Government College of Engineering, Amravati
(An Autonomous Institute of Government of Maharashtra)

First Year B. Tech. (All Branches)
Summer – 2017

Course Code: SHU 202

Course Name: Applied Chemistry

Time: 2 ½ Hrs.   **Max. Marks: 60**

Instructions to Candidate
1) All questions are compulsory.
2) Assume suitable data wherever necessary and clearly state the assumptions made.
3) Diagrams/sketches should be given wherever necessary.
4) Use of logarithmic table, drawing instruments and non-programmable calculators is permitted.
5) Figures to the right indicate full marks.

Q.1. Explain the following.   (Each for 3 Marks)
   a) Break point chlorination.
   b) Pitting Corrosion.
   c) Fire clay Refractories **OR** Silica Refractories.
   d) Laminar Composites **OR** Fiber glass Reinforced Composites.

Q.2. Answer the following questions.   (Each for 4 Marks)
   a) Define Viscosity Index. How can be it determined?
   b) Explain the principle, Instrumentation and applications of Atomic Absorption Spectrometry **OR** Ultraviolet Spectroscopy.
   c) Explain determination of Calorific value by Bomb Calorimeter.

C-

Answer the following questions. (Each for 3 Marks)

a) Give the preparation, properties and applications of Teflon OR Silicon Rubber.

b) Define Lubrication. Explain the Mechanism of Hydrodynamic Lubrication.

c) Define Corrosion? Explain Anodic Protection Method.

d) What are Explosives? What are the precautions taken for the Storage of Explosives?

e) Explain Zeolite Method for water softening.

Q. 4. Answer the following questions. (Each for 4 Marks)

a) Give the selection criteria of lubricants for Cutting tools and Gears.

b) What are Boiler Troubles? Explain Scale with its Causes and Disadvantages.

c) Explain the working of IC engine with knocking and Antiknocking properties.

d) Differentiate between Thermosetting and Thermoplastic Polymers.

Q.5. Solve **any one** of the problem. (5 Marks)

Water on analysis gave the following results. $Ca(HCO_3)_2 = 40.5$ ppm, $MgCl_2 = 71.25$ ppm, $Mg(HCO_3)_2 = 58.4$ ppm, $MgSO_4 = 168$ ppm, $CaCl_2 = 44.4$ ppm, Turbidity = 11 ppm. Calculate the Amount of lime and Soda required to soften 1 million liters of water using 24.6 ppm Sodium aluminate as coagulant.

OR

A water sample, on analysis, gave the following constituents in grains per gallon. $MgCl_2 = 9.5$, $CaSO_4 = 3.4$, $CaCO_3 = 5$, $Mg(HCO_3)_2 = 7.3$, $MgSO_4 = 6$ And $SiO_2 = 2.4$. Calculate the cost of chemicals required for softening 20,000 gallons of water if the purities of Lime and soda are 95% and 90% respectively. The costs per 100 pounds each of lime and soda are Rs. 490/- and Rs. 960/- Respectively.

Government College of Engineering, Amravati
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Second Semester B. Tech.

Summer – 2013

Course Code: SHU202

Course Name: Applied Chemistry

Time: 2 Hrs. 30 Min.   Max. Marks: 60

Instructions to Candidate
1) All questions are compulsory & carry equal marks.
2) Assume suitable data wherever necessary and clearly state the assumptions made.
3) Diagrams/sketches should be given wherever necessary.
4) Use of Refrigerant property chart, Mollier chart, steam table, drawing instruments and calculators is permitted.
5) Figures to the right indicate full marks.

1.	a)	Difference between hot lime –soda process and Zeolite process with respect to principle involved, advantage and limitation.	2
	(b)	What do you mean by caustic embrittlement?	2
		OR	
	b)	What is hardness of water what are types of hardness? Which ion is responsible for hardness?	2
	c)	A water sample has the analytical report as under	4

		MgCO3-84 mg/lit	4
		CaCO3-40 mg/lit	
		CaCl2-55.5 mg/lit	
		Mg(NO3)2-37.0 mg/lit	
		KCl-20 mg/lit	
		Calculate the amount of lime (86% pure) and Soda (83% pure0 needed for the treatment of 80,000 liters of water.	
	d)	Short note (any two) 1) Break point Chlorination 2) Ion exchange method 3) Phosphate conditioning process.	4
Q.2	a)	Explain the mechanism of Dry corrosion.	4
		OR	
	a)	Explain design and selection of material for corrosion control.	4
	b)	What is significance of Ultimate analysis of Coal?	3
	c)	What is Cracking? Discuss with well-labelled diagram a fluid bed complete cracking?	3
	d)	Explain why petrol can not be used in Diesel engines and vice versa.	2
Q.3	a)	What is composite material? How can they be used as Engineering material? Give some examples.	3

		examples.	
	b)	Discuss the preparation, properties and uses of Bakelite.	4
	c)	Give the difference between Thermosetting polymer and Thermoplastic polymer.	3
	d)	Teflon is addition polymer but it behave somewhat like thermosetting polymer Give reason.	2
Q.4	a)	Explain Boundary and Extreme pressure lubrication.	4
	b)	What is significance of Flash point and Fire point of lubricating oil?	3
	c)	Give an account of the preparation, properties and uses of the Dolomite.	3
	d)	What is nano material? Give four application of nano material.	2
		OR	
	d)	What is Viscosity and viscosity index?	2
Q 5		Solve any three (4 marks each)	
	a)	Give the priciple, Instrumentation and application of AAS OR Flame photometry.	
	b)	Give the prparation, properties and uses of PVC.	

	c)	PVC. What is corrosion? Explain in brief Pitting corrosion.
	d)	What are Boiler troubles? Explain in brief about priming and foaming.

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First Year B. Tech. (All Branches)

Winter – 2016

Course Code: SHU202   Course Name: Applied Chemistry

Time: 2 Hrs. 30 min.   Max. Marks: 60

Instructions to Candidate

1) All questions are compulsory.
2) Assume suitable data wherever necessary and clearly state the assumptions made.
3) Use of non-programmable calculators is permitted.
4) Figures to the right indicate full marks.

1 (a) A water sample using $FeSO_4.7H_2O$ as a coagulant at the rate of 139 ppm, gave the following results on analysis: Ca^{2+}-160 ppm, Mg^{2+}-72 ppm, CO_2-88 ppm, HCO_3^- -488 ppm. Calculate the amount of lime and soda required to soften 1,00,000 liters of water.   04

(b) What is cracking and for what it is used? Describe the working of Fluid Bed Catalytic Cracking.   04

(c) Differentiate between thermosetting and thermoplastic polymers   04

OR

(d) What are the requisites for good refractory material?   04

2   Write notes on the following (any four):

(a) Fiber reinforced composite   02
(b) Dolomite   02
(c) Zeolite process   02

	(d)	Cathodic protection	02
	(e)	Pitting corrosion	02
	(f)	Sandwich panels	02

3 (a)   What are explosives? Give its classification with   **04** examples.

OR

What are rocket propellants? Give the **04** characteristics of good propellant

   (b)   What is meant by lubrication? Discuss the   **04** mechanism of thin film lubrication.

   (c)   How does knocking occur in IC engine? Explain   **04** the nature and molecular structure of the constituents in petrol and diesel of fuel.

4 (a)   A sample of coal contained C-81%, H_2 – 4%, O_2 –   **04** 2% and N_2 – 1%,Estimate the minimum quantity of air required for complete combustion of 1 kg of the sample. Find the composition of dry flue gas volume if 40% excess air is supplied.

   (b)   Give the preparation, prosperities and uses of   **06**
         (i) Silicon polymer
         (ii) Nbrile rubber

   (c)   What are boiler troubles? Explain scale with its   **04** advantages and causes.

5 (a)   Discuss the principle, instrumentation and   **05** applications of flame photometry OR UV-visible spectrometry.

   (b)   Give the importance of design and material   **05** selection to minimize corrosion.