CBCS SCHEME

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BCHEC102/202

First/Second Semester B.E./B.Tech. Degree 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.	Describe the manufacturing of cement by wet method.	7	L2	CO1
	b.	What are refractories? Mention the properties and applications of refractory materials.	7	L2	CO1
	c.	Mention the properties and applications of Aluminium and its alloys.	6	L2	CO1
		OR			
Q.2	a.	Describe the preparation of Soda-lime glass.	7	L2	CO1
	b.	Explain the testing of cement by EDTA method.	7	L2	CO1
	c.	Mention the properties and applications of Iron and its alloys.	6	L2	CO1
		Module – 2			
Q.3	a.	Explain construction, working and applications of methanol-oxygen fuel cell.	7	L2	CO2
	b.	Explain electrochemical corrosion of steel in concrete.	7	L2	CO2
	c.	Explain construction and working of Li-ion battery.	6	L2	CO2
		OR			
Q.4	a.	Discuss the following types of corrosion: (i) Differential metal corrosion. (ii) Differential aeration corrosion.	7	L2	CO2
	b.	Describe the following corrosion control methods : (i) Galvanization (ii) Sacrificial anode method.	7	L2	CO2
	c.	Explain construction, working and applications of photovoltaic cells.	6	L2	CO2
		Module – 3			
Q.5	a.	Explain softening of water by Ion exchange method.	7	L2	CO3
	b.	Define nanomaterials. Explain the synthesis of nanomaterials by Sol-gel method.	7	L2	CO3
	c.	In a COD test, 28.1 cm³ and 14 cm³ of 0.05 N FAS solutions were required for blank and sample titrations respectively. The volume of sample used is 25 cm³. Find the COD of the sample solution.	6	L3	CO3
		OR			
Q.6	a.	50 ml of hard water sample is titrated with 0.015 M EDTA solution consumes 12 ml EDTA during titration. Now 250 ml of same hard water is boiled to 50 ml, filtered and diluted to 250 ml with distilled water. When 50 ml of boiled water titrated with 0.015 m EDTA, it consumes 8 ml EDTA during titration. Calculate temporary, permanent and total hardness of given water sample.	7	L3	CO3

	b.	Explain desalination of water by Electrodialysis method.	7	L2	CO3
	c.	What are carbon nano tubes? Mention the properties and applications of carbon nanotubes.	6	L2	CO3
Module – 4					
Q.7	a.	What is Geo polymer concrete? Mention the properties and applications of Geo polymer concrete.	7	L2	CO4
	b.	A polymer sample contain 5 molecules having molecular weight 2000 g/mol, 4 molecules having molecular weight 3000 g/mol and 3 molecules having molecular weight 4000 g/mol. Calculate the number average and weight average molecular mass of the polymer.	7	L3	CO4
	c.	Explain synthesis, properties and applications of nylon fibers.	6	L2	CO4
OR					
Q.8	a.	Define biodegradable polymers. Explain synthesis and applications of polylactic acid.	7	L2	CO4
	b.	Explain the properties and applications of fiber reinforced polymer composites.	7	L2	CO4
	c.	Describe synthesis properties and applications of epoxy resin.	6	L2	CO4
Module – 5					
Q.9	a.	What is phase rule? Explain the terms involved in it with example.	7	L2	CO5
	b.	Explain the estimation of acid mixture using conductometric sensor.	7	L2	CO5
	c.	Explain the principle of pH sensor and describe the determination of pH of soil sample using pH sensor.	6	L2	CO5
OR					
Q.10	a.	With the help of neat phase diagram, describe the lead-silver system.	7	L2	CO5
	b.	Describe the construction and working of pH sensor.	7	L2	CO4
	c.	Explain the estimation of Iron in FAS using potentiometric sensors.	6	L3	CO4

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