Code No: R19BS1210 **R19** SET - 1

I B. Tech II Semester Regular Examinations, December - 2020
ENGINEERING CHEMISTRY
(Com. to CE, ME, Agri E**)**

Time: 3 hours Max. Marks: 75

Answer any five Questions one Question from Each Unit
All Questions Carry Equal Marks

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1.	a)	Discuss emulsion polymerization and explain the stress-strain graph about the mechanical properties of polymers.	(8M)
	b)	Explain the drawbacks of natural rubber. Discuss vulcanization.	(7M)
		Or	
2.	a)	Differentiate rigid and plasticized PVC. Explain the preparation and applications of PVC.	(8M)
	b)	Discuss glass and aramid fiber reinforced plastics.	(7M)
3.	a)	Discuss (i) Ni-metal hydride cell (ii) lithium ion battery	(8M)
	b)	Explain the environmental factors affecting the rate of corrosion.	(7M)
		Or	
4.	a)	Write a note on special paints.	(8M)
	b)	Explain electronation and de-electronation in an electrode potential.	(7M)
5.	a)	Explain the refractoriness and refractory under load.	(8M)
	b)	Discuss sol-gel method for synthesis of nanomaterials.	(7M)
		Or	
6.	a)	Explain differential scanning calorimetry (DSC) and its applications.	(8M)
	b)	Discuss the setting and hardening of cement.	(7M)
7.	a)	Explain the estimation of carbon, hydrogen, nitrogen and sulphur present in coal and write its significance.	(8M)
	b)	Write notes on octane and cetane number.	(7M)
		Or	
8.	a)	Explain Thermal cracking. Give reasons why catalytic cracking better than thermal cracking?	(8M)
	b)	Discuss with a neat labeled diagram Fischer Tropsch method.	(7M)
9.	a)	Describe the process involved in treatment of industrial waste water.	(8M)
	b)	Define hardness and its types. How can it be removed? Calculate the hardness of water containing Mg $(HCO)_3$ = 36.5 ppm, $MgCl_2$ = 19.0 ppm, $CaCO_3$ = 40 ppm, $CaCl_2$ = 44.4 ppm.	(7M)
		Or	

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10. a) Describe ion-exchange process for softening of hard water. (8M)

    b) Explain priming, foaming and remedies to minimize them. (7M)

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Code No: R19BS1210 **R19** SET - 2

I B. Tech II Semester Regular Examinations, December - 2020
ENGINEERING CHEMISTRY
(Com. to CE, ME, Agri E**)**

Time: 3 hours Max. Marks: 75

Answer any five Questions one Question from Each Unit
All Questions Carry Equal Marks

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1.	a)	Explain any two methods which can be used for preparation of thermoplastics.	(8M)
	b)	Differentiate synthetic and natural rubber? Give the preparation and uses of two synthetic rubbers.	(7M)
		Or	
2.	a)	Explain biomedical polymers and their applications.	(8M)
	b)	Describe p-type and n-type of conducting polymers.	(7M)
3.	a)	Explain (i) differential aeration (ii) stress corrosion	(8M)
	b)	Discuss the working of H_2-O_2 and methanol-oxygen fuel cell.	(7M)
		Or	
4.	a)	Explain different methods involved in surface preparation of the base metal.	(8M)
	b)	Discuss the working of glass electrode.	(7M)
5.	a)	Discuss the manufacture of Portland cement.	(8M)
	b)	Explain how nanomaterials can be characterized.	(7M)
		Or	
6.	a)	Outline (i) cloud and pour point (ii) aniline point (iii) oiliness (iv) flash and fire point.	(8M)
	b)	Explain the preparation of fullerenes and it's applications.	(7M)
7.	a)	Describe fixed bed catalytic cracking with a neat sketch diagram.	(8M)
	b)	Discuss the importance of ethanol, LPG, CNG as alternative fuels.	(7M)
		Or	
8.	a)	Describe flue gas analysis by Orsat apparatus.	(8M)
	b)	Discuss the various methods involved during refining of petroleum.	(7M)
9.	a)	Explain the complexometric method for determination of hardness.	(8M)
	b)	Differentiate between zeolite process and ion-exchange process.	(7M)
		Or	
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10. a) Discuss the disadvantages of using hard water in boilers and domestic use. (8M)

    b) Write notes on boiler corrosion. (7M)

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Code No: R19BS1210 **R19** SET - 3

I B. Tech II Semester Regular Examinations, December - 2020
ENGINEERING CHEMISTRY
(Com. to CE, ME, Agri E**)**

Time: 3 hours Max. Marks: 75

Answer any five Questions one Question from Each Unit
All Questions Carry Equal Marks

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1.	a)	Discuss on the various biopolymers.	(8M)
	b)	Explain how e-plastic waste can be recycled.	(7M)
		Or	
2.	a)	Explain the moulding technique involved in preparation of bottles. (ii) Discuss the properties of carbon fiber reinforced plastics.	(8M)
	b)	Briefly discuss the preparation, applications and properties of polyurethanes.	(7M)
3.	a)	Explain the nature of metal affecting the rate of corrosion.	(8M)
	b)	Discuss the uses of electrochemical series.	(7M)
		Or	
4.	a)	Differentiate (i) anodic and cathodic coatings (ii) electro and electroless plating	(8M)
	b)	Explain construction and working of concentration cell.	(7M)
5.	a)	Write the classification of refractories with examples.	(8M)
	b)	Discuss the preparation of carbon nanotubes.	(7M)
		Or	
6.	a)	Explain about (i) thermal spalling (ii) extreme pressure lubrication (iii) silica and alumina ratio.	(8M)
	b)	Discuss differential thermal analysis (DTA) and its applications.	(7M)
7.	a)	Describe proximate analysis of coal and its significance.	(8M)
	b)	Discuss calorific value. Calculate the HCV and LCV of the coal having the following composition C = 71%, H = 9 %, O = 4%, N = 9 %, S = 5% and remaining ash.	(7M)
		Or	
8.	a)	Explain fluid bed catalytic cracking with a labeled flow diagram.	(8M)
	b)	Discuss Natural gas and Bio-diesel.	(7M)
9.	a)	Explain zeolite processs for softening of hard water with a neat sketch.	(8M)
	b)	List out the causes for scale formation, and how they can be minimized.	(7M)
		Or	
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10. a) Discuss the various internal treatments methods used for purification of hard water. (8M)

    b) Write notes on break-point chlorination and reverse osmosis. (7M)

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Code No: R19BS1210 **R19** SET - 4

I B. Tech II Semester Regular Examinations, December - 2020
ENGINEERING CHEMISTRY
(Com. to CE, ME, Agri E**)**

Time: 3 hours Max. Marks: 75

Answer any five Questions one Question from Each Unit
All Questions Carry Equal Marks

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1.	a)	Discuss the role of plasticizers, resins, fillers, stabilizers in compounding of plastics.	(8M)
	b)	State the importance of biomedical polymers and give examples.	(7M)
		Or	
2.	a)	Explain the preparation, applications and properties of thiokol and bakelite.	(8M)
	b)	Discuss (i) how polymers are prepared by suspension polymerization (ii) mention the advantages of biodegradable polymers.	(7M)
3.	a)	Discuss the standard hydrogen electrode and calomel electrode.	(8M)
	b)	Explain how proper design helps in controlling corrosion.	(7M)
		Or	
4.	a)	Discuss any one mechanism of corrosion.	(8M)
	b)	Explain (i) Zn-air batteries (ii) dry cell	(7M)
5.	a)	Explain thin-film and thick-film lubrication methods.	(8M)
	b)	Discuss thermogravimetric analysis (TGA) and its applications.	(7M)
		Or	
6.	a)	Explain the reasons for (i) failure of refactory (ii) deterioration of cement concrete.	(8M)
	b)	Explain the types of nanotubes and explain the applications of nanotubes.	(7M)
7.	a)	Discuss Bergius method for synthesis of petroleum.	(8M)
	b)	Explain how moisture, volatile matter and ash can be determined and write their significance.	(7M)
		Or	
8.	a)	Write notes on petrol knocking and diesel knocking. Mention the anti-knocking agents added to reduce knocking in both.	(8M)
	b)	Write notes on rocket fuels.	(7M)
9.	a)	Discuss how caustic embrittlement is formed in boilers and the methods to reduced it.	(8M)
	b)	Write the specifications or essential requirements of Portable water.	(7M)
		Or	

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10. a) Describe the steps involved in purification of municipal water. (8M)

b) Explain electro dialysis method for desalination of brackish water. (7M)

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