

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER-V (NEW) - EXAMINATION – SUMMER 2017

Subject Code:2151303**Date: 05/05/2017****Subject Name: Physic-chemical Treatment Technologies.****Time:02:30 PM to 05:00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

MARKS**Q.1 Short Questions****14**

- 1 Which is not includes in unit operations
 - (a)Screen
 - (b)Grit chamber
 - (c) Oil and grease removal
 - (d) Coagulation
- 2 Self-cleansing velocity is
 - (a)velocity at which no accumulation remains in the drains
 - (b)velocity of water at flushing
 - (c)velocity of water in a pressure filter.
 - (d)velocity at dry weather flow
- 3 The screens are fixed
 - (a) perpendicular to the direction of flow
 - (b) at an angle 30° to 60° to the direction of flow
 - (c) parallel to the direction of flow
 - (d) none of these
- 4 Chlorination of water is done for the removal of
 - (a)bacterias
 - (b)suspended solids
 - (c)sediment
 - (d)hardness.
- 5 The coagulant widely used for sewage treatment, is
 - (a) alum
 - (b) ferric chloride
 - (c) chlorinated copperas.
 - (d) ferric sulphate

- 6 The detention period for plain sedimentation water tanks, is usually
 - (a) 4 to 8 hours
 - (b) 24 to 36 hours.
 - (c) 8 to 16 hours
 - (d) 16 to 24 hours
- 7 The recommended detention period for grit chambers is
 - (a) 1 minute
 - (b) 2 minutes
 - (c) 3 minutes
 - (d) 5 minutes
- 8 Water is passed through filter beds of sand and gravel to remove smaller particles of dust, it is called
 - (a) Coagulation
 - (b) Sedimentation
 - (c) Filtration
 - (d) Chlorination
- 9 Addition of small doses of chlorine gas into filtered water is known as
 - (a) Coagulation
 - (b) Sedimentation
 - (c) Filtration
 - (d) Chlorination
- 10 The following cause alkalinity as well hardness in natural water.
 - (a) Calcium carbonate
 - (b) Calcium bicarbonate
 - (c) Magnesium carbonate
 - (d) All of the above
- 11 When water is being treated to make it safe for drinking, the first stage is to pass it through a wire mesh. This stage is called
 - (a) Chlorination
 - (b) settling
 - (c) filtration
 - (d) Screening
- 12 In a water treatment plant, water is treated before being sent to homes. Which one of the following is the correct order of treatment in these plants?
 - (a) Screening → Settling → Filtration → Chlorination → Fluoridation
 - (b) Settling → Screening → Filtration → Fluoridation → Chlorination
 - (c) Screening → Filtration → Settling → Fluoridation → Chlorination
 - (d) Filtration → Screening → Settling → Chlorination → Fluoridation
- 13 Removals of colloidal particles take place in
 - (a) Grit chamber
 - (b) equalizaion
 - (c) Neutralization
 - (d) Chemical Coagulation

- 14** Which major step in wastewater treatment prepares the wastewater for treatment by physically removing the majority of solid material?
 (a) Primary treatment
 (b) Secondary treatment
 (c) Tertiary treatment
 (d) All of the above
- Q.2** (a) Give the classification of screen with opening size **03**
 (b) Differentiate between unit process and unit operations. **04**
 (c) Explain the procedure for statistical analysis of waste water flow rate data. **07**
- OR**
- (c) Derive the Newton's law for settling velocity of discrete particle. **07**
- Q.3** (a) Explain the sources & effect of following parameters in water and waste water. **03**
 (1) Hardness (2) organic matter (3) chlorides.
 (b) Differentiate between: Rapid mixture and flocculator. **04**
 (c) Enlist and explain the mechanisms by which the colloids are stabilized. **07**
- OR**
- Q.3** (a) Explain the sources & effect of following parameters in water and waste water. **03**
 (1) Nitrates (2) Oil & grease (3) phenol.
 (b) Differentiate between: Coagulation and Flocculation **04**
 (c) Prepare a list of different chemical coagulants. Explain chemical reactions when alum is used as coagulants. **07**
- Q.4** (a) Define : (1) SOR (2) WOR (3) Scour velocity **03**
 (b) Give the classification of RSF based on (1) direction of flow (2) driving force. **04**
 (c) Write a note on "tube settler". **07**
- OR**
- Q.4** (a) Define: (1) Effective size of sand (2) uniformity co-efficient (3) under drainage system. **03**
 (b) Enlist and explain different types of settling phenomena observed in sedimentation tank. **04**
 (c) Enlist and explain mechanism of filtration in RSF with neat sketch. **07**
- Q.5** (a) Enlist the factors which affect chlorination. **03**
 (b) Explain the multimedia filter with neat sketch. **04**
 (c) Explain the ideal sedimentation concept and highlight the chief features of inlet and outlet **07**
- OR**
- Q.5** (a) Explain the purpose of disinfection. **03**
 (b) Explain anaerobic sludge digestion in detail. **04**
 (c) Describe true usual sources of sludge generated in a convectional waste water treatment plant. **07**
