University of Mumbai

Examination 2021 under cluster __(Lead College: ___KJSIEIT_____)

Examinations Commencing from 1 June 2021

Program: Civil Engineering

Curriculum Scheme: Rev - 2016

Examination: TE Semester VI

Course Code: CEC604 and Course Name: Environmental Engineering-II

Time: 2-hour Max. Marks: 80

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Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	Sewers are normally not subjected to the following test before they are put into service.
Option A:	Smoke test
Option B:	Water test
Option C:	Shadow test
Option D:	Air test
2.	A bulked sludge is the one that has
Option A:	Good settling characteristics and poor compatibility.
Option B:	Poor settling characteristics and good compatibility.
Option C:	Poor settling characteristics and poor compatibility.
Option D:	Good settling characteristics and good compatibility.
3.	When chlorine is added to sewage both at the beginning as well as at the end of the treatment process, the phenomenon is called
Option A:	Post chlorination
Option B:	Super chlorination
Option C:	Split chlorination
Option D:	Pre chlorination
4.	In a flowing stream, what is the effect of the breakdown of degradable wastes by bacteria on dissolved oxygen?
Option A:	Increases
Option B:	Depletes
Option C:	Maintains
Option D:	Improves
5.	The use of pure oxygen as a substitute for air in the activated sludge process has gained in popularity since
Option A:	1960
Option B:	1980
Option C:	1970
Option D:	1990
6.	Traps
Option A:	are water seals which prevent the entry of foul gases
Option B:	are used to trap the rats entering sewers

Option C:	are not dissolve the foul gases
Option D:	create symphonic action to increase the quick disposal of sewerage
7.	The type of joint is not used for joining the pipes or sewers is
Option A:	Flexible joint
Option B:	Expansion joint
Option C:	Complex joint
Option D:	Mechanical joint
8.	Sludge (either wet, or dry or incinerated) cannot be finally disposed of by the following method.
Option A:	Spreading on farm land
Option B:	Digestion
Option C:	Land fills
Option D:	Disposal in water or sea
9.	The sewer which received discharge from two or more main sewers, is known as
Option A:	A trunk sewer
Option B:	An outfall sewer
Option C:	A cross sewer
Option D:	An intercepting sewer
10.	The 1-day BOD at 30 degree C of waste water sample is 110 mg/lt. Determine ultimate BOD. Assume K = 0.1/day at 20-degree C.
Option A:	Lo = 160.68 mg/lt
Option B:	Lo = 260.68 mg/lt
Option C:	Lo = 480. 68 mgl/lt
Option D:	Lo = 360.68 mg/lt
11.	Which types of bacteria are used in trickling filters?
Option A:	Facultative
Option B:	Nitrifying
Option C:	Anaerobic
Option D:	Blue-green bacteria
12.	In sludge drying bed the depth of sand may vary from
Option A:	20 to 30 cm.
Option B:	40 to 50 cm
Option C:	30 to 40 cm
Option D:	50 to 60 cm
13.	The working condition in imhoff tank are
Option A:	Aerobic only
Option B:	Anaerobic only
Option C:	Aerobic in lower compartment and anaerobic in upper compartment
Option D:	Aerobic in upper compartment and anaerobic in lower compartment
14.	Another name of Mean Cell Residence Time is
Option A:	Aeration period
Option B:	Volumetric loading

Option C:	F/M ratio
Option D:	Sludge age
15.	Which of the following is not the zone of pollution in a stream or river?
Option A:	Zone of disinfection
Option B:	Zone of degradation
Option C:	Zone of active decomposition
Option D:	Zone of recovery
16.	Sewage cannot be applied by the following methods of irrigation:
Option A:	Spray irrigation
Option B:	Overland flow irrigation
Option C:	Surface irrigation
Option D:	Sub-surface irrigation
17.	Drop manholes are the manholes
Option A:	Without entry ladders
Option B:	Without manhole covers
Option C:	With depths more than 3.5 m
Option D:	Having drains at different levels
18.	Which are the three ingredients in activated sludge systems?
Option A:	Cells, sewage and oxygen
Option B:	Cells, sewage and nitrogen
Option C:	Solids, sewage and oxygen
Option D:	Solids, water and oxygen
19.	What is the percentage of methane produced during sludge digestion?
Option A:	0-15%
Option B:	15-30%
Option C:	30-45%
Option D:	60-70%
20.	Which of the following action is not involved in self-purification process of streams?
Option A:	Dilution
Option B:	Concentration
Option C:	Action of sunlight
Option D:	Reduction

Q. 2. A	**Solve any Two (5 marks each) (Total: 10 Marks)**
i.	Write short note on plastic wastes and hazardous wastes.
ii.	Enlist various sewer appurtenances. Explain any one with neat sketch.
iii.	Distinguish between combined & separate system of sewerage.
Q.2. B	**Solve any One (10 marks each) (Total: 10 Marks Each)**
i.	Explain flow sheet for conventional sewage treatment plant with neat sketch.

ii.	Design the dimensions of a septic tank for a small colony of 150 persons provided with an assured water supply from the municipal head-works at a rate of 120 litres per person per day. Assume suitable data if necessary.

Q.3. A	**Solve any Two (5 marks each) (Total: 10 Marks)**
i.	What do you understand by self-purification property of a stream? Explain the factors affecting this property.
ii.	Explain sludge thickening & dewatering in brief.
iii.	Differentiate between single pipe and single stack plumbing system with neat sketch.
Q.3. B	**Solve any One (10 marks each) (Total: 10 Marks Each)**
i.	Determine the size of high-rate trickling filter for the following data: 1. Sewage Flow = 4.5 MLD, 2. BOD of raw sewage = 250 mg/lit, 3. Recirculation ratio = 1.5 4. BOD removed in primary Clarifier = 30% 5. Final effluent BOD desired = 30 mg/lit
ii.	An average operating data for conventional activated sludge treatment plant is as follows: 1. Wastewater flow = 35000 m^3/day 2. Volume of aeration tank = 10900 m^3 3. Influent BOD = 250 mg/l 4. Effluent BOD = 20 mg/l 5. MLSS = 2500 mg/l 6. Effluent suspended solids = 30 mg/l 7. Waste sludge suspended solids = 9700 mg/l 8. Quantity of waste sludge = 220 m^3/d. Determine: a. Aeration period in hours. b. F/M Ratio (kg BOD per day/kg MLSS). c. Percentage efficiency of BOD removal. d. Sludge age (days).