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GUJARAT WATER SUPPLY & SEWERAGE BOARD - GJTI

Name of Subject: Water Supply & sanitary Engineering for DEE/A Ex.Eng.

Time: 10:30 to 13:30

Date : 15-10-2015

Max Marks : 75

SECTION-A (to be returned)

25 - Marks

Objective questions : 1 mark each, no negative marks

Please tick the answer in box. To be completed in 45 min.

Instructions: You are monitored by CCTV, if any person observed copying shall be considered disqualified for entire examination

ROLL NUMBER

Question: 1 Any - 25

1) Which one of the following practices causes reduction in the per capita water Consumption?

- a) Good quality water
- b) Hotter climate
- c) Modern living
- d) Metering system

✓

2) If the average daily water consumption of a city is 24000 cum, the peak hourly demand (of the maximum day of course) will be:

- a) 1000 cum/hr
- b) 1500 cum/hr
- c) 1800 cum/hr
- d) 2700 cum/hr

3) The type of pumps used in tube wells are :

- a) Submersible Pumps
- b) Centrifugal Pumps
- c) Turbine type pumps
- d) All of these

✓



4) A Water having $\text{pH}=9$, will have hydrogen ion Concentration equal to :

- a) 9 mol/l
- b) 10^{-9} mol/l
- c) 10^9 mol/l
- d) None of this

5) Blue baby disease may be caused in infants due to drinking water containing higher concentrations of :

- a) Nitrites
- b) Nitrates
- c) Lead
- d) Arsenic

6) The maximum allowable concentration of nitrate (as NO_3) mg/l in drinking water is :

- a) 45 mg/lit
- b) 100 mg/lit
- c) 55 mg/lit
- d) 125 mg/lit

7) The maximum safe permissible limit of chlorides in domestic water supplies is :

- a) 0.5 mg/lit
- b) ~~2.5~~ mg/lit ²⁵⁰
- c) 200 mg/lit
- d) ~~100~~ mg/lit ²⁵⁰

8) Match the columns most appropriately :

Water pipe material

Average Age Of Pipe

- a) Cast iron
- b) Steel
- c) RCC
- i) 75 years
- ii) 100 years
- iii) 40 years

a	
b	
c	



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9) A check valves is also known as a :

- a) Relief valve
- b) Reflux valve
- c) Blow off valve
- d) None of these

10) Summits are the points of :

- a) High pressure
- b) Low pressure
- c) Equal pressure
- d) None of these

11) Hand pumps make use of :

- a) Centrifugal pumping
- b) Reciprocation pumping
- c) Rotary pumping
- d) None of the above

12) The treatments which are generally given to treat row water supply follow the sequence :

- a) Screening, sedimentation, disinfection, filtration
- b) Screening, sedimentation, filtration, disinfection
- c) Screening, sedimentation, disinfection, aeration
- d) Screening, sedimentation, coagulation, filtration, disinfection

13) The efficiency of sediment removal in continuous sedimentation tank does not depend upon the :

- a) Discharge through the tank
- b) Width of the tank
- c) Length of the tank
- d) Depth of the tank

14) The most widely used coagulant for water treatment is :

- a) Lime and soda
- b) Ferrous sulphate
- c) Chlorinated copperas
- d) Alum



- 15) Chlorine demand of water is equal to :
- a) Applied chlorine
 - b) Residual chlorine
 - c) (a) + (b) Above
 - d) (a) - (b) Above
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- 16) A drop manhole may be provide along the sewer line :
- a) When the sewer drops from a height of more than 0.6 mtr or so
 - b) When a branch sewer outfalls in to it from a height of more than 0.6 mtr or so
 - c) To provide inspection chamber in the sewer line
 - d) For none of these
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- 17) PH=3 when compared to PH=5 will be more acidic by :
- a) 2 times
 - b) 20 times
 - c) 100 times
 - d) None of then
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- 18) Between BOD and COD the greater of the two is :
- a) BOD
 - b) COD
 - c) Both are equal
 - d) Depends on sewage characteristic
- | |
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- 19) The maximum efficiency of BOD removal is achieved in :
- a) Oxidation ditch
 - b) Oxidation pond
 - c) Aerated lagoon
 - d) Trickling filter
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- 20) Minimum Do prescribed for a river stream to avoid fish kills is :
- a) 2 ppm
 - b) 4 ppm
 - c) 8 ppm
 - d) 10 ppm
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- 21) Purpose of Aeration in water treatment :
- a) Increase the dissolved oxygen concentration in water
 - b) Decrease Co₂ concentration
 - c) Reduce taste & order
 - d) All above
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22) To Control the growth of algae in reservoirs, the compound which is used, is :

- a) Bleaching powder
- b) Copper Sulphate
- c) Lime Solution
- d) Alum Solution
- e) All the above

23) Recuperation test is carried out to determine :

- a) Turbidity of water
- b) PH value of water
- c) Yield of well
- d) Discharge from a well

24) ESR is located & constructed at which point in the area to be served :

- a) Lowest
- b) Highest
- c) Average
- d) Non of above

25) Drainage pumping station is located in constructed at which point in the area to be served :

- a) Highest
- b) Average
- c) Lowest
- d) All the above



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SECTION-B

(25 Marks)

Instructions: You are monitored by CCTV, if any person observed copying shall be considered disqualified for entire examination

Question: 2 (A) Answer in one sentence (Any Five)

(5) marks

- 1) For a water sample having a total hardness of 200 mg/lit. As CaCO_3 and alkalinity 250mg/lit. As CaCO_3 then find carbonate hardens and non carbonate hardens.
- 2) Find out appropriate diameter of a water main for supplying 9 MLD of water with a velocity of 1.5 mtr/sec.
- 3) What is wholesome water?
- 4) Water is to be lifted from a ground reservoir of 4 mtr depth to an elevated reservoir. The deference in their water level is 40 mtr In order to fill this Elevated reservoir of 90 cum capacity in one hour fine the appropriate HP of the centrifugal pump.
- 5) If a 2% solution of sewerage sample is incubated for five days at 20°C , and dissolved oxygen depletion is 10mg/lit., then find the BOD of the sewerage.
- 6) Difference between drainage and sewer.

Question: 2 (B) Give full form of following abbreviation. (Any Ten)

(10) marks

- 1) EPA
- 2) TDS
- 3) EDTA
- 4) BOD
- 5) ARWSP
- 6) NTU
- 7) PAC
- 8) PH
- 9) LPCD
- 10) HMG
- 11) HGLR
- 12) COD
- 13) MNP
- 14) ARP



Question: 2 (C) Give the Answer of following.

(10) marks

1) Match the following

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|-----------------|--|
| a) Disinfection | i) Removal of salt |
| b) Aeration | ii) Removal of hardness |
| c) Softening | iii) Removal of unpleasant taste and odour |
| d) Desalination | iv) Making water free from pathogenic bacteria |

- 2) What is filtration rate of rapid sand filter unit?**
- 3) What is surface loading of clarifier unit?**
- 4) Explain air binding in filter bed.**
- 5) Explain term "Water Hammer".**
- 6) List out parameter required for economic design of pumping main (Rising main)**
- 7) List out Permissible limits of any four (4) water quality Standard generally tested in GWSSB Laboratory (excluding Nitrates, Chlorides)**

SECTION-C

(25 Marks)

Question: 3

- (1)** Explain requirement of good distribution system in W.S. Projects, Types of Distribution system, Method of distribution system. **(5) marks**
- (2) Give the Answer of following. (5) marks**
- (a) Draw the lay-out Flow diagram of conventional water treatment or sewage plant.
- (b) Design the approximate dimensions of a set of Rapid sand filter for treating water required for a population of 50,000, the rate of supply being 180 liters per day per person. The filters are rated to work 5000 liters per hours per Sq.Mt. Assuming whatever data are necessary & not given.



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(3) Give the Answer of following. (5) marks

- (a) Explain different types of Valves used in W.S. Projects in GWSSB.
- (b) Explain different types of pipes used with range of diameter in water supply projected in GWSSB.

(4) Give the Answer of following. (5) marks

- (a) Explain different types of disinfectant used in chlorination. What is pre & post chlorination.. What is break point & Super Chlorination?
- (b) Explain Coagulation & Flocculation in water treatment plant.. Explain different types of coagulant used in WTP explain disadvantage of Alum.

(5) Give the Answer of following. (5) marks

- (a) Explain BOD , COD & DO what mean by BOD/COD Ratio how you judge waste water can consider fully biodegradable.
- (b) Explain different methods of population forecasting in brief.