

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**
