

CBCS SCHEME

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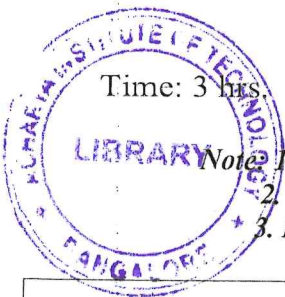
BCHEM102/202

First/Second Semester B.E./B.Tech. Degree Examination, June/July 2026 Applied Chemistry for ME Stream

Time: 3 hrs.

Max. Marks: 100

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



Module – 1			M	L	C
Q.1	a.	Define Calorific value. Explain principle , construction and working of bomb calorimeter to determine GCV and NCV of a solid fuel.	7	L2	CO1
	b.	What are green fuels? Explain the synthesis of biodiesel by transesterification. Write any four applications.	7	L2	CO1
	c.	Solar energy conversion is considered as a sustainable method for power generation. Apply the concept of energy conversion and highlight the construction , working and application of PV cells, with a neat labeled diagram.	6	L3	CO1
OR					
Q.2	a.	0.85g of coal sample (carbon 90% , H ₂ 5% and ash 5%) was subjected to combustion in a bomb calorimeter. Mass of water taken in the calorimeter was 2000 g and the water equivalent of calorimeter was 600 g. The rise in temperature was 3.5°C. Calculate the gross and net calorific value of the sample. (Given , specific heat of water = 4.187 kJ kg ⁻¹ /°C)	7	L3	CO1
	b.	Describe the construction and working of Lithium – ion battery and mention any two applications.	7	L2	CO1
	c.	Describe the construction and working of methanol oxygen fuel cell.	6	L2	CO1
Module – 2					
Q.3	a.	Rusting of iron is an electrochemical process, which is an example for atmospheric corrosion. Apply the concept of corrosion and discuss the theory and corrosion mechanism involved in rusting of iron.	7	L3	CO2
	b.	What is Stress Corrosion? Explain the process of stress corrosion taking caustic embrittlement as an example.	7	L2	CO2
	c.	What do you mean by metal finishing? Highlight any five technological importances.	6	L2	CO2
OR					

Q.4	a.	What is CPR? A thickness of alloy sheet of area 100 inch ² is exposed to air near the ocean. After one year period it was found to experience a weight loss of 35 g due to corrosion. If the density of alloy is 8.4 g/cm ³ , calculate CPR in mmpy and mpy.	7	L3	CO2
	b.	What is Electroplating? Explain electroplating of chromium as hard and decorative coatings.	7	L2	CO2
	c.	Explain the process of galvanization and its applications.	6	L2	CO2
Module – 3					
Q.5	a.	In a polymer sample of polystyrene is prepared by mixing three monodisperse samples in the following proportions. 1 g of 10,000 molecular weight, 2 g of 50,000 molecular weight and 2 g of 100,000 molecular weight. Determine number average and weight average molecular weight.	7	L3	CO3
	b.	Summarize the synthesis, properties and applications of PMMA.	7	L2	CO3
	c.	Explain metal matrix composite with an example. Explain any four properties and applications of metal matrix composites.	6	L2	CO3
OR					
Q.6	a.	Polymer sample is made up of 10 polymer molecules with molar mass of 1000 g/mol and 30 molecules with molar mass of 2000 g/mol. Calculate the number average and weight average of molar mass of polymer.	7	L3	CO3
	b.	Explain the synthesis, properties and application of poly vinyl chloride.	7	L2	CO3
	c.	What are lubricants? Explain any four properties and applications of lubricants.	6	L2	CO3
Module – 4					
Q.7	a.	Discuss the lead – silver two component system along with phase diagram.	7	L2	CO4
	b.	Explain the principle, instrumentation and applications of potentiometric titration.	7	L2	CO4
	c.	Describe the construction and working of pH sensor electrode.	6	L2	CO4
OR					
Q.8	a.	Define Phase Rule. Explain the following terms with an example phase, components and degree of freedom.	7	L2	CO4
	b.	Explain the instrumentation and application of colorimetric sensors in the estimation of copper.	7	L2	CO4
	c.	Explain the determination of pH of beverages using glass electrode.	6	L2	CO4

Module – 5

Q.9	a.	Define an Alloy. Explain the composition , properties and application of stainless steel.	7	L2	CO5
	b.	What are nano materials? Explain any three size dependent properties of nano materials.	7	L2	CO5
	c.	Explain the properties and applications of carbon nanotubes.	6	L2	CO5
OR					
Q.10	a.	What is Alnico? Explain composition , properties and applications of Alnico.	7	L2	CO5
	b.	What are Perovskites? Mention any four properties and applications of perovskites.	7	L2	CO5
	c.	Explain the synthesis of nano materials by sol – gel method.	6	L2	CO5

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