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| Name: |  UPES UNIVERSITY WITH A PURPOSE |
| Enrolment No: | |

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
Online End Semester Examination, May 2020

Course: Water Supply, Refugee Health and Sanitation in Emergency
Program: M. Tech. HSE-DM
Course Code: HSFS 8010

Semester: III
Time 03 hrs.
Max. Marks: 100

SECTION A

- 1. Each Question will carry 5 Marks**
- 2. Instruction: Complete the statement / Select the correct answer(s)**

| S. No. | Question | CO |
|------------|--|-----|
| Q 1 | Differentiate between a typical water treatment and waste water treatment plant (at least 3 points for each). | CO3 |
| Q2 | Give examples of five establishments that can be used as an emergency settlement. | CO2 |
| Q3 | Fill in the blanks with the correct answer: a. Mosquitoes are the _____ for malaria. (vector/parasite) b. U5MR is a _____. (health indicator/ adult morbidity indicator) c. Diarrhea is a _____ of cholera. (symptom / disease) d. Ebola is an example of a _____ disease. (communicable/ non- communicable) e. Dengue in the rainy seasons of Dehradun is _____. (endemic/epidemic) | CO1 |
| Q4a Q4b | Point out the differences between the two additional protocols of the Geneva Convention. — How many protocols of the 1949 Geneva Convention has India adopted? | CO2 |
| Q5 | Select all the correct statements. a. Alcohol and drug abuse could be a result of trauma faced during a disaster. b. Post traumatic stress disorder is the only anxiety disorder which can occur after a disaster. c. International human rights law could be applied to both peace times as well as war times. d. OCHAs guidelines on internally displaced persons is independent of the international human rights law. e. A refugee is a person who has crossed international borders to escape from natural disaster. | CO2 |
| Q6 | How many liters of HTH has to be mixed in water to obtain 50 liters of 5% stock solution? How many grams of chlorine is present in this mixture? | CO4 |

SECTION B

1. Each question will carry 10 marks
2. Instruction: Write short / brief notes

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|------|---|-----|
| Q 7 | What are the hazards posed by biomedical solid waste and dead bodies? Describe the methods by which these can be handled to minimize health risks during disasters. | CO1 |
| Q 8 | The primary source of water for a small village has been severely damaged due to a recent cyclone, an emergency water supply has been set up using water from a nearby stream. The stream water is mostly contaminated with organic matter. Considering that chlorination is used as a method of disinfection, describe the shape that the added chlorine versus the residual curve would take to achieve breakpoint chlorination with explanations for the same. | CO2 |
| Q 9 | Early warning systems in tandem with disaster resource networks can help preparedness and successful management of environmental disasters. Justify this statement with the example of early warning system for any one natural disaster. | CO3 |
| Q 10 | When is rapid assessment done? Describe the steps involved in rapid assessment. | CO1 |
| Q 11 | Differentiate water treatment plants from wastewater treatment plants? What are the water quality parameters that must be given importance during water quality analysis and treatment in emergencies? Justify your answer. | CO3 |

Section C

1. Each Question carries 20 Marks.
2. Instruction: Write long answer.

| Q12a | Derive the linearised expression for the combined effect of concentration and contact time on disinfection action. Mention the factors that affect disinfection. (8M) | CO4 | | | | | | | | | |
|------------------------------|---|-----|------------------------------|---------------------------------------|---|----|----|----|----|----|----|
| Q12b | <p>It is desired to design a bromide chloride contact tank to be used to disinfect a secondary-treated sewage discharge. To determine the dosage required an experiment was conducted, at 15 °C, producing the following results: (12M)</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th><i>Dosage of BrCl (mg/L)</i></th> <th><i>Time to 99% inactivation (min)</i></th> </tr> </thead> <tbody> <tr> <td>5</td> <td>85</td> </tr> <tr> <td>20</td> <td>30</td> </tr> <tr> <td>50</td> <td>15</td> </tr> <tr> <td>75</td> <td>10</td> </tr> </tbody> </table> <p>Determine the concentration required to achieve 99% removal if a contact time of 30 minutes is employed in the tank. What contact time would be required to achieve the same degree of removal at 25 °C? The activation energy is 52 KJ/mol.</p> | | <i>Dosage of BrCl (mg/L)</i> | <i>Time to 99% inactivation (min)</i> | 5 | 85 | 20 | 30 | 50 | 15 | 75 |
| <i>Dosage of BrCl (mg/L)</i> | <i>Time to 99% inactivation (min)</i> | | | | | | | | | | |
| 5 | 85 | | | | | | | | | | |
| 20 | 30 | | | | | | | | | | |
| 50 | 15 | | | | | | | | | | |
| 75 | 10 | | | | | | | | | | |