

# MAKE-UP EXAM

BCHEM102/202



First/Second Semester B.E./B.Tech. Degree Examination, Nov./Dec.2023

## 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 calorific value. Explain the determination of calorific value of a solid fuel using bomb calorimeter.	7	L1, L2	CO1
	b.	Explain the synthesis and advantages of bio diesel.	6	L2	CO1
	c.	Define photo voltaic cells. Explain the construction and working of PV cell.	7	L3	CO1
OR					
Q.2	a.	On burning $1.15 \times 10^{-3}$ kg of coal in a calorimeter the temperature of 3.5kg of water increased from 26.5°C to 28.5°C. The water equivalent is 0.325kg and specific heat of water is 4.187kJ/kg/°C. Latent heat of steam is 2458kJ/kg. If the fuel contains 4% of hydrogen. Calculate GCV and NCV.	7	L4	CO1
	b.	Explain the production of hydrogen by electrolysis method and mention its advantages.	6	L3	CO1
	c.	Explain the construction and working of methanol oxygen fuel cell.	7	L3	CO1
Module - 2					
Q.3	a.	Define metallic corrosion. Describe the electrochemical theory of corrosion taking iron as an example.	7	L2	CO2
	b.	Explain: i) Pitting corrosion and ii) Water-line corrosion.	6	L2	CO2
	c.	Calculate the CPR in mpy and mmpy for a steel of area 100 inch <sup>2</sup> which experience a weight loss of 485g due to corrosion after 1 year. Density of steel is 7.9g/cc.	7	L2	CO2
OR					
Q.4	a.	Describe galvanizing and mention its applications.	6	L3	CO2
	b.	Define electroplating. Explain electroplating chromium as hard coatings.	7	L2	CO2
	c.	Define electroless plating, explain electroless plating of nickel.	7	L2	CO3

## Module – 3

Q.5	a.	Explain the synthesis, properties and applications of CPVC.	7	L2	CO3
	b.	In a polymer 100 molecules have molecular mass $10^3$ g/mol, 250 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	L3	CO3
	c.	Explain the synthesis, properties and applications of Teflon.	6	L3	CO3

## OR

Q.6	a.	Explain the synthesis of polystyrene and mention its applications.	6	L3	CO3
	b.	Explain the methods of polymerization.	7	L3	CO3
	c.	What are lubricants? Explain the properties and applications of lubricants.	7	L2	CO3

## Module – 4

Q.7	a.	Explain lead-silver component system along with diagram.	7	L2	CO4
	b.	Explain the determination of pH of leverages using pH sensor glass electrode.	6	L2	CO4
	c.	Explain the estimation of copper present in a solution by optical sensor method.	7	L2	CO4

## OR

Q.8	a.	Explain the estimation of FAS potentiometrically using potentiometric sensors.	7	L2	CO4
	b.	Explain the various terminology involved in phase rule.	6	L2	CO4
	c.	Explain the instrumentation and working of glass electrode.	7	L2	CO4

## Module – 5

Q.9	a.	Define alloys. Explain the composition, properties and applications of Alnico.	7	L2	CO5
	b.	Explain the synthesis of Nanomaterials by sol-gel method.	7	L2	CO5
	c.	Explain the following size dependent properties of nano materials i) Surface area ii) Catalytic iii) Thermal properties.	6	L2	CO5

## OR

Q.10	a.	Define alloys. Explain the composition, properties and applications of stainless steel.	7	L2	CO5
	b.	Explain the synthesis of nanomaterials by co-precipitation method.	7	L2	CO5
	c.	Explain the properties and applications of carbon nano tubes.	6	L2	CO5

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