Code No: R161105 **R16** SET - 1

I B. Tech. I Semester Regular/ Supplementary Examinations, Nov/Dec.-2017
ENGINEERING CHEMISTRY
(Com. to CE,ME,Aero E,Bio-Tech,Chem E, Min E,Metal E,PE,PChem E,Auto E)
Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

~~~~~~

PART –A

1. a) What are co-polymers? Give examples. (2M)
   b) Write the significance of measurement of moisture and volatile matter in coal. (2M)
   c) Discuss differential aeration corrosion. (2M)
   d) What are carbon nanotubes? Mention the types of CNTs. (2M)
   e) Why hot lime soda process is better than cold lime soda process. (2M)
   f) Discuss caustic embrittlement. (2M)
   g) Define refractory. Give examples. (2M)

PART -B

2. a) Explain any two methods for fabrication of plastics. (8M)
   b) What are conducting polymers? Discuss p-type conducting polymers. (6M)

3. a) Explain analysis of flue gases by Orsat apparatus. (8M)
   b) Define HCV and LCV. Calculate the gross and net calorific value of coal having the following compositions: C=86%, S=1%, H=7%, N=2% and remaining ash. Latent heat of steam -587 cal/g. (6M)

4. a) Discuss determination of single electrode potential and uses of electrochemical series. (8M)
   b) What is corrosion? Explain pitting corrosion. (6M)

5. a) What are fullerenes? Mention three properties and applications. (6M)
   b) What are superconductors? Explain Type-I and Type-II superconductors. (8M)

6. a) Explain (i) breakpoint chlorination (ii) electrodialysis (8M)
   b) What is hardness? Explain determination of hardness of water by EDTA method. (6M)

7. a) Explain setting and hardening of cement. (6M)
   b) Write short notes on (i) Thermal insulators (ii) H_2-O_2 fuel cell (8M)

|''|'''||''||'''||||
~~~~~~

Code No: R161105 **R16** SET - 2

I B. Tech. I Semester Regular/ Supplementary Examinations, Nov/Dec.-2017
ENGINEERING CHEMISTRY
(Com. to CE,ME,Aero E,Bio-Tech,Chem E, Min E,Metal E,PE,PChem E,Auto E)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

~~~~~~

PART –A

1. a) What kind of polymers act as conducting polymers. (2M)
   b) Discuss the importance of addition of anti-knocking agent to fuels. (2M)
   c) What is passivity of metals? Give examples (2M)
   d) Write the differences between Type –I and Type-II superconductors. (2M)
   e) What is meant by disinfection? Give example. (2M)
   f) Discuss the failure of refractories. (2M)
   g) Write the applications of thermal insulators? (2M)

PART -B

2. a) What are natural rubbers? How compounding improve their properties. (6M)
   b) Explain preparation and applications of Bakelite and Teflon. (8M)

3. a) Write notes on (i) power alcohol (ii) bio-diesel (6M)
   b) Explain any one method of synthesis of petrol? Why synthetic petrol has high octane rating then refined petrol. (8M)

4. a) Discuss the working of concentration cell. Write the differences between galvanic cell and concentration cell. (8M)
   b) Explain (i) electroplating (ii) electroless plating. 6M)

5. a) What are nanomaterials? Explain the preparation of nanoparticles by sol-gel method. (6M)
   b) What is green synthesis? Explain any two green synthesis methods. (8M)

6. a) Explain softening of hard water by hot lime soda process. Calculate the quantity of lime and soda required for softening of 15000 L of water which is analysed as follows: temporary hardness = 25 ppm, permanent hardness = 20 ppm, permanent Mg hardness = 15 ppm. (8M)
   b) Explain any one method for separation of salts from salt water. (6M)

7. a) Discuss working principle involved in H_2-O_2 fuel cells and mention its advantages. (6M)
   b) Write notes on classification of refractories and discuss their properties. (8M)
~~~~~~

Code No: R161105 **R16** SET - 3

I B. Tech. I Semester Regular/ Supplementary Examinations, Nov/Dec.-2017
ENGINEERING CHEMISTRY
(Com. to CE,ME,Aero E,Bio-Tech,Chem E, Min E,Metal E,PE,PChem E,Auto E)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

~~~~~~

PART –A

1.	a)	Why Teflon is chemically inert compound than PVC.	(2M)
	b)	When is petrol considered as power alcohol?	(2M)
	c)	What is the role of salt bridge in galvanic cells?	(2M)
	d)	Discuss the effect of temperature and humidity on rate of corrosion.	(2M)
	e)	What is meant by R_4M_4?	(2M)
	f)	Write the limitations of zeolite process.	(2M)
	g)	Write the advantages of fuel cells.	(2M)

PART –B

2.	a)	What is compounding. Discuss compounding of plastics.	(6M)
	b)	Explain preparation applications of BUNA-N and polyurethane.	(8M)
3.	a)	What is meant by calorific value? Explain determination of calorific value of solid fuel.	(6M)
	b)	Explain refining of petroleum.	(8M)
4.	a)	Write factors affecting corrosion.	(8M)
	b)	Explain working of (i) calomel electrode (ii) Ni-Cd cell	6M)
5.	a)	Define liquid crystals? Mention their types and applications.	(6M)
	b)	Write any two methods of preparation of CNTs.	(8M)
6.	a)	Discuss the types of hardness. Calculate the temporary and permanent hardness of a sample of water, which on analysis is found to contain: $Ca(HCO_3)_2$ = 16.2 mg/L, $Mg(HCO_3)_2$ = 7.3 mg/L, $MgCl_2$ = 19 mg/L, $CaSO_4$ = 27.2 mg/L	(8M)
	b)	Explain softening of hard water by ion-exchange process. How the soft water obtained by this process is better than other methods.	(6M)
7.	a)	Define lubricant. Discuss its functions and mechanisms of thin film lubrication.	(6M)
	b)	Explain manufacturing of cement and its constituents.	(8M)

|''|'''||''||'''||||
~~~~~~

Code No: R161105 **R16** SET - 4

I B. Tech. I Semester Regular/ Supplementary Examinations, Nov/Dec.-2017
ENGINEERING CHEMISTRY
(Com. to CE,ME,Aero E,Bio-Tech,Chem E, Min E,Metal E,PE,PChem E,Auto E)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

~~~~~~

PART –A

1.	a)	Discuss the significance of stereoregular polymers.	(2M)
	b)	What is the difference between petrol and diesel in improving antiknockin?	(2M)
	c)	Write the differences between hydrogen and calomel electrode.	(2M)
	d)	What kind of oxide films formed on metal surface to protect the metal from further corrosion.	(2M)
	e)	Discuss briefly about types of liquid crystals.	(2M)
	f)	How are scales formed in boilers? How to minimize its formation.	(2M)
	g)	What is fire and flash points of lubricants? Mention their importance.	(2M)

PART –B

2.	a)	Discuss the mechanism of free radical addition polymerization.	(6M)
	b)	Write notes on (i) biodegradable polymers (ii) fiber reinforced plastics (with examples).	(8M)
3.	a)	What is cracking? Explain moving bed catalytic cracking process.	(6M)
	b)	Explain proximate analysis of coal and discuss the significance of result.	(8M)
4.	a)	What are secondary batteries? Explain working of zinc air cells. How it is different compared to Ni-Cd cells.	(8M)
	b)	What is corrosion? Explain cathodic metallic coating.	6M)
5.	a)	Discuss the importance of green principles.	(6M)
	b)	What are CNTs? Discuss the types and any one method of synthesis of CNTs.	(8M)
6.	a)	What are boiler troubles? Explain the formation of scale and sludge particles and how to remove them.	(8M)
	b)	Calculate the quantity of lime and soda required to soften 25000 L of water containing the following salts: $CaCO_3$ = 20 mg/L, $MgCO_3$ =8.4mg/L, $CaCl_2$=22.2mg/L, $MgSO_4$= 12mg/L, SiO_2 = 2.2 mg/L assuming purity of lime as 90% and soda as 95%.	(6M)
7.	a)	Discuss (i) function of lubricants (ii) failures of refractories	(6M)
	b)	Write notes on (i) CH_3OH-O_2 fuel cell (ii) thermal insulators	(8M)

|''|'''||''||'''||||
~~~~~~