

3 pages.

6012-(3)

①

N19-00204

TED (15) – 6012

Reg. No. ....

(REVISION – 2015)

Signature .....

DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/  
MANAGEMENT/COMMERCIAL PRACTICE — OCTOBER, 2019

**ENVIRONMENTAL ENGINEERING**

[Time : 3 hours

(Maximum marks : 100)

PART — A

(Maximum marks : 10)

Marks

I Answer *all* questions in one or two sentences. Each question carries 2 marks.

1. State the purposes for which water is required.
2. Differentiate pre-chlorination and post-chlorination.
3. Define sewer and sewage.
4. Distinguish BOD and COD.
5. Define trap.

(5×2 = 10)

PART — B

(Maximum marks : 30)

II Answer any *five* of the following questions. Each question carries 6 marks.

1. Explain general systems of supply of water.
2. Discuss the dead-end method of layout of distribution pipes with neat sketch.
3. State the types of fire hydrant and write any four requirements of fire hydrant.
4. Explain the classification of sewerage systems for the collection and carrying of sewage.
5. State the factors to be considered while determining the quantity of dry weather flow.
6. With the help of neat sketch state the purpose of installing a skimming tank in primary treatment of sewage.
7. Define soil pipe, anti siphonage pipe and vent pipe.

(5×6 = 30)

PART — C

(Maximum marks : 60)

(Answer *one* full question from each unit. Each full question carries 15 marks.)

UNIT — I

- III (a) The population figures for the last five decades of a town are given below. Estimate its future population at the end of next two decades by incremental increase method.

<i>year</i>	<i>population</i>
1925	20000
1935	30000
1945	42000
1955	56000
1965	75000

- (b) Explain the factors affecting rate of demand of water.

OR

- IV (a) Discuss the factors which contribute to the pipe corrosion.

- (b) Explain canal intake with a neat sketch.

UNIT — II

- V (a) List the impurities present in water. Explain physical tests of water.

- (b) Draw a neat sketch showing general layout of gravity type rapid sand filter and explain its working.

OR

- VI (a) Explain the working of air valve with a sketch.

- (b) Explain various methods for the distribution of water.

UNIT — III

- VII (a) Write any seven comparisons of conservancy system and water carriage system for carrying refuse.

- (b) State the requirements of surface drain and explain the shapes commonly adopted in the construction of surface drain with neat sketches.

OR

(15) 6012

(3)

Marks

- VIII (a) Discuss the components parts of a sewage pumping station. 7
- (b) Explain the working of an automatic flushing tank with a neat sketch. 8

UNIT — IV

- IX (a) Explain various types of screens for removing floating matters in primary treatment of sewage. 7
- (b) Draw a neat sketch of a sludge digestion tank and explain its essential parts. 8

OR

- X (a) State the function of a trap in house drainage system and explain the classification of trap according to the shape with neat sketches. 7
- (b) Discuss flushing cisterns and explain the working of a bell type flushing cistern with a neat sketch. 8
-

**SCHEME OF VALUATION (Scoring indicators)**

Revision: 2015

Course title: Environmental Engineering

Course Code : 6012

Qst.no	Scoring indicator	Split up score	Sub total	total
I	PART-A.			
1.	Domestic purposes, civic or public purposes, Industrial Purposes, Business or trade purposes, Loss & waste.	any four		2.
2.	When chlorine is added to the raw water before any treatment is known as prechlorination. Post chlorination indicates the application of chlorine after all the treatment of purification of water are completed. [After it leaves rapid sand filters and before it enters the distribution systems]	1		2
3.	The underground conduits or drains through which sewage is conveyed are known as a sewer. The term Sewage is used to indicate the liquid waste from the community and it includes Sullage, discharge from latrines, urinals, stables, industrial waste etc. Storm water etc.	1		2
4.	The amount of oxygen required for microbes to carry out the biological decomposition of dissolved solids or organic matter in sewage under aerobic conditions at standard temperature is called BOD. The amount of oxygen required for the chemical oxidation of organic matter by strong oxidising agent under acidic conditions COD	1		2

**SCHEME OF VALUATION (Scoring indicators)**

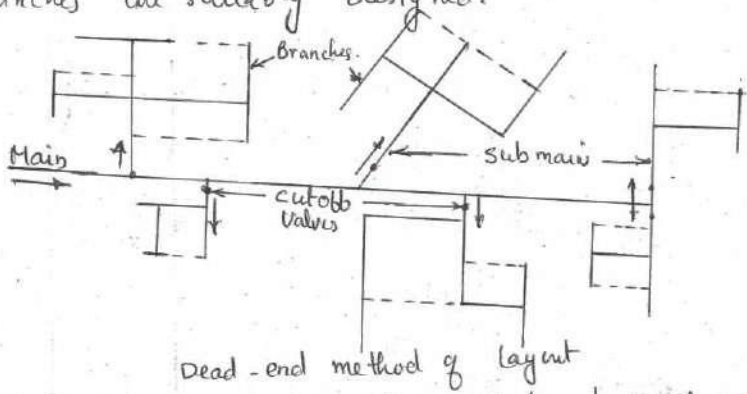
Revision:		Course Code :		
Course title:				
Qst.no	Scoring indicator	Split up score	Sub total	total
5.	<p>A trap is a depressed or bent sanitary fitting which always remains full of water.</p> <p>PART-B.</p>			2
1.	<p><b>Intermittent supply system:-</b> water is supplied only for a few fixed hours every day. This helps in reducing the losses in pipe lines, taps etc and also discouraging the consumer from a too liberal use of water. The usual period of supply is about one to four hours in the morning and same period in the afternoon. This system of supply of water useful for two conditions</p> <ol style="list-style-type: none"> <li>1. the available pressure is poor</li> <li>2. The quantity of water is not sufficient to meet with various demands for water</li> </ol> <p><b>Continuous system:-</b> In this system water supply is continuous, extending to all at the 24 hours of the day. The necessity of storage of water in huge vessels is avoided, But losses in pipes, taps, conveyance joints etc will be maximum. This is the most ideal system of supply.</p>	3.		
2.	<p>This is also known as the tree system of layout and it consists of one supply main from which submains are taken. The submains again divided into several</p>	3		6.

**SCHEME OF VALUATION (Scoring indicators)**

Revision: (2) Course Code :

Qst.no	Scoring indicator	Split up score	Sub total	total
--------	-------------------	----------------	-----------	-------

branches from which service connections are given to the consumers. The diameters of mains, submains and branches are suitably designed.



2

4

6.

3. Flush hydrant :- It is provided below footpath or street level and it is protected or covered by a cast iron box or brick masonry chamber.

1

Post hydrant :- It is provided projecting above the road level and its height above road level is about 1m to 2m.

1

Requirements :-

1. It should be cheap
2. It should be easily detectable in case of fire.
3. It should be such nature that it can be easily connected with the hose of motor pump.
4. It should function properly and should not go out of order during operation
5. It should permit undisturbed flow of water when being fully opened.

any four

4x1 = 4

6.

4. Combined systems :- when only one set of sewers is laid

**SCHEME OF VALUATION (Scoring indicators)**

Revision:

Course Code :

Course title:

Qst.no	Scoring indicator	Split up score	Sub total	total
5.	<p>to carry both the sanitary sewage and storm water, it is called combined system. The sewage and storm water are carried to the sewage treatment plant.</p> <p><b>Separate system:-</b> When the domestic and industrial sewage are taken in one set of sewers, whereas storm water and surface water are taken in another separate set of sewers, it is called separate system. The sewage is carried to the treatment plant and storm water is directly discharged into the natural outlet to the river flow or streams.</p> <p><b>Partially Separate system:-</b> In the separate system, if a portion of storm water is allowed to enter in the sewers carrying the sewage, and the remaining storm water flows in separate set of sewers, it is called a partially separate system.</p> <p>1. Infiltration and exfiltration:- The infiltration is used to indicate the leakage of water from the ground surrounding the sewer and exfiltration is used to indicate the leakage of sewage from the sewer into the ground surrounding the sewer. Exfiltration will increase the quantity of sewage.</p> <p>2. Nature of industries:- The quantity of industrial sewage depends on the nature of industries.</p> <p>3. Population:- It is necessary that the future population</p>	2		6.

**SCHEME OF VALUATION (Scoring indicators)**

Revision: (3) Course Code :

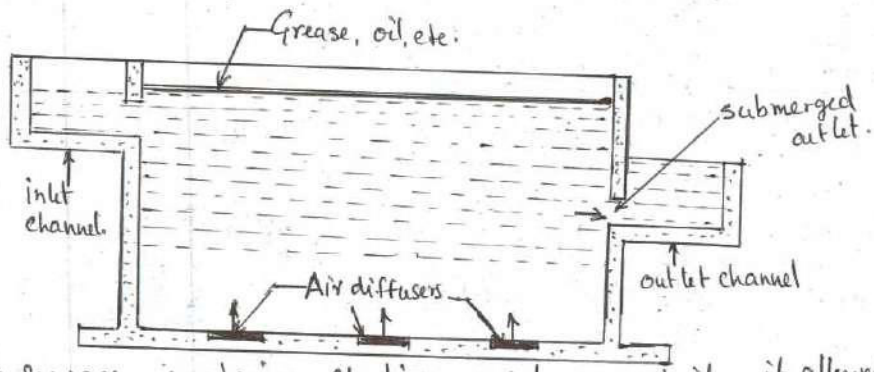
Qst.no	Scoring indicator	Split up score	Sub total	total
--------	-------------------	----------------	-----------	-------

after two or three decades is determined by applying any suitable method of population forecast as adopted for a water supply project. The design period for different parts of a sewerage system is different considering the life of a particular part of the sewerage system.

4. Rate of water supply:- The quantity of water entering the sewer will be slightly less than the quantity of water supplied. However, water supplied by private sources will compensate for the losses of evaporation, industrial use, fire extinguishing, lawns preparation etc. The rate of sewage will be assumed to be about 60% to 70% of the water supply.

1 1/2 x 4

6.



4

The sewage contains floating substances which, if allowed to remain in sewage, seriously affect the working of various treatment units. The object of installing a skimming tank is to remove such floating substances which include grease, soap, wood pieces, fruit sticks etc.

2

6.

**SCHEME OF VALUATION (Scoring indicators)**

Revision: \_\_\_\_\_ Course Code: \_\_\_\_\_  
 Course title: \_\_\_\_\_

Qst.no	Scoring indicator	Split up score	Sub total	total																														
7.	<p>soil pipe :- The term soil pipe is used to indicate the pipe which carries the discharges from soil fittings such as urinals, water closets, etc.</p> <p>Anti-siphonage pipe :- A pipe which is installed in the house drainage to preserve the water seal of traps is known as anti-siphonage pipe.</p> <p>Vent pipe :- The pipe installed for the purpose of ventilation is known as vent pipe and it should be open at one end. Top and bottom and such openings should be suitable levels for the flow of foul gases.</p>	2   2		6.																														
III a.	<p>PART C.</p> <table border="1"> <thead> <tr> <th>S.No</th> <th>Year</th> <th>Population</th> <th>Increase in population</th> <th>Incremental increase.</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>1925</td> <td>20000</td> <td></td> <td></td> </tr> <tr> <td>2</td> <td>1935</td> <td>30000</td> <td>10000</td> <td></td> </tr> <tr> <td>3</td> <td>1945</td> <td>42000</td> <td>12000</td> <td>2000</td> </tr> <tr> <td>4</td> <td>1955</td> <td>56000</td> <td>14000</td> <td>2000</td> </tr> <tr> <td>5</td> <td>1965</td> <td>75000</td> <td>19000</td> <td>5000</td> </tr> </tbody> </table> <p>Average /decade      <math>50000/4 = 13750</math>      <math>9000/3 = 3000</math></p> <p>The population in 1975 = The population in 1965 + (Average arithmetical increase + Average incremental increase) x number of decades. (1)</p> <p><math>= 75000 + (13750 + 3000) \times 1 = 91750</math>      -      (1)</p> <p>The population in 1985 = <math>75000 + [13750 + 3000] \times 2</math>      -      (1)</p> <p><math>= 108500</math></p>	S.No	Year	Population	Increase in population	Incremental increase.	1	1925	20000			2	1935	30000	10000		3	1945	42000	12000	2000	4	1955	56000	14000	2000	5	1965	75000	19000	5000	2+2	7	(*)
S.No	Year	Population	Increase in population	Incremental increase.																														
1	1925	20000																																
2	1935	30000	10000																															
3	1945	42000	12000	2000																														
4	1955	56000	14000	2000																														
5	1965	75000	19000	5000																														

**SCHEME OF VALUATION (Scoring indicators)**

Revision:

(4)

Course Code :

Course title:

Qst.no	Scoring indicator	Split up score	Sub total	total
b.	<p>1. Size of the town:- <del>The</del> bigger the town, the greater <del>the</del> will be the per capita demand of water. This is due to the fact that in big cities, water requirements will be more;</p> <p>2. Climatic conditions:- Water consumption in a hotter country will be more than in colder regions, as more water will be required for bathing, cleaning, maintenance of gardens, lawns etc. In colder cities, to prevent water freezing in pipes, the taps may be kept open and this may result in more leakage from metal joints.</p> <p>3. Habits of people:- The quantity of water consumed varies from rich people to poor people. The amount of water consumed usually depends upon the status of people.</p> <p>4. Industrial and commercial activities:- The industrial and commercial activities in a particular area definitely increase the demand for water. The demand due to industries and commerce depends on the number of industries and the business activities.</p> <p>5. Systems of water supply:- Unlimited supply of water can result in a reduction in demand because there can be saving in water consumption due to the reduction in wastage and losses. Sometimes the intermittent supply may produce increase in demand also.</p> <p>6. Quality of water supplied:- Good quality water is welcomed by domestic consumers and factories and the</p>			

8

**SCHEME OF VALUATION (Scoring indicators)**

Revision:

Course Code :

Course title:

Qst.no	Scoring indicator	Split up score	Sub total	total
	<p>demand will increase. The water is good, the people will never bother to think of alternative supplies of water such as well water and this results in increase in demand of water.</p> <p>7. Pressure in the distribution system:- Higher pressures in the distribution system will result in increase of water consumption and thereby demand.</p> <p>8. Development of <del>sewer</del> Sewerage facilities:- Conservancy demands less of water than the water carriage system. In water carriage system, demand becomes more because water will be liberally used by the consumers for flushing toilets, urinals etc.</p> <p>9. Policy of distribution:- If the supply is unlimited and the consumers are asked to pay a fixed amount every month naturally, lot of water will be wasted and the demand increases.</p> <p>10. Cost of water:- Cost of any material influences its consumption and thereby demand.</p>	<p>any 8 points</p>	<p>8x1 28</p>	<p>8.15</p>
<p><u>IV</u> 9.</p>	<p>Acidity:- This is the most important factor in corrosive water having low <math>P^H</math> value due to the presence of carbonic acid or other acids is invariably corrosive.</p> <p>Alkalinity:- The water possessing sufficient calcium bicarbonate alkalinity is anti-corrosive in nature.</p> <p>Biological action:- The growths of non-bacteria and sulphur bacteria may develop aerobic and anaerobic corrosion respectively.</p>			



**SCHEME OF VALUATION (Scoring indicators)**

Revision:		Course Code :		
Course title:				
Qst.no	Scoring indicator	Split up score	Sub total	total
V a.	<p>An intake chamber is constructed in the canal section. The entry of water in the intake chamber takes through the coarse screen and the top of the outlet pipe is provided with fine screen. Inlet to outlet pipe is of bell-mouth shape with perforations on fine screen on its surface. The outlet valve is opened/operated from the top and it controls the entry of water in the outlet pipe from where it is taken to the treatment plant. As the water level of the canal is constant, it is not necessary to provide intake pipes in different levels. To reach up to bottom provide steps in zig-zag manner, starting from manhole.</p>	3	8	(15)
	<p>Physical impurities, chemical impurities, Biological impurities.</p> <p>1. Colour:- Pure water is colourless.</p> <p>The sources which contribute colour to the water are -</p> <ol style="list-style-type: none"> <li>1. algae metabolism.</li> <li>2. end products of degraded organic matter.</li> <li>3. divalent species containing iron and manganese etc.</li> </ol> <p>The colour caused by the suspended matter is known as apparent colour, and dissolved solids that remain removal of suspended matter is referred as true colour. An undesirable appearance is produced by colour in water. The measurement of colour in water is carried out by means of tintometer. This instrument has an eye piece and two holes. In one hole <sup>sample of</sup> standard water and other hole a slide of water to be tested is inserted. The unit of colour on cobalt scale is the colour produced by one milligram of platinum cobalt in a litre of distilled water. The number of cobalt scale not exceed 20 and should be preferably less than 10.</p> <p>2. Taste and odour:- The water possesses taste and odour due to various causes and they make the water unpleasant</p>	1		

**SCHEME OF VALUATION (Scoring indicators)**

11

Revision:

(6)

Course title:

Course Code :

Qst.no	Scoring indicator	Split up score	Sub total	total
	<p>or dunking. The test is carried out by is having through two tubes of an osmoscope. One tube is kept in a flask containing diluted water and the other one in a flask containing water to be tested. The taste and odour may also be tested by threshold number. The water supplied should not contain objectionable taste and odours.</p> <p>Temperature :- The desirable temperature of potable water is 10°C while temperature of 25°C is considered to be objectionable. The measurement of temperature of water is done with the help of ordinary thermometer.</p> <p>Turbidity :- The colloidal matter present in water interfere with passage of light and thus impart turbidity to water. The turbidity also be due to clay and silt particles, discharge of sewage etc. The measurement of turbidity in the field is done by means of turbidity rod and it is referred to as visual method of turbidity measurement. The turbidity is measured in ppm.</p> <p>b. Working of Rapid sand filter :- The inlet valve (1) is opened and the water from coagulated sedimentation tank is allowed to enter the filter. The filtered water storage tank valve (2) is opened to carry filtered water to the filtered water storage tank. All other valves are kept in closed position. Only valve No: 1 &amp; 2 are open in working condition of Rapid sand filter.</p> <p>Valve No-3 - waste water valve - (4) Wash water storage tank valve (2)                      (5) - waste water valve (6) Compressed air valve.</p>	<p>1 1/2 x 4</p>	<p>47</p>	<p>78</p>

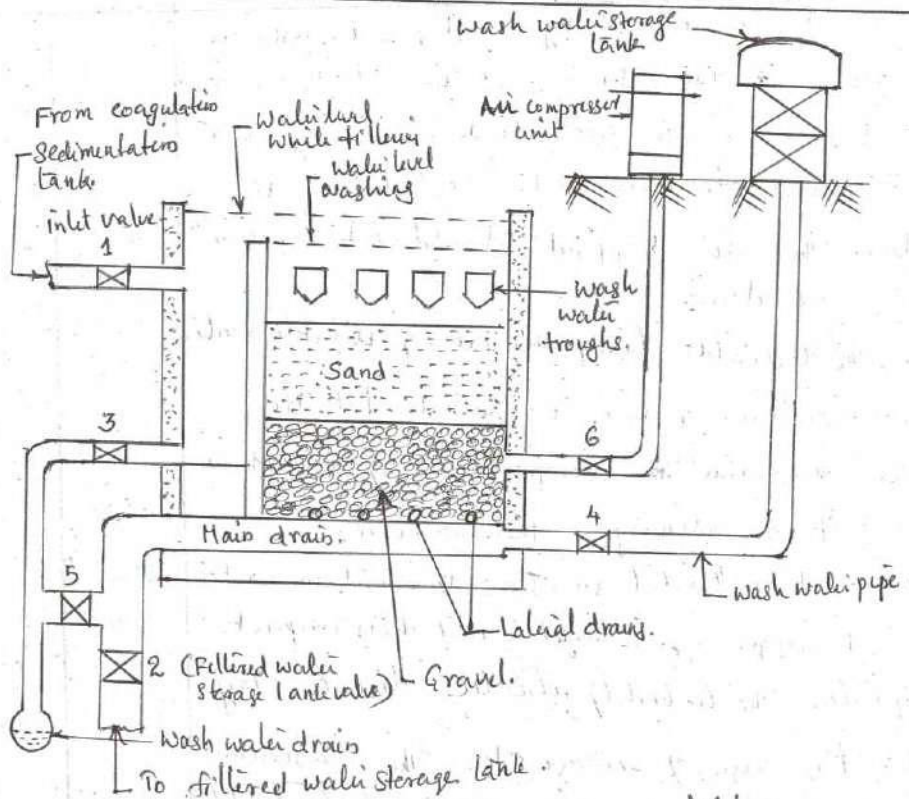
**SCHEME OF VALUATION (Scoring indicators)**

Revision:

Course title:

Course Code :

Qst.no	Scoring indicator	Split up score	Sub total	total
--------	-------------------	----------------	-----------	-------



(6)

8

8(15)

✓ a.

1. In the normal condition the chamber is full of water drawn from wash pipe. The float therefore touches the roof of chamber and poppet valve is in a closed position.
2. When air from wash pipe enters the chamber, it starts accumulating just below the roof of chamber. This accumulation of air makes the lever to work and to bring down the float.

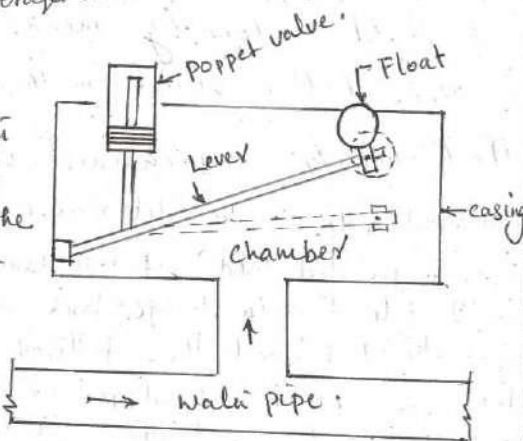
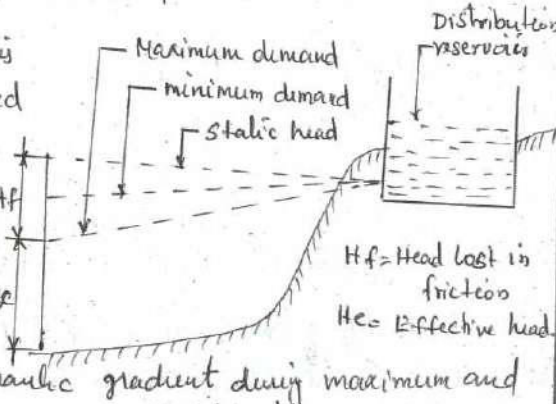
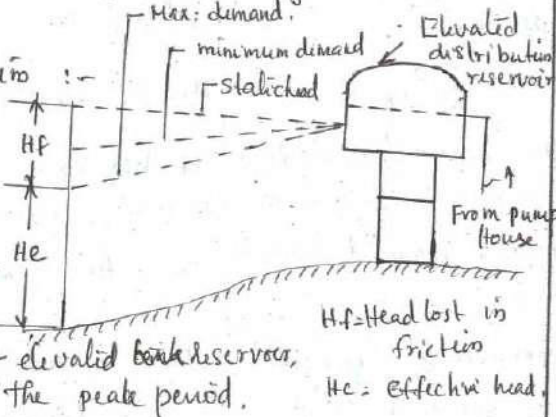


Figure - 3

**SCHEME OF VALUATION (Scoring indicators)**

Revision: (4) Course Code: \_\_\_\_\_  
 Course title: \_\_\_\_\_

Qst.no	Scoring indicator	Split up score	Sub total	total
	<p>3. Pulling down of float by lever operates the poppet valve which is then opened. The air is thus allowed to escape through the poppet valve.</p> <p>4. When air escapes, the water rises again in the chamber and the lever works to rise the float. It ultimately results in the closing of poppet valve before escape of water takes place through it.</p> <p>5. The action of air valve is the repeated.</p> <p>b.</p> <p>1. Gravity system :- In this system, the water is conveyed through pipes by gravity only. The source of water is situated at a higher level than that of distribution area. The figure shows the gravity system with hydraulic gradient during maximum and minimum demands.</p>  <p>2. Gravity and pumping system :- In this system, the treated water is pumped and stored in an elevated distribution reservoir. The excess water during low consumption remains in the elevated reservoir, and it is supplied during the peak period.</p> 	<p>working 4</p> <p>3</p> <p>2 1/2</p>	<p>7</p>	<p>8</p>

SCHEME OF VALUATION (Scoring indicators)

Revision:

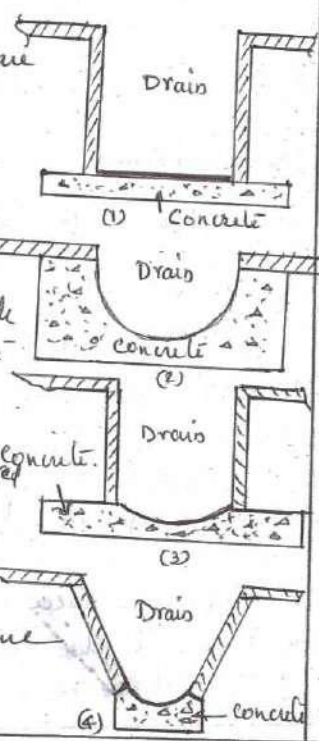
Course title:

Course Code :

Qst.no	Scoring indicator	Split up score	Sub total	total
<p>3. Pumping systems.</p> <p>In this system, the water is directly pumped into the mains leading to the consumers. The number of pumps required in this system will depend on the demand of water.</p>		2 1/2	8	(15)
VII a.	Conservancy system	water carriage system.		
<ol style="list-style-type: none"> <li>It does not permit compact design of structures</li> <li>It is laid above ground. Hence it is visible, but non-hygienic.</li> <li>It requires small quantity of water to the extent of about 30 to 40 litres per capita per day.</li> <li>There exists putrefaction</li> <li>It has been normally considered as system for rural conditions.</li> <li>The labour force required is much more.</li> <li>There is presence of segregation.</li> <li>It is cheap in initial cost but expensive in maintenance work.</li> </ol>	<ol style="list-style-type: none"> <li>It permits compact design of structures</li> <li>It is necessarily laid below ground. Hence it is not visible, but hygienic.</li> <li>It requires large quantity of water to the extent of about 100 to 120 litres per capita per day.</li> <li>There are no chances for putrefaction.</li> <li>It has come up basically as an urban system.</li> <li>only few labours are required.</li> <li>There is absence of segregation.</li> <li>It is expensive in initial cost but maintenance cost are low.</li> </ol>	any 7x1	7	

**SCHEME OF VALUATION (Scoring indicators)**

Revision: (8)		Course Code :		
Course title:				
Qst.no	Scoring indicator	Split up score	Sub total	total
9.	There are chances for the cut break of epidemic			
10.	It does not require the help of skilled or technical personnel.			
	<p>The risks of cut break of epidemic is greatly reduced.</p> <p>It requires the help of skilled or technical personnel for laying, maintenance and running of treatment units.</p>			
b.	<ol style="list-style-type: none"> <li>The inner surface of drains should be made smooth.</li> <li>The joints of such drains should be properly and neatly finished</li> <li>They should be laid at such a gradient that self-cleansing velocity is developed</li> <li>They should be laid on easy curves.</li> <li>They should be properly designed with reasonable provisions of free board.</li> </ol>	any 4 @ 4 = 16		
	<ol style="list-style-type: none"> <li>Rectangular surface drains :- These drains are suitable for carrying heavy discharge.</li> </ol>			
	<ol style="list-style-type: none"> <li>Semi-circular surface drains :- These drains can be easily constructed. The drains can also be formed by using readymade semi-circular sections of stoneware or concrete or AC pipes.</li> </ol>			
	<ol style="list-style-type: none"> <li>U-shaped surface drains :- These drains are in the shape of letter U. They are known as U-shaped surface drains, easy to construct, advantages of rectangular and semi-circular surface drains.</li> </ol>			
	<ol style="list-style-type: none"> <li>V-shaped surface drains :- These drains possess better hydraulic properties but they are difficult to construct.</li> </ol>			



**SCHEME OF VALUATION (Scoring indicators)**

Revision: \_\_\_\_\_ Course Code: \_\_\_\_\_  
 Course title: \_\_\_\_\_

Qst.no	Scoring indicator	Split up score	Sub total	total
VIII a.	<ol style="list-style-type: none"> <li>1. Arrangement for primary treatment:- The crude sewage is to be pumped, it will be necessary to eliminate the floating materials and heavy mineral or inorganic matter contained in it. This is to be achieved by primary treatment.</li> <li>2. Sump well or wet well:- The purpose of providing sump well or wet well is to form a suction pit from which the pump may draw sewage. It may be square or rectangular or circular in shape. It may be constructed of brick masonry, concrete or stone masonry and usually provided by the side of pump room.</li> <li>3. Pump room or dry well:- In this room pumps are installed and the end of suction pipe is placed in the suction pit or wet well.</li> <li>4. Motor room:- This room is situated above the pump room and it accommodates the electric motors which run the pumps.</li> <li>5. Rising Mains:- The sewage after being pumped is led to gravity sewer through rising mains which may either be cast iron or steel or asbestos cement pressure pipes.</li> <li>6. Emergency exit pipe:- This is connected to a natural stream or river or storm water drain. Sumpwell is overflows due to any reason the excess sewage is diverted to through this pipe.</li> <li>7. Pumps:- The pumping station contains the required number of pumps to handle the quantity of sewage. A provision for standby units also be made.</li> <li>8. Automatic starter:- It helps in starting the pumps automatically when the level of sewage in wet well goes beyond particular point.</li> <li>9. Valves:- It is necessary to install various valves on the pipes. The usual valves are sluice valve, reflex and air valves.</li> <li>10. Flow recorders:- The flow recorders are installed in the sewage pumping station to know the quantity of sewage pumped every second or minute or a day.</li> </ol>		7	8

**SCHEME OF VALUATION (Scoring indicators)**

Revision:

(9)

Course Code :

Course title:

Qst.no

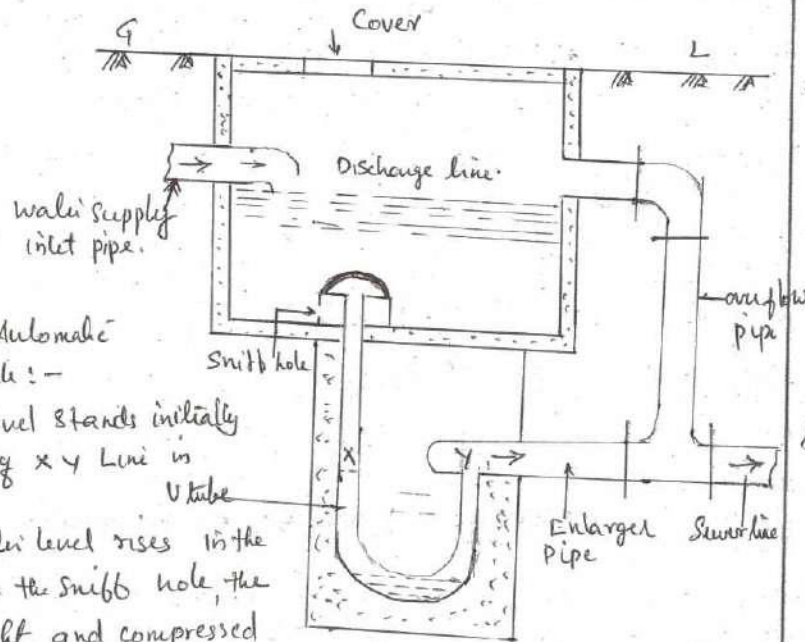
Scoring indicator

Split up score

Sub total

total

b.



Working of Automatic flushing tank :-

1. The water level stands initially at the level of X-Y line in U-tube.
2. As the water level rises in the tank above the sniff hole, the air is caught and compressed in the bell portion.
3. The compressed air exerts a pressure on the surface, at 'X' and hence the water level goes down in the longer arm of U-tube.
4. Ultimately a stage is reached when water level in the longer arm of U-tube reaches the bend portion; At this stage some compressed air is released through the shorter arm of U-tube and a corresponding quantity of water enters the bell.
5. The discharge line is reached at this stage and the head of water above the bell becomes greater than that in the shorter arm of U-tube. The compressed air is suddenly removed from the longer arm and the siphonic action starts. The water is discharged into the sewer line through the enlarger pipe.

Fig: 4

**SCHEME OF VALUATION (Scoring indicators)**

Revision: Course title:		Course Code :		
Qst.no	Scoring indicator	Split up score	Sub total	total
6.	<p>The siphonic action continues until the water level in tanks falls up to the level of siphon hole. The air then enters the bell through the siphon hole at its breaks the siphonic action.</p> <p>The water level in the two arms of U-tube again is XY line, and the process repeated.</p>	<p>workin</p> <p>4</p>	8	8 (15)
IX a.	<p>1. According to the size of openings :- The screens are classified as coarse screen, medium screen, fine screen</p> <p>The coarse screen are also known as the racks and the spacing between the bars about 40mm or more. This <del>are</del> <del>screen</del> reduce the organic load of sewage to some extent.</p> <p>Medium Screen :- The spacing between the bars is about 6mm to 40mm. Such screens remove organic load of sewage to a very small amount and it is not of much significance in the further treatment of sewage.</p> <p>Fine screen :- This have perforations of size about 1.5mm to 6mm. This is generally made of metal plates and wire mesh.</p> <p>2. According to the conditions of screens :- The screens are classified as fixed screen, movable screen, moving screen.</p> <p>Fixed Screen :- It is permanently set in position. A perforated platform is provided to receive the material collected from the screen bar.</p> <p>Movable Screen :- It is stationary during their operating period. But they can be lifted up bodily and removed</p>	<p>3 1/2</p>		

**SCHEME OF VALUATION (Scoring indicators)**

Revision: (10) Course Code: \_\_\_\_\_  
 Course title: \_\_\_\_\_

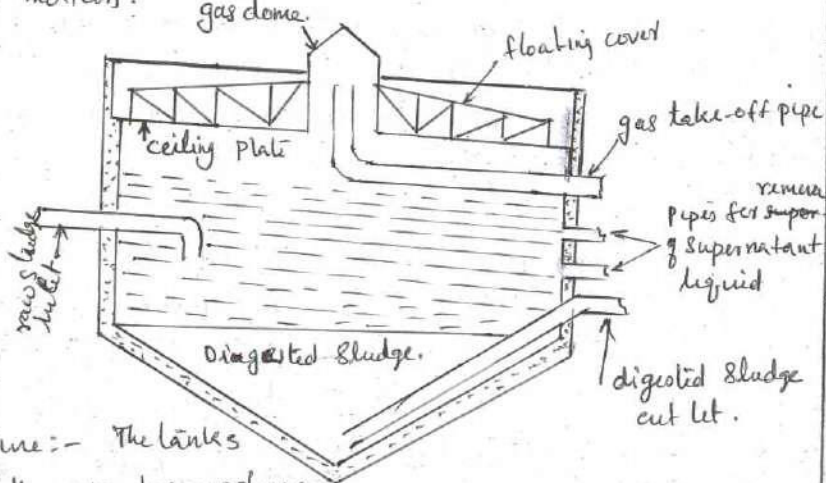
Qst.no	Scoring indicator	Split up score	Sub total	total
b.	<p>from their positions for the purpose of cleaning.</p> <p><b>Moving screen:-</b> It is moving during their operating period and they are automatically cleaned while they are in motion.</p>  <p>1. <b>Enclosure:-</b> The tanks are generally circular in shape and made of reinforced cement concrete. The dia of tank varies from 5m to 35m. and depth - 3m to 12m. The tanks are usually hopper-bottomed.</p> <p>2. <b>Floor:-</b> The floor of tank is given a slope of 1:1 to 1:3. But when mechanical equipment is used to move the sludge to the cut let, the bottom slope may be made relatively flat.</p> <p>3. <b>Gas dome:-</b> For collection of gas formed during digestion of sludge, a gas dome is provided, made up of suitable metal. It is cylindrical in shape and is fixed to the roof of tank together with various gas meter, pressure relief valve etc.</p> <p>4. <b>Heating arrangements:-</b> It is desirable to keep the tank as warm as practicable.</p>	3 1/2	7	7

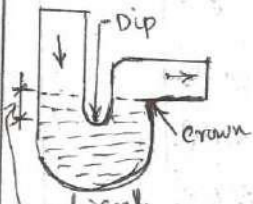
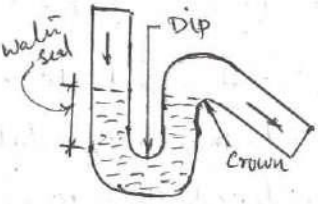
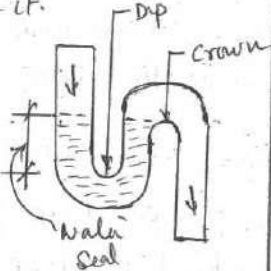
Figure - 4

**SCHEME OF VALUATION (Scoring indicators)**

Revision:

Course title:

Course Code :

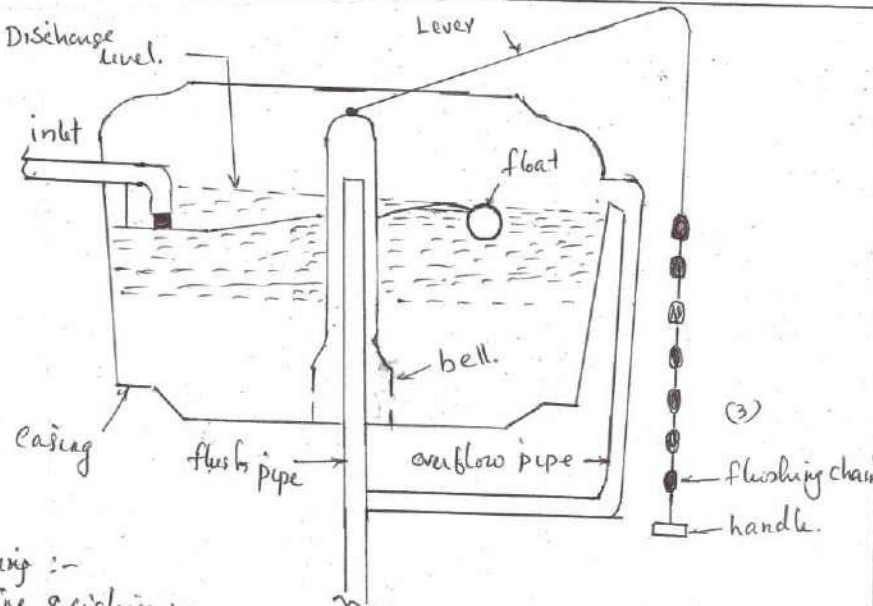
Qst.no	Scoring indicator	Split up score	Sub total	total
5.	Inlet and outlet:- The fresh raw sludge is usually introduced within the middle third section of the tank. The withdrawal of digested sludge is done from the centre of bottom.			
6.	Mixing devices:- For proper mixing of the incoming fresh sludge with the digested sludge, suitable mechanical equipment or recirculation pumps should be accommodated in the body of digestion tank.			
7.	Roof:- <del>It</del> may have roof or may not have roof. But when sludge gas is to be collected, the provision of a roof is essential. It may be either floating or fixed type			
8.	Scum breaking device:- To avoid the troubles due to scum, it is to provide suitable device in the digestion tank to break up the scum either continuously or intermittently.	4	8	(15)
X a.	The function of a trap in a drainage system is to prevent the passage of foul air or gases through it. But at the same time, it allows the sewage to flow through it.	1		
	 <p>P-trap :- Shape of letter P. The legs of trap are at right angles to each other.</p>	2 + 2 + 2		
	 <p>Q-trap :- Shape of letter Q. The legs of trap at an angle other than a right angle.</p>			
	 <p>S-trap :- Shape of letter S. The legs of trap are parallel.</p>			
			7	2

SCHEME OF VALUATION (Scoring indicators)

Revision: (11) Course title: Course Code :

Qst.no	Scoring indicator	Split up score	Sub total	total
--------	-------------------	----------------	-----------	-------

b.



Working :-

Flushing cistern :-

1. install flushing cistern in water closets and urinals.
2. These made of cast iron and for superior work porcelain may be used.
3. They are provided at a height of about 2m. from floor level and for western type height about 60cm. from floor level.
4. The capacity of flushing cistern varies from 5 to 15 liters.
5. They may be hand operated or automatic. (2)

The working of flushing cistern is simple. The flushing chain is pulled by hand and by the levee action, the bell inside the cistern is lifted up. As a result of this action, the partial vacuum is created at the crown of bell which causes water to spill over the top of the flush pipe. The siphonic action thus starts and the water of tank enters the bell through holes provided near the bottom portion. When the tank empties out, the float is lowered and the water from inlet starts to accumulate in the tank. (2)

Discussion - 2  
fig: 3  
Working - 3.

2+3+3.

8

(15)