ACHARYA INSTITUTE OF TECHNOLOGY MCA Library BANGALORE

CBCS SCHEME

USN | | | | | | | | | | |

BCHEC102/202

First/Second Semester B.E./B.Tech. Degree Examination, June/July 2023
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.	Discuss the production of cement by wet process.	7	L2	CO1
	b.	Define Refractories. Mention the properties and applications of refractory materials.	7	L2	CO1
	c.	Explain the properties and applications of Aluminium and its alloys.	6	L2	CO1
		OR			
Q.2	a.	What is glass? Describe the preparation of soda lime glass.	7	L2	CO1
	b.	Explain the testing of cement by EDTA method.	7	L2	CO1
	c.	Write the properties and applications of stainless steel and duralumin.	6	L2	CO1
		Module – 2			
Q.3	a.	Define secondary batteries. Explain construction and working of Li-ion Battery.	7	L2	CO2
	b.	What is anodizing? Explain the anodizing of aluminium.	7	L2	CO2
	c.	Explain the construction and working of methanol-oxygen fuel cell.	6	L2	CO2
		OR			
Q.4	a.	Describe the electrochemical corrosion of steel in concrete.	7	L2	CO2
	b.	Define PV cell. Illustrate the construction and working of photovoltaic cell.	7	L2	CO2
	c.	Define Batteries. Give the classification of batteries with suitable examples.	6	L2	CO2
		Module – 3			
Q.5	a.	What is hard water? Discuss the estimation of total hardness using EDTA solution.	7	L2	CO3
	b.	Define nano material. Explain the synthesis of nano material by Sol-gel method.	7	L2	CO3
	c.	Define COD. In a COD Test, 30 cm^3 and 15 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 the sample solution.	6	L3	CO3
		OR			
Q.6	a.	What is Desalination? With a neat labelled diagram, describe the desalination of water by electrodialysis method.	7	L2	CO3
	b.	Explain the following size dependent properties of nano materials: (i) Surface area (ii) Catalytic property	7	L2	CO3
	c.	100 ml of sample water required 18 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 9.0 ml of 0.01 m EDTA using EBT indicator. Calculate: (i) Total Hardness (ii) Permanent Hardness (iii) Temporary Hardness	6	L3	CO3

		Module – 4			
Q.7	**a.**	What are adhesives? Give the synthesis, properties and applications of Epoxy Resin.	**7**	**L2**	**CO4**
	b.	A polymer sample contains 1, 2, 3 and 4 molecules having molecular mass 10^5, 2×10^5, 3×10^5 and 4×10^5 respectively. Calculate number average and weight average molecular mass of the polymer.	**7**	**L3**	**CO4**
	c.	Mention the properties and applications of geopolymer concrete.	**6**	**L2**	**CO4**
		OR			
Q.8	**a.**	Define biodegradable polymer. Explain the synthesis and applications of polylactic acid.	**7**	**L2**	**CO4**
	b.	Describe the synthesis, properties and applications of polyethylene.	**7**	**L2**	**CO4**
	c.	What are polymer composites? Mention the properties and application of FRP (Fiber Reinforced Polymer).	**6**	**L2**	**CO4**
		Module – 5			
Q.9	**a.**	Define the following terms with examples: (i) Phase (ii) Component (iii) Degree of freedom	**7**	**L2**	**CO5**
	b.	Illustrate the principle, instrumentation and working of potentiometric sensors.	**7**	**L2**	**CO5**
	c.	Explain the determination of pH of soil sample using pH sensors.	**6**	**L2**	**CO5**
		OR			
Q.10	**a.**	With the help of neat phase diagram, describe Lead-Silver system.	**7**	**L2**	**CO5**
	b.	Describe the instrumentation and application of conductometric sensors in the estimation of acid mixture.	**7**	**L2**	**CO5**
	c.	Describe the principle and instrumentation of potentiometric sensors.	**6**	**L2**	**CO5**

* * * * *

AY - AY - AY -