

Model Question Paper-I with effect from 2022

CBCS SCHEME

First/Second Semester B.E. Degree Examination _____

Chemistry for Mechanical Engineering & Allied Stream (BCHEM102/202)

TIME: 03 Hours

Max.Marks: 100

Note							
1: Answer 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							
					M	L	C
MODULE 1							
1	a	What are chemical fuels? Explain about the determination of calorific value of fuel using Bomb calorimeter.	7	L2	CO1		
	b	0.945g of a fuel on complete combustion in excess of oxygen increased temperature of water in a calorimeter from 13.25° C to 19.2° C. The mass of water in calorimeter was 1458 g. Calculate GCV if water equivalent of calorimeter is 144g.	7	L3	CO1		
	c	Explain construction, working of Lithium –ion battery along with its applications.	6	L2	CO1		
OR							
2	a	Explain the production of hydrogen by electrolysis method, and mention its advantages.	6	L2	CO1		
	b	Explain construction, working of photovoltaic cell along with its advantages.	7	L2	CO1		
	c	Explain construction, working of Methanol-oxygen fuel cell with acid electrolyte	7	L2	CO1		
MODULE 2							
3	a	Define metallic corrosion? Describe the electrochemical theory of corrosion taking iron as an example.	7	L2	CO2		
	b	Explain: (i) Differential metal corrosion & (ii) Water-line corrosion	6	L3	CO2		
	c	Describe galvanizing and mention its applications.	7	L2	CO2		
OR							
4	a	What is CPR? A thick brass sheet of area 400 inch ² is exposed to moist air. After 2 years of period, it was found to experience a weight loss 375 g due to corrosion. If the density of brass is 8.73 g/cm ³ . Calculate CPR in mpy and mmpy.	6	L3	CO2		
	b	What is metal finishing? Mention any five of its technological importance.	7	L2	CO2		
	c	Mention any four properties and applications of QLED	7	L2	CO2		
MODULE 3							
5	a	Explain the synthesis of Polyvinylchloride and mention its applications	7	L2	CO3		
	b	A polydisperse sample of polystyrene is prepared by mixing three monodisperse samples in the following proportions. 1g	6	L3	CO3		

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		of 10000 molecular weight, 2g of 50000 molecular weight and 2g of 100000 molecular weight. Determine number average and weight average molecular weight.			
	c	Explain the synthesis of Teflon and mention its applications	7	L2	CO3
OR					
6	a	Explain the synthesis of Polystyrene and mention its applications	6	L2	CO3
	b	Explain the Condensation method of polymerisation with an example	7	L3	CO3
	c	Describe properties and application of Lubricants	7	L2	CO3
MODULE 4					
7	a	Define phase, components & degree of freedom	7	L2	CO4
	b	Explain the principle, instrumentation and working of potentiometric sensor.	7	L2	CO4
	c	Explain the process of estimation of copper in industrial waste by using optical sensor	6	L3	CO4
OR					
8	a	Explain along with diagram Lead-silver two component system	7	L2	CO4
	b	Explain the principle, instrumentation and working of Glass electrode.	7	L2	CO4
	c	Explain the principle, instrumentation and working of colorimetry.	6	L2	CO4
MODULE 5					
9	a	Define Alloys. Explain the composition along with properties of Brass.	7	L2	CO5
	b	Explain the synthesis of Nanomaterials by Sol-gel method	7	L2	CO5
	c	Explain Size dependant properties of nanomaterials with respect to surface area, catalytic and thermal.	6	L2	CO5
OR					
10	a	Define Alloys. Explain the composition along with properties of AlNiCo.	7	L3	CO5
	b	Explain the chemical composition, properties and applications of perovskites.	6	L2	CO5
	c	Explain the properties and applications of carbon nanotubes and graphene	7	L2	CO5