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Question Paper Code : 27181

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2015.

Second Semester

Civil Engineering

CY 6251 — ENGINEERING CHEMISTRY — II

(Common to all Branches except Marine Engineering)

(Regulations 2013)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Mention any two disadvantages of formation of deposits in steam boilers.
2. What is caustic embrittlement?
3. Write the chemical reaction that takes place in a galvanic cell.
4. What is chemical corrosion?
5. Write all the nuclear fission reactions of ${}_{92}\text{U}^{236}$.
6. Write how wind energy is generated.
7. How are abrasives classified?
8. What is white cement?
9. What is calorific value of coal?
10. What is producer gas and water gas?

PART B — (5 × 16 = 80 marks)

11. (a) (i) What are the requirements of boiler feed water? (6)
 (ii) Draw a suitable diagram and describe the ion exchange process for the softening of hard water. (10)
- Or
- (b) (i) Write a brief note on priming and foaming. (8)
 (ii) How can the boiler feed water be purified by calgon and phosphate conditioning? (8)
12. (a) (i) What is electrode potential? Discuss the cause of electrode potential. (8)
 (ii) Derive the Nernst equation for single electrode potential. (8)
- Or
- (b) (i) Write in detail about the constituents of paint. (10)
 (ii) Discuss in detail about the electroplating of copper. (6)
13. (a) (i) Describe the nuclear fusion reaction. (8)
 (ii) Describe the functioning of a light water nuclear reactor using a suitable diagram. (8)
- Or
- (b) (i) Write in detail about lead acid battery. (8)
 (ii) How is solid state lithium battery constructed? Describe its functioning. (8)
14. (a) (i) What are the important properties of refractories? (10)
 (ii) Write about the preparation of alumina and magnesite bricks. (6)
- Or
- (b) (i) Describe about the hardening and setting of cement. (10)
 (ii) How is glass manufactured? (6)
15. (a) (i) What is the importance of proximate analysis? (8)
 (ii) Describe the Otto Hoffman process for the manufacture of metallurgical coke. (8)
- Or
- (b) Write short notes on the following :
- (i) Compressed natural gas (6)
 (ii) Power alcohol. (10)

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Question Paper Code : 57267

B.E./B. Tech. DEGREE EXAMINATION, MAY/JUNE 2016

Second Semester

Civil Engineering

CY 6251 – ENGINEERING CHEMISTRY – II

(Common to all Branches except Marine Engineering)

(Regulations 2013)

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions.

PART – A (10 × 2 = 20 Marks)

1. List out the requirements of boiler feed water.
2. Why Calgon conditioning is better than phosphate conditioning ?
3. What is an electrochemical series ?
4. What are the essential ingredients of paints ?
5. What are batteries ?
6. Differentiate between nuclear fission and nuclear fusion.
7. Define abrasives.
8. What are refractories ?
9. What is meant by calorific value of a fuel ?
10. Give the composition of producer gas.

PART – B (5 × 16 = 80 Marks)

11. (a) (i) With neat diagram, explain the Zeolite process for water treatment. (8)
- (ii) Describe the demineralization process of water softening and write down the reaction involved in it. (8)

OR

- (b) (i) Explain with neat diagram, the desalination of brackish water of reverse osmosis method. (8)
- (ii) Describe the carbonate and phosphate conditioning of water to overcome the boiler feed problems. (8)

12. (a) (i) Explain how corrosion is controlled by sacrificial anode. (8)
- (ii) Derive Nernst equation and write its applications. (8)

OR

- (b) (i) Discuss the importance of design and material selection in controlling corrosion. (8)
- (ii) Write a note on
- Galvanic corrosion
 - Differential aerated corrosion (8)

13. (a) (i) Describe the construction of lead-acid battery with reaction occurring during discharging. (8)
- (ii) What is a breeder reactor ? Describe with a neat diagram the conversion of U-235 into Pu-239. (8)

OR

- (b) (i) With a neat diagram, explain the working principle of H_2-O_2 fuel cell with cell reaction. (8)
- (ii) Explain how electric power is generated by using wind energy. (8)

14. (a) (i) Explain the terms “Dimensional stability” and “Thermal spalling”. (8)
- (ii) Describe the manufacturing process of borosilicate glass. (8)

OR

- (b) (i) Describe with a neat diagram how Portland cement is manufactured by a wet process. (8)
- (ii) Write down the properties and uses of
- Waterproof cement
 - White cement
- (8)

15. (a) (i) What is meant by Proximate analysis ? (8)
- (ii) Describe with neat diagram how flue gas is analyzed by Orsat method. (8)

OR

- (b) (i) With neat diagram, explain the manufacturing of metallurgical coke by Otto-Hoffman method. (8)
- (ii) Discuss the production and applications of water gas. (8)
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Question Paper Code : 71698

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2017.

Second Semester

Civil Engineering

CY 6251 — ENGINEERING CHEMISTRY — II

(Common to All Branches Except Marine Engineering)

(Regulations 2013)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Why is water softened before using in boiler?
2. What is meant by caustic embrittlement? How it is prevented?
3. Define single electrode potential. Mention the factors affecting it.
4. Bolt and nut made of the same metal is preferred, justify.
5. Define nuclear chain reaction.
6. Alkaline battery is superior to dry cell. Why?
7. What is meant by thermal spalling? How it can be avoided?
8. What is hydrophobic cement?
9. Distinguish between proximate and ultimate analysis.
10. What is CNG? Give its composition.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain the following boiler troubles :
 - (1) Sludge and Scale formation (4)
 - (2) Caustic embrittlement. (4)
 - (ii) Describe Reverse Osmosis method for desalination of water. (8)
- Or
- (b) (i) What is meant by internal conditioning of water? (8)
 - (ii) Explain the demineralization of water by ion exchange process. How are exhausted cation and anion exchange resins regenerated? (8)

12. (a) (i) Derive Nernst equation for electrode potential. Mention its applications. (8)
(ii) Describe the sacrificial anode and impressed current methods for corrosion control. (8)

Or

- (b) (i) What is electroless plating? Write short note on electroless nickel plating. (8)
(ii) What are the factors influencing chemical and electrochemical corrosion. (8)
13. (a) (i) Write notes on lithium battery. (8)
(ii) With a neat sketch explain the functioning of Hydrogen–oxygen fuel cell. (8)

Or

- (b) (i) Explain with a neat diagram the parts and functions of a nuclear reactor. (8)
(ii) Explain the construction and working of Ni-Cd battery. (8)
14. (a) (i) What are abrasive? Give the preparation and properties of Carborundum and Alundum. (8)
(ii) Explain setting and hardening of cements with the reactions involved. (8)

Or

- (b) (i) How are alumina and magnesite bricks manufactured? (8)
(ii) Write the composition, properties and uses of soda and flint glasses. (8)
15. (a) (i) Describe the ultimate analysis of coal. (8)
(ii) What is bio-diesel? Explain transesterification and advantages of bio-diesel. (8)

Or

- (b) (i) Explain the physico chemical principles involved in the manufacture of water gas. (8)
(ii) Explain the flue gas analysis by Orsat method with suitable diagram. (8)

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Question Paper Code : 77106

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2015.

Second Semester

Civil Engineering

CY 6251 — ENGINEERING CHEMISTRY –II

(Common to all Branches except Marine Engineering)

(Regulation 2013)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Write any two disadvantages of hardwater in boilers.
2. What are boiler compounds?
3. Write the nernst equation for the cell,
 $Z_n(s)/Z_{n(ag)}^{2+} // Mg_{(ag)}^{2+}/Mg_{(s)}$.
4. What is dry corrosion?
5. What are the limitations of $H_2 - O_2$ fuel cell?
6. Write a nuclear fission reaction.
7. Define refractoriness.
8. What is the composition of Boro silicate glass?
9. What is the drawback of sulphur in coal?
10. What is CNG? Mention its calorific value.

PART B — (5 × 16 = 80 marks)

11. (a) (i) What is reverse osmosis? How is it useful for desalination of brackish water? Explain with a diagram. (2 + 2 + 4)
- (ii) What are sludge and scale in boilers? How are they formed? Suggest any two methods to prevent their formation. (2 + 2 + 4)

Or

- (b) (i) What are zeolites? How are they used in softening of water? Use a diagram for your explanation? (2 + 2 + 4)
- (ii) Explain the internal conditioning of water? Take two examples for your explanation. (6 + 2)

12. (a) (i) Explain the terms, cell potential and single electrode potential and describe the method of determination of electrode potential. (4 + 4)
- (ii) Discuss the importance of design and material selection in controlling corrosion. (8)
- Or
- (b) (i) What is electrochemical series? Write any two of its practical applications. (2 + 6)
- (ii) What is electroless plating? Explain the plating of Nickel by this process. (2 + 6)
13. (a) (i) What is a photovoltaic cell? Explain the construction and working of a photovoltaic cell with a diagram. (2 + 6)
- (ii) How is wind energy harnessed? What are its advantages and limitations? (2 + 3 + 3)
- Or
- (b) (i) Explain the construction, working and uses of a nuclear reactor with a neat diagram. (8)
- (ii) What are the compounds of Ni-cd battery? Explain its construction and advantages. (3 + 5)
14. (a) (i) What are abrasives? How are they classified? Explain the properties of any two in each category. (2 + 2 + 4)
- (ii) How is Portland cement manufactured? Give a neat diagram of the process. (4 + 4)
- Or
- (b) (i) Describe any four important properties of refractories. (4 × 2)
- (ii) How is glass manufactured? Explain the process giving chemical reactions involved. Give a neat diagram also. (2 + 4 + 2)
15. (a) (i) Define gross and net calorific values. Calculate gross and net calorific values of a coal sample containing 84% carbon, 1.5% sulphur, 6% nitrogen, 5.5% hydrogen and 8.4% oxygen. (3 + 5)
- (ii) What is meant by proximate analysis of coal? What are the quantities estimated in this analysis and their significance? (2 + 6)
- Or
- (b) (i) What is metallurgical coke? How is it superior than coal? Describe any one method of manufacturing metallurgical coke. (2 + 2 + 4)
- (ii) What is meant by knocking in petrol engines? How is knocking prevented? (4 + 4)

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Question Paper Code : 80310

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2016.

Second Semester

Civil Engineering

CY 6251 — ENGINEERING CHEMISTRY – II

(Common to All Branches Except Marine Engineering)

(Regulations 2013)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Mention any two requirements of boiler feed water.
2. What is calgon conditioning of water?
3. What is electroless plating?
4. With suitable example, explain the concept of galvanic corrosion.
5. Point out the advantages of wind energy.
6. What is the significance of breeder reactor?
7. Why is gypsum added to cement?
8. Classify refractories. Give one example each.
9. Define cetane number.
10. What is bio-diesel? Mention its advantages.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain the Zeolite softening process of water. (8)
(ii) Describe the reverse osmosis method for the desalination of brackish water. (8)

Or

- (b) (i) Explain the demineralization of water by ion exchange process. (8)
(ii) Discuss the causes, problems and prevention of caustic embrittlement. (8)
12. (a) (i) Explain the principle and mechanism of chemical corrosion. (8)
(ii) Describe the sacrificial anode and impressed current cathode method of corrosion control. (8)

Or

- (b) (i) What is paint? Explain its constituents and functions. (8)
(ii) Give a detailed account on copper electroplating. (8)
13. (a) (i) Describe the components of a light water nuclear reactor with a suitable diagram. (8)
(ii) Explain the construction and working of Hydrogen-Oxygen fuel cell. (8)

Or

- (b) (i) Write a note on solar energy. (8)
(ii) With the help of required cell reactions, describe the construction and working of nickel-cadmium batteries. (8)
14. (a) (i) What are refractories? Explain any three of their important properties. (8)
(ii) What is glass? Discuss the manufacture of glass. (8)

Or

- (b) (i) Describe the manufacture of cement by wet process. (8)
(ii) What are abrasives? How are they classified? Give any two examples for each category with their properties and uses. (8)

15. (a) (i) How will you carry out flue gas analysis by Orsat method? Explain. (8)
- (ii) Write short notes on the following :
- (1) Ignition temperature
- (2) Explosive range (8)
- Or
- (b) (i) What is producer gas? Discuss the manufacture of producer gas. (8)
- (ii) What is carbonization? Describe the Otto-Hoffman's process for preparing metallurgical coke. (8)
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Question Paper Code : 97220

B.E./B.Tech. DEGREE EXAMINATION, DECEMBER 2015/JANUARY 2016.

Second Semester

Civil Engineering

CY 6251 — ENGINEERING CHEMISTRY — II

(Common to all Branches except Marine Engineering)

(Regulation 2013)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is foaming?
2. Bring out the differences between scale and sludge.
3. Write the principle involved in electroless plating. Give an example.
4. Illustrate the use of electrochemical series giving an example.
5. Write the chemical reaction involved during discharging of lead storage battery.
6. Mention the constituents and their functions of paints.
7. Define refractoriness and RUL.
8. Name any two types of glass and their properties.
9. Why is net calorific value less than gross calorific value? When are they equal?
10. Differentiate coal and coke.

PART B — (5 × 16 = 80 marks)

11. (a) (i) What is internal treatment? Explain its types with examples. (8)
(ii) Explain the mechanism and working of demineralization process. (8)
- Or
- (b) (i) What is reverse osmosis? Explain the process and its application. (8)
(ii) What are the requirements of boiler feed water? (8)
12. (a) (i) Explain the mechanism of electrochemical corrosion. (8)
(ii) Explain the sacrificial anodic protection method of controlling corrosion. (8)
- Or
- (b) (i) Derive the Nernst equation explain its use. (8)
(ii) Write a note on electrode potential, its origin, measurement and uses. (8)
13. (a) Explain the following: (16)
(i) Nuclear fission and fusion
(ii) Classification of nuclear reactor.
- Or
- (b) Discuss the following: (16)
(i) Wind energy and its harvest
(ii) Hydrogen oxygen fuel cell.
14. (a) (i) Explain the setting and hardening of cement. (8)
(ii) What are abrasives? How are they classified? (8)
- Or
- (b) (i) Explain the manufacture of Portland cement. (8)
(ii) Explain the important properties of refractories. (8)
15. (a) (i) Differentiate proximate and ultimate analysis of coal. (8)
(ii) How does reforming of petrol increase the octane number? (8)
- Or
- (b) (i) Explain a method for the analysis of flue gas. (8)
(ii) Write about the production and applications of water gas. (8)