JAIPUR NATIONAL UNIVERSITY

Jagatpura, Jaipur

info@jnujaipur.ac.in www.jnujaipur.ac.in

School of Engineering and Technology

MID-TERM TEST-I, NOVEMBER, 2021

B. Tech. I Year (Common for all Branches)

ENGINEERING CHEMISTRY-I

BSC-102

Max Marks: 20 **Time: 2Hrs**

Note: All questions are compulsory.

Q1. Attempt any eight questions. **[8 x 1 = 8]**

a. Draw the structure of cation exchange resin.

b. Which salts are responsible for scale formation in boilers?

c. What is the difference between pressure filter and gravity filter?

d. Draw the structure of EDTA.

e. What is alum? Give the chemical formula of alum.

f. Give the reaction of zeolite regeneration.

g. Give two disadvantages of chlorination.

h. Give two advantages of soda lime process.

i. What is complexometric titration?

j. According to WHO, what is the pH of drinkingwater?

k. Name the different methods used for internal treatment of water.

l. What is demineralization?

Q.2 i) A sample of water on analysis has been found to contain following impurities: [2]

$Mg(HCO_3)_2$= 15.6mg/l , $Mg(NO_3)_2$ = 45mg/l.$MgSO_4$= 36mg/l, $MgCl_2$= 19.0mg/l and $CaCO_3$= 30 mg/l.

Calculate temporary and permanent hardness in ppm and ^{0}Clark.

ii) Discuss Sedimentation with coagulation in detail. [2]

iii) What is hardness of water? What are the different units in which the hardness is expressed? [2]

OR

i) A sample of water on analysis has been found to contain following impurities: [2]

$Ca(HCO_3)_2$= 25.5mg/l , $MgSO_4$= 12 mg/l, $MgCl_2$= 20.0mg/l and $CaCO_3$= 20 mg/l.

Calculate total hardness of water in ppm.

ii) Write a note on filtration and types of filters used in filtration process. [2]

iii) Discuss break point chlorination in detail. [2]

Q.3 i) Write a short note on zeolite process of water softening. [2]

ii) Explain scales and sludge formation in boilers. [2]

iii) Give the difference between lime soda and zeolite process of softening of water. [2]

OR

i) Discuss blow down process of removal of sludge from boilers [2]

ii) Explain carbonate conditioning in boilers. [2]

iii) Discuss various disadvantages of boiler corrosion [2]

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School of Engineering and Technology

MID TERM EXAMINATIONS-II, JANUARY, 2022

B.Tech. Semester-I

ENGINEERING CHEMISTRY-I

BTEBE102

Time: 2 Hrs **MM:** 20

Note: All questions are compulsory.

Q1. Attempt any eight questions. **[8x1=8]**

a. Draw the structure of cation exchanger resin.

b. Write full form and structure of LDPE.

c. What is the difference between addition and condensation polymers?

d. What is pH?

e. Give two examples of strong acid and weak base buffer.

f. Give the example of hydraulic cement.

g. What are the raw materials needed for manufacturing cement?

h. Write the chemical formula of silica glass.

i. What is the purpose of RUL test?

j. If the precipitate is hard and adhering on the inner wall, it is called .....

k. Give the chemical formula of zeolites.

l. What is priming?

Q.2 Answer the following:

(a) What is the Permutit process for removing the hardness of water? Explain. [2]

(b) Differentiate between Lime Soda & Ion Exchange process in detail. [2]

(c) A Discuss Strong and Weak Acids and Bases with suitable examples. [2]

OR

(a) Discuss all the major boiler troubles in detail. [4]

(b) **Write a notes on:** [2]

i) Conductance

ii) Specific conductance

Q.3 Answer the following:

(a) What are refractories? Write the properties of good refractories. [2]

(b) Discuss vertical shaft kiln with diagram. [2]

(c) Write note on Buffers with suitable examples. [2]

OR

(a) Discuss the role of gypsum in Portland cement. [2]

(b) Write a note on conductometric titration. [2]

(c) **Write a notes on:** [2]

i) Conductors

ii) Insulators

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BTEBE102

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SCHOOL OF ENGINEERING & TECHNOLOGY

B.Tech.

I SEMESTER END EXAMINATION: JANUARY 2022

ENGINEERING CHEMISTRY-I

Time: 3 Hrs. **Max. Marks: 70**

- **Attempt all questions.**
- **All questions are compulsory and carries equal marks.**

UNIT-I

Q.1 (a) What are pre-requisites of drinking water? Discuss disinfection method in detail. 7

(b) Give the detailed account on the estimation of hardness by EDTA method. 7

OR

(a) What is hardness of water? Give the types of hardness. Also discuss units of hardness. 10

(b) Write a note on break point chlorination. 4

UNIT-II

Q.2 (a) Discuss Caustic Embrittlement and its treatment process. 5

(b) Give the internal water treatment methods in detail. 9

OR

(a) Discuss Zeolite process of water treatment. 7

(b) Write a note on boiler troubles. 7

UNIT-III

Q.3 (a) Give the chemical composition of portland cement. Discuss manufacturing process of portland cement. 7

(b) Write a note of vertical shaft kiln. 7

OR

(a) Define refractories. How can they be classified? 7

(b) What is glass? Give chemical composition and manufacturing of silica glass. 7

UNIT-IV

Q.4 (a) Discuss different theories of acid and bases in detail. 10

(b) Write note on conductors. 4

OR

(a) What is the principle behind conductometric titration? Discuss weak acid and ~~sharp~~ Strong base titration. 7

(b) Give the difference between ~~sharp~~ Strong and weak electrolytes. 7

UNIT-V

Q.5 (a) Give the synthesis of Nylon 6.6 and Bakelite. Also discuss their uses in industries. 8

(b) Write a note on vulcanization of rubber. 6

OR

(a) What is polymer? Give the classification of polymers with examples. 7

(b) Give the difference between addition and condensation polymerization. 7