

**SARDAR PATEL UNIVERSITY**  
**M.Sc. (EST) (First Semester) Examination**  
**Wednesday, 5<sup>th</sup> December, 2012**  
**10:30 a.m. to 01:30 p.m.**

**PS01CEST03: Water Pollution and Control Technology**

**Max. Marks: 70**

- Note:
1. Answer all Questions (including Multiple Choice Questions) in Answer Books only.
  2. Draw Neat and Labelled Diagrams, Wherever Necessary.

**Q.1. Multiple Choice Questions (Choose Correct Answer)**

**[08]**

- (1) Purpose of waste water treatment with copper sulphate is
 

(a) Removal of phenolic compounds	(b) Removal of heavy metals
(c) Prevention of viral growth	(d) Prevention of algal growth
- (2) Which one of the following is an example of inorganic ion exchanger?
 

(a) Cross-linked polystyrene	(b) Phenol formaldehyde co-polymer
(c) Zeolite	(d) Poly acryl amine
- (3) Which of the following filtration processes corresponds to the typical operating pressure of 3-15 Bar?
 

(a) Micro filtration	(b) Nano filtration
(c) Ultra filtration	(d) Reverse osmosis
- (4) Which of the feeding system is mostly used in case of disinfecting the wastewater body?
 

(a) Liquid feed system	(b) Gas feed system
(c) Dry feed system	(d) Colloidal feed system
- (5) Amoebic Dysentery is a water \_\_\_\_\_ disease.
 

(a) based	(b) washed	(c) borne	(d) related
-----------	------------	-----------	-------------
- (6) Cyanosis is a diseases caused by \_\_\_\_\_.
 

(a) Lead	(b) Nitrate	(c) Mercury	(d) Phosphorus
----------	-------------	-------------	----------------
- (7) "S" Trap is similar to \_\_\_\_\_ trap.
 

(a) Floor	(b) Gully	(c) P	(d) Intercepting
-----------	-----------	-------	------------------
- (8) Which type of spring is formed, when a fissure in an impervious stratum allows artesian water to flow?
 

(a) Artesian	(b) Shallow	(c) Gravity	(d) Surface
--------------	-------------	-------------	-------------

**Q.2. Write a Short Note on followings (Any Seven).**

**[14]**

- (1) Adverse effects of reuse of wastewater
- (2) Infiltration gallery
- (3) Properties of water
- (4) Fire demand
- (5) Preservation of sample
- (6) Use of chlorine as a disinfectant (including its advantage and disadvantages)
- (7) Differences between slow sand and rapid sand filter
- (8) Introductory note and significance of ionic charge balance
- (9) Water softening

- Q.3. (a) Given the following data, calculate the population at the end of four and five decades by Incremental increases method and Decreasing rate method. [06]

Year	Population
1940	80,000
1950	1,20,000
1960	1,68,000
1970	2,28,580

- (b) Explain the significance of Lead, Fluoride and Chromium in determining the water quality criteria. [06]

OR

- (b) Enumerate the specific agent, reservoir, common vehicle and symptoms of Diphtheria, Typhoid fever and Bacillary dysentery diseases. [06]

- Q.4. (a) Describe the structure, design and functions of different types of tubewells. [06]

- (b) (i) Nuisance organisms [03]

- (ii) Types of sewerage system [03]

OR

- (b) (i) Types of traps [03]

- (ii) Control of saline water intrusion [03]

- Q.5. (a) Describe the objectives of surface and groundwater sampling. Enlist the pre-requisite requirements prior to sampling. [06]

- (b) Explain lime soda process and ion exchange technique used for water softening. [06]

OR

- (b) Elaborate the mode of operation of any three chemicals used as Coagulants. Add a note on their advantages and disadvantages.

- Q.6. (a) Highlight the benefits of reclaimed water. Mention the types of sectors where the reclaimed water is used. [06]

- (b) Discuss various techniques used for color, taste and odor removal from wastewater. Add a note on its mode of operation. [06]

OR

- (b) Calculate the ionic charge balance for given water sample and interpret your ideas.

ID (mg/L)	HCO <sub>3</sub>	Cl	SO <sub>4</sub>	NO <sub>3</sub>	Ca	Mg	Na	K
P1	54.5	45.1	52.5	67.5	27.0	12.7	35.4	16.8

Atomic weights: H-1, C-12, O-16, Cl-35.5, S-32, N-14, Ca-40, Mg-24, Na-23, K-39