

I B. Tech I Semester Supplementary Examinations, May - 2018
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

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

1. a) What is meant by compounding? (2M)
- b) What is the difference of synthetic petrol and cracked petrol? (2M)
- c) Write the drawbacks of dry cell. (2M)
- d) Write the importance of TEM in characterization of nanoparticles. (2M)
- e) Explain the cause of caustic embrittlement in water. (2M)
- f) What are the constituents of cement? (2M)
- g) How is biodiesel prepared? (2M)

PART -B

2. a) Define addition polymerization. Explain free radical mechanism of addition polymerization. (8M)
- b) Discuss any two techniques for fabrication of plastics. (6M)
3. a) Explain Bergius process for preparation of synthetic petrol. (6M)
- b) Explain Orsat process for flue gas analysis. (8M)
4. a) What are standard electrodes? Explain the working of standard electrode by taking an example. (8M)
- b) Differentiate anodic and cathodic coatings. (6M)
5. a) Explain sol-gel method in preparation of nanomaterials. (8M)
- b) Discuss the applications of superconductors. (6M)
6. a) Explain break point chlorination. (6M)
- b) Explain electro dialysis method for purification of brackish water. (8M)
7. a) Discuss any two mechanisms of lubricant. (8M)
- b) What are insulators? Explain thermal insulators. (6M)

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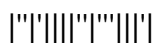
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PART -A

1. a) Give reason why vulcanization is required for natural rubber. (2M)
- b) Define higher calorific value. (2M)
- c) What are the limitations of standard hydrogen electrode? (2M)
- d) What are nematic liquid crystals? (2M)
- e) What is hardness? Mention its types and units. (2M)
- f) What are refractories? (2M)
- g) Define cloud and pour point. (2M)

PART -B

2. a) Explain conducting polymers. (7M)
- b) Explain the advantages and limitations of plastics. (7M)
3. a) Explain fractional distillation of petroleum with a neat sketch. (7M)
- b) What is meant by knocking? Distinguish petrol knocking and diesel knocking. (7M)
4. a) Write notes on electroplating and tinning. (7M)
- b) Explain single electrode potential. (7M)
5. a) Discuss the characteristics and applications of superconductors. (7M)
- b) What are carbon nanotubes? Discuss single walled and multiwalled nanotubes. (7M)
6. a) Explain ion-exchange process for softening of hard water. (7M)
- b) Discuss about (7M)
 - (i) Reverse osmosis
 - (ii) Breakpoint chlorination
7. a) Explain setting and hardening of cement. (7M)
- b) Discuss hydrogen-oxygen fuel cells. (7M)



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PART -A

1. a) How is Teflon prepared? (2M)
- b) Write the characteristics of rocket fuels. (2M)
- c) Explain the effect of temperature on corrosion. (2M)
- d) Write any four principles of green chemistry. (2M)
- e) What are scales and sludges? (2M)
- f) Explain the effect of sulphates on cement. (2M)
- g) Which of the following metals provide cathodic protection to iron: Al, Cu, Zn, Cr, and Ni? State the reason. (2M)

PART -B

2. a) Discuss the preparation and applications of polyurethanes. (7M)
- b) Explain suspension and emulsion polymerization. (7M)
3. a) Explain Orsat analysis of flue gases. (7M)
- b) Discuss moving bed catalytic cracking method for manufacture of gasoline. (7M)
4. a) Discuss bimetallic and differential aeration corrosion. (7M)
- b) Discuss electro chemical series and uses of this series. (7M)
5. a) Explain the characterization methods of nanomaterials. (7M)
- b) Write the applications of liquid crystals. (7M)
6. a) Discuss zeolite process for softening of hard water. (7M)
- b) A water sample on analysis contains 10 mg/L $\text{Ca}(\text{HCO}_3)_2$, 25 mg/L $\text{Mg}(\text{HCO}_3)_2$, 12 mg/L CaSO_4 , 15 mg/L MgSO_4 . Calculate temporary, permanent and total hardness of water. (7M)
7. a) What are the characteristics of refractory? Discuss the failure of refractories. (7M)
- b) Define the following terms: (7M)
 - (i) Flash and fire point
 - (ii) Saponification value
 - (iii) Oiliness



Code No: R161105

R16

SET - 3

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3. Answer any **FOUR** Questions from **Part-B**

PART -A

1. a) Explain the need for the use of biodegradable polymers. Give examples. (2M)
- b) Explain the role of antiknocking agents in engines. Give examples. (2M)
- c) Define electroplating. (2M)
- d) What are type -I superconductors? (2M)
- e) Explain why concentration of hardness of water is expressed in terms of calcium carbonate (CaCO₃) equivalence. (2M)
- f) What is meant by aniline point? (2M)
- g) What is the function of gypsum in cement? (2M)

PART -B

2. a) Explain any two moulding techniques of plastics. (7M)
- b) Discuss the preparation, applications of Thiokol. (7M)
3. a) Explain with a neat sketch the working of bomb calorimeter. (7M)
- b) Write notes (7M)
 - (i) Biodiesel
 - (ii) Natural gas.
4. a) Explain the factors affecting corrosion based on nature of metal. (7M)
- b) Explain about (7M)
 - (i) Galvanic cell
 - (ii) Zinc-air batteries
5. a) Explain supercritical method of green synthesis. (7M)
- b) Discuss the applications of carbon nanotubes. (7M)
6. a) Explain priming and foaming. How can it be reduced? (5M)
- b) Discuss internal treatment methods for purification of water. (9M)
7. a) Explain refractoriness under load and refractoriness. (7M)
- b) Discuss thermal insulators and their applications. (7M)



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PART -A

1. a) What is the role of stabilizers in compounding of rubber? (2M)
- b) What is power alcohol? (2M)
- c) Explain water line corrosion. (2M)
- d) How are fullerenes prepared? (2M)
- e) What is meant by phosphate conditioning? (2M)
- f) What are acidic and basic refractories? Give examples (2M)
- g) Explain why small anodic area causes intense corrosion. (2M)

PART -B

2. a) Discuss the physical and mechanical properties of polymers. (7M)
- b) Write the engineering applications of plastics. (7M)
3. a) What are fuels? Discuss the classification of fuels with examples for each. (7M)
- b) Explain ultimate analysis of coal. (7M)
4. a) Distinguish anodic and cathodic coatings. (7M)
- b) Explain reversible and irreversible cells with examples. (7M)
5. a) Discuss the aqueous phase method of green synthesis. (7M)
- b) Explain the principles of green chemistry. (7M)
6. a) What are boiler troubles? Explain boiler corrosion. How can it be minimized? (7M)
- b) Explain how hardness and alkalinity can be determined. (7M)
7. a) Explain wet process for manufacture of cement. (7M)
- b) Explain the mechanism of fluid lubrication. (7M)

