.	Illustrate the principle, instrumentation and working of potentiometric sensors.	07	L2	CO5
	b.	Define the following terms with examples: (i) Phase (ii) Component (iii) Degree of freedom	07	L2	CO5
	c.	Explain the determination of p^H of soil sample using p^H sensors.	06	L2	CO5

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