

# CBCS SCHEME

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BCHEM102/202

**First/Second Semester B.E./B.Tech. Degree Supplementary Examination,  
June/July 2024**

## Applied Chemistry for ME 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.	Define Chemical fuel. Explain the classification of fuel with examples.	7	L1,2	CO1
	b.	Define GCV and NCV. Explain the determination of calorific values of a solid fuel using bomb calorimeter.	7	L3	CO1
	c.	The 0.85g of coal sample (carbon = 90% H <sub>2</sub> = 5% and ash = 5%) was subjected to combustion in a bomb calorimeter mass of water taken in the calorimeter was 2000g and the water equivalent of the calorimeter was 600g. The rise in temperature was found to be 3.5°C. Calculate the gross and net calorific values of the sample. (Latent heat of steam = 2.454kJ/g ; specific heat of water = 4.2kJ/kg °C)	6	L4	CO1
<b>OR</b>					
Q.2	a.	What is Fuel cell? Explain the construction and working of Methanol – Oxygen fuel cell.	7	L3	CO1
	b.	Explain the construction, working and application of PV cell.	6	L3	CO1
	c.	What are Green Fuels? Explain the production of hydrogen by electrolysis of water and mention its advantages.	7	L1,2	CO1
<b>Module – 2</b>					
Q.3	a.	Define Metallic Corrosion. Describe the electrochemical theory of corrosion taking Iron as an example.	7	L2	CO2
	b.	What is Anodizing? Explain the process of anodizing of Aluminium.	6	L2	CO2
	c.	What is CPR? A thick brass sheet of area 400 inch <sup>2</sup> is exposed to moist air. After 2 years of period, it was found to experience a weight loss 375g due to corrosion. If the density of brass is 8.73tg/cm <sup>3</sup> . Calculate CPR in mpy and mmpy.	7	L2	CO2
<b>OR</b>					
Q.4	a.	What is meant by metal finishing? Mention the technological importance of metal finishing.	6	L1	CO2
	b.	Define electrolessplating? Explain the electroless plating of Nickel.	7	L2	CO2
	c.	Explain the electroplating of chromium as hard and decorative.	7	L2	CO3



## Module – 3

Q.5	a.	Explain the synthesis, properties and application of CPVC.	7	L3	CO3
	b.	What is composite? Explain the properties and industrial application of carbon based reinforced composites.	7	L2	CO3
	c.	Explain the synthesis, properties and industrial application of PMMA.	6	L2	CO3

## OR

Q.6	a.	What are lubricants? Explain the properties and applications of lubricants.	6	L2	CO3
	b.	Explain the synthesis, properties and application polyester.	7	L2	CO3
	c.	In a polymer, 100 molecules have molecular mass $10^3$ g/mol, 250 molecules have molecular mass $10^4$ g/mol, and 300 molecules have molecular mass $10^5$ g/mol. Calculate the number average and weight average molecular mass of the polymer.	7	L2	CO3

## Module – 4

Q.7	a.	Define phase rule, explain the following terms with an example phase, components and degree of freedom.	7	L1	CO4
	b.	Explain the estimation of FAS potentiometrically using platinum and calomel electrode as potentiometric sensors.	7	L2	CO4
	c.	Explain the determination of pH of beverages using pH sensor glass electrode.	6	L3	CO4

## OR

Q.8	a.	Explain the lead – silver two components system along with phase diagram.	7	L2	CO2
	b.	Explain the estimation of copper present in a solution by using optical sensor method.	7	L2	CO4
	c.	Explain the determination of pH using glass electrode as pH sensing electrode.	6	L2	CO4

## Module – 5

Q.9	a.	Explain the synthesis of nonomaterial by co-precipitation method.	7	L2	CO5
	b.	Explain composition, properties and applications of stainless steel and Brass.	7	L2	CO5
	c.	Explain the following size dependent properties. i) Surface area ii) Catalytic iii) Thermal properties of nanomaterial.	6	L2	CO5

## OR

Q.10	a.	Explain the properties and application of Graphene.	7	L2	CO5
	b.	Explain the synthesis of Nano material by Sol-gel method.	6	L2	CO5
	c.	Explain the properties and applications of perovskities.	7	L2	CO5