Environmental Engineering

Duration: 40 Minutes **Maximum marks: 30**

Q.1 - Q.10 Carry One Mark each.

1. Gases, which are generally evolved during anaerobic decomposition of sewage, are :
   (A) $CO_2 + NH_3 + H_2S$
   (B) $CO_2 + NH_3 + H_2S + CH_4$
   (C) $CO_2 + NH_3 + SO_2$
   (D) $CO_2 + NH_3 + SO_2 + CH_4$

2. The pH of fresh sewage is usually :
   (A) Less than 7
   (B) More than 7
   (C) Equal to 7
   (D) Equal to zero.

3. Methaemoglobinemia disease is caused in children, by
   (A) Conversion of nitrites' to nitrates
   (B) Conversion of nitrates to nitrites
   (C) Reaction between haemoglobin and carbon dioxide
   (D) Both due to (A) and (C)

4. At an incubation temperature of 20°C, if initial D.O. (dissolved oxygen) and final D.O. values after 5 days incubation period on a 2% sample of sewage, are 8.5 mg/l and 5.5 mg/l, respectively, then the B.O.D. will be
   (A) 50 mg/l
   (B) 150 mg/l
   (C) 250 mg/l
   (D) 350 mg/l

5. If the depletion of oxygen is found to be 2 mg/l after incubating 3 ml of sewage diluted to 300 ml, at 20°C for 5 days, then the BOD_5 of the sewage would be :
   (A) 200 mg/l
   (B) 300 mg/l
   (C) 600 mg/l
   (D) None of these

Q.6 - Q.10 Carry Two Mark each.

6. Which of the following pairs is/are correctly matched?
   1 Eutrophication: Nutrient accumulation leading to ecosystem change occurring in impounded water
   2 Autotrophism: Utilization, rearrangement and decomposition of complex materials predominate
   3 Heterotrophism: Predominance of fixation of light energy, use of simple inorganic substances and built up complex substances.
   Select the correct answer using the codes given below
   (A) 1, 2 and 3
   (B) 1 alone
   (C) 2 and 3
   (D) 1 and 3

7. The results of analysis of a sample of J water is given below

Turbidity = 10 mg/L; colour = slightly yellowish : pH = 7.4; taste and odour = inky taste; total dissolved solids = 450 mg/L: total hardness = 200 mg/L; Chlorides = 100 mg/L; Sulphates = 200 mg/L; Fluorides = 0.5 mg/L; Nitrates = 30 mg/L; Calcium = 75 mg/L ; Magnesium = 200 mg/L; Iron = 3.0 mg/L.
From the data given above, it can be inferred that the water needs
(A) No treatment except disinfection
(B) Treatment for removal of iron, hardness, and disinfection
(C) Treatment for removal of colour, taste and odour
(D) Treatment for removal of iron, taste, odour and disinfection

8. Match List I with List II and select the correct answer using the codes given below the Lists

List I	List II
a. Absence of fluorides	1. Methemoglobinaemia
b. Excess of lead	2. Goitre
c. Presence of excess nitrates	3. Dental caries
d. Absence of iodide	4. Anemia

Codes

	a	b	c	d
(A)	3	4	2	1
(B)	2	3	4	1
(C)	3	4	1	2
(D)	1	2	4	3

9. A water treatment plant for a city treats 50 MLD of turbid water in a co-agulation sedimentation tank. Dosage of alum is 15 mg/l, if the alkalinity of raw water is equivalent to 1.0 mg/l of $CaCO_3$, the quantity of quick lime (Containing 80% CaO) required per month by the water treatment plant is _____ tonnes. [up to 1 decimal]

10. The chlorine demand of a water sample was found to be 0.2 mg/l. The amount of bleaching powder containing 30% available chlorine to be added to treat one liter of such a water sample is
(A) 0.67 mg
(B) 0.06 mg
(C) 1.33 mg
(D) 0.14 mg