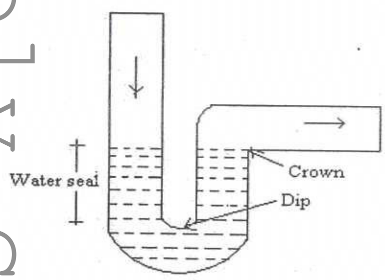
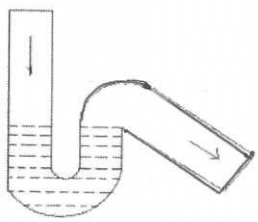
SCHEME OF EVALUATION

(Scoring Indicators)

Revision : 2010 Course Code : 4011

Course Title : ENVIRONMENTAL ENGINEERING

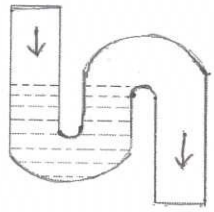
Qn. No.	Scoring Indicator	Split up Score	Sub Total	Total
	PART - A			
I 1	The pervious layer or water bearing strata on earth's surface is called an aquifer			2
2	Yield of a well is the rate of withdrawal or pumping of water from wells without causing failure or drying of wells. It is thus a rate at which a well delivers water.			2
3	(i) Physical impurities (ii) Chemical impurities (iii) Bacteriological impurities			2
4	Sewage is the liquid waste from community which includes sullage, discharge from latrine, urinals, industeial waste, storm water etc,.while sewer is the underground pipe through which sewage is conveyed.			2
5	When sewage is discharged into natural waters, its organic matters get oxidised by dissolved oxygen in water and the sewage is converted into inoffencive substances. The defficiency of dissolved oxygen in natural water is filled up by the absorption of atmospheric oxygen. This phenomenon is called self purification.			2
	PART -B			
II 1	(i) climatic conditions	1		
	(ii) cost of water	1		
	(iii) distribution pressure	1		
	(iv) habits of population	1		
	(v) policy of metering	1		
	(vi) quality of water	1		6
2	(i) Lakes and streams:- Lake is a large body of water within land with impervious bed. Streams are formed by the surface runoff.The flow in stream in summer is less. The water available from these sources are moreover pure but are not considered as the principle source for large cities.	1.5		
	(ii) Ponds:- It is a manmade water body smaller than lake. The water may contain impurities. It cannot be adopted as a source of water for a scheme.	1.5		
	(iii) Rivers:- They may be perennial or non-perennial. Dams may be constructed across non-perennial rivers to store water for summer. The water may contain silt and suspended impurities, sewages etc,. Hence treatment is necessary to make the water potable. Large rivers are the principle source for a scheme.	1.5		
	(iv) Storage reservoirs:- It is an artificial lake formed by constructing a dam across a valley to store water for various purposes.	1.5		6

3	(i) Reflux valves:- It is also called as non-return valves which allows water to go in one dorection only. When water moves, the valve swings around the pivot and it kept in open condition due to the pressure of water. When the flow ceases, the valve occupies its seat and prevent the back flow of water.	2	
	(ii) Scour valve:- These are known as drain or washout valves. They are located at dead ends or lowest point in mains. The are operated to remove silt deposits in water pipe.	2	
	(iii) Stop cocks:- These are small sluice valves installed on water pipe leading to flushing tank, wash basin, water tank etc,.	2	6
4	(i) Air diffusion:- Perforated pipes are installed at the botom of tank and compressed air is blown through these pipes. The air bubbles while coming up come into contact with water.	1.5	
	(ii) Cascades:- The waterfalls consists of a series of three or four steps which are made of concrete or metal. The water is allowed to fall through a height of 1 to 3 m.	1.5	
	(iii) Spray nozzles:- In this, water is sprinkled through nozzles to a height of about 2-2.5 m which removes Co2 of about 90%.	1.5	
	(iv) Trickling beds:- Beds of cock or slag are prepared and are supported over perforated trays. Beds are arranged in vertical series. Water is discharged through perforated pipes and allowed to trickle down through the beds to occur aeration	1.5	6
5	(i) Advantages:- It permits a compact design. This system is hygenic. The land for treatment is small when compared to conservancy system. Moderm methods can be adopted for sewage treatment. This system require more water for flushing of solid matters, but in practice usual water supply is only needed.	3	
	(ii) Disadvantages:- The initial cost is high. This system require pumping. It requires skilled supervision and maintenance.	3	6
6	(i) P-trap It has the shape of letter 'P' The legs are at right angles to each other. 	2	
	(ii) Q-trap This trap has the shape of letter 'Q' The legs meets at an angle other than right angle. 	2	

(iii) S-trap

This trap has the shape of letter 'S'

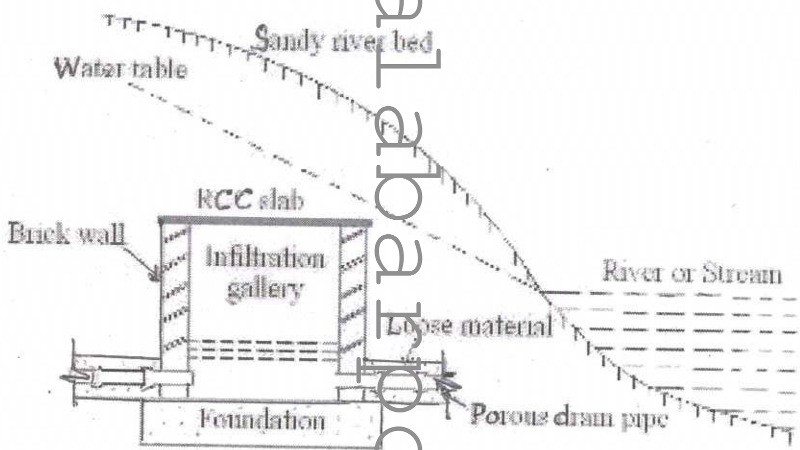
The legs are parallel.



2 6

7 It is a pipe which is provided in house drainage to preserve the water seal of traps. It maintain proper ventilation and does not allow the siphonic action to take place. The water seal may break due to siphonic action when water is suddenly discharged from fixtures on upper floor. If sanitary fittings on different floors are connected by a common pipe, when the discharge from upper floor comes down, takes away the air from short branch drain pipe causes siphonic action to take place and the water seal of trap in lower floor brakes. To avoid this, a separate pipe of smaller diameter is attached to the trap is called anti-siphonage pipe which supplies air to short branch during suction. It also act as vent pipe 6

III (a)



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It is a horizontal tunnel which is constructed through water bearing strata. It is constructed with brick walls with RCC roof slab at top. The gallery obtains water from water bearing strata through porous drain pipes which are covered with gravel to prevent the entry of fine materials. The gallery is laid at a slope and is led to a sump well from where it is pumped to treatment plant for purification. 3 8

(b) <u>% increase in population</u>

from present and before 1 decade = (50000-47100)/47100 x100 = 6.16

before 1 decade and 2 decade = (47100-43500)/43500 x 100= 8.28

before 2 decade and 3 decade = (43500-41000)/41000 x 100 = <u>6.10</u>

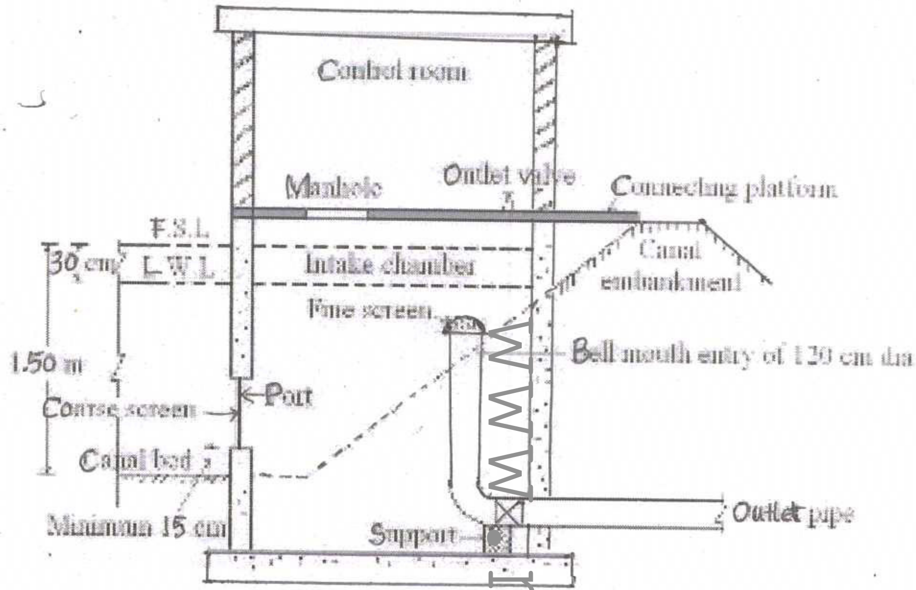
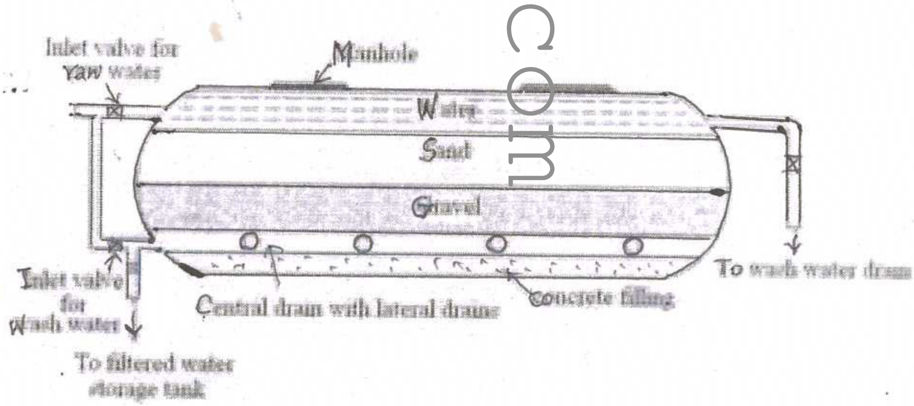
Total = 20.54

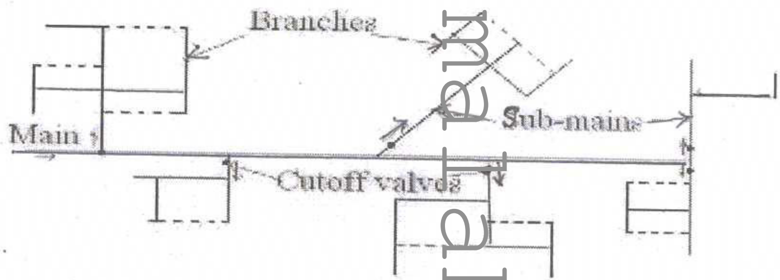
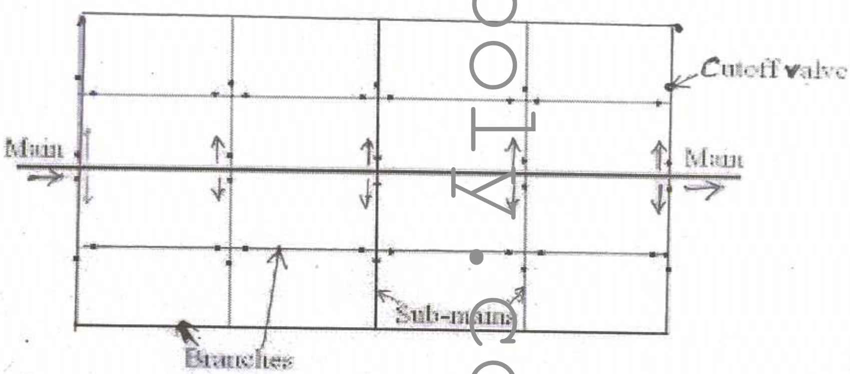
Average % = 20.54/3 =6.85 say 7 4

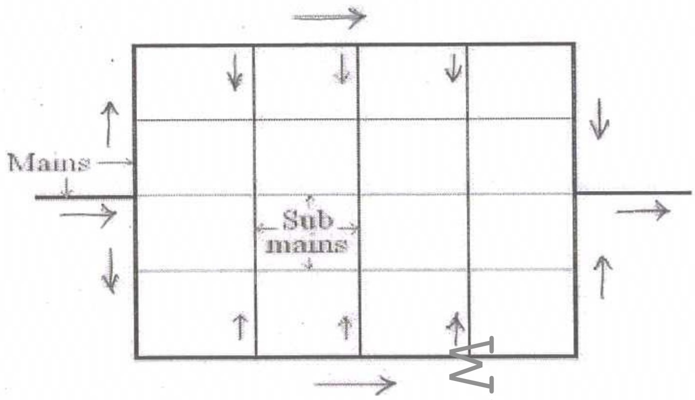
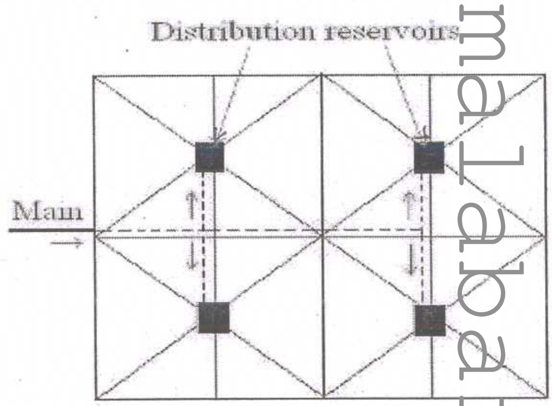
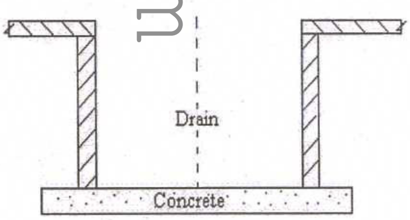
Population after 1 decade = 50000+50000 x 0.07 = 53500

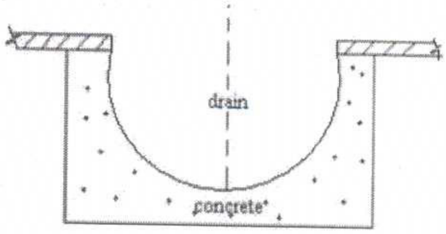
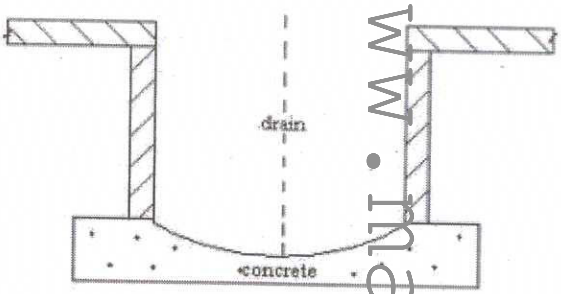
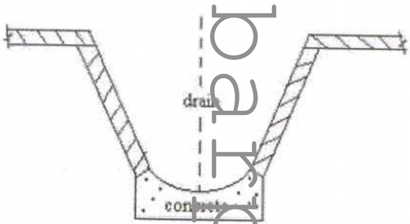
Population after 2 decade = 53500+53500 x 0.07 = 57245

Population after 3 decade = 57245+57245 x 0.07 = 61252 3 7 15

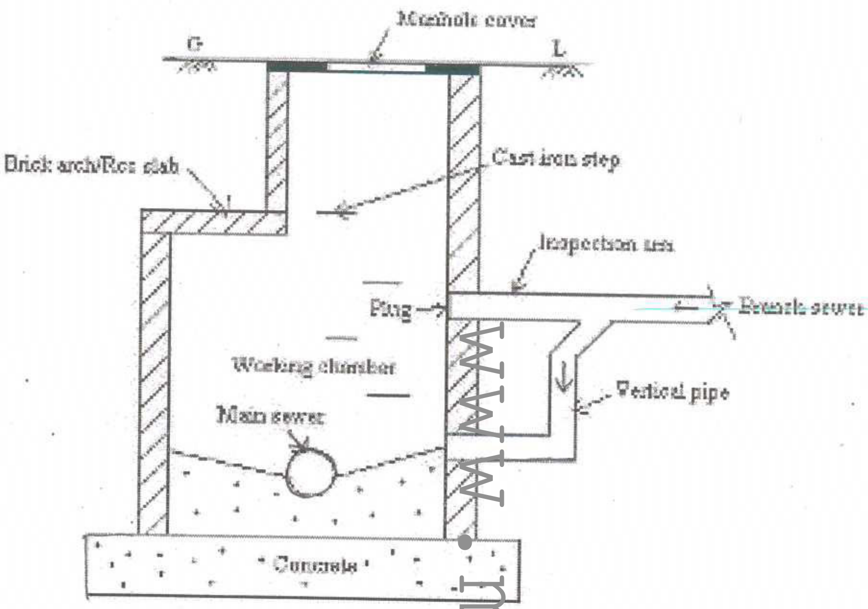
IV (a)		5		
	The intake chamber is constructed in the canal section. The entry of water to intake chamber takes through a coarse screen and the top of outlet is provided with a fine screen. The outlet valve can be operated from top. The outlet pipe leades to the treatment plant which is laid through the body of canal embankment.	3	8	
(b)	<u>Causes</u> Acidity Alkalinity Biological action Chlorination Electrical current Oxygen	3		
	<u>Prevention</u> Cathodic protection Proper pipe material Protective linings Treatment of water	4	7	15
V (a)		5		

	The water mixed with coagulant is directly admitted to the pressure filter to takes place the flocculation. In normal condition, all valves are closed except those for raw water and filtered water. For cleaning, compressed air may be used to agitate the sand grains. The valves for raw water and filtered water are closed and the valves for wash water and wash water drain in open condition.	3	8	
(b)	Boiling method	1		
	Excess lime treatment	1		
	Iodine and bromine treatment	1		
	Ozone treatment	1		
	Pottassium permanganate treatment	1		
	Silver treatment	1		
	Ultra-violet ray treatment	1	7	15
VI (a)	(i) Dead end method			
		1		
	It is also as called tree system. It consists of one main supply from which submains starts. The submains are again divided in to several branches to act as service connection to consumers.	1		
	(ii) Grid-iron method			
		1		
	It is also known as interlaced system. The mains, submains and branches are interconnected with each other.	1		

	(iii) Circular method			
		1		
	It is also known as ring system. A ring is formed around the distribution area. The area is divided into rectangular blocks. The main line is laid on the periphery.	1		
	(iv) Radial method			
		1		
	mains and pumped into the distribution reservoirs which are situated at the centres of different zones. The water is supplied through radially laid pipes.	1		8
(b)	Plain chlorination	1		
	Pre-chlorination	1		
	Post-chlorination	1		
	Double chlorination	1		
	Breakpoint chlorination	1		
	Super-chlorination	1		
	Dechlorination	1	7	15
VII(a)	(i) Rectangular			
		1		
	These are suitable to carry heavy discharges. They get easily silted.	1		

	(ii) Semi-circular			
		1		
	They can easily constructed. Readymade section are available. They are suitable for small discharges.	1		
	(iii) U-shaped			
		1		
	They can easily constructed. They combine the advantages of semicircular and rectangular shapes.	1		
	(iv) V-shaped			
		1		
	They possess better hydraulic properties. They are difficult to construct. They does not permit to deposit solids at any point.	1	8	
(b)	Asbestos cement sewer	1		
	Brick sewer	1		
	Cast-iron sewer	1		
	Cement concrete sewer	1		
	Plastic sewer	1		
	Steel sewer	1		
	Stoneware sewer	1	7	15

VIII(a)



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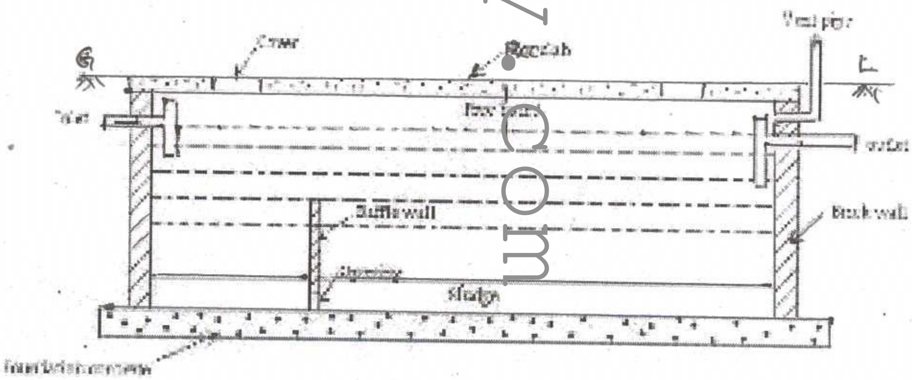
It is constructed to provide a connection between high level branch sewer to a low level main sewer with minimum amount of disturbance. The branch sewer is joined to the manhole through a vertical pipe. A plug is provided at the point where branch sewer intersect with the wall. The cleaning of branch sewer is done through inspection arm. 3 8

(b) Circular section 1
Semicircular section 1
Basket-handle section 1
Egg shaped section 1
Horse shoe section 1
Parabolic section 1
Rectangular or box type section 1 7 15

IX (a)



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		It is a rectangular watertight tank with brick walls. The direct current of flow between inlet and outlet is prevented by tee pipes and baffle wall. Level of outlet pipe is 15 cm lower than inlet pipe. Vent pipe is provided for ventilation. Top of tank is provided with RCC slab with manhole. The sludge is allowed to accumulate at the bottom and is removed at intervals by manual labour or by pumping. Before the tank is put in to operation, it is filled with water. The effluent is carried to a soak pit for disposal.	4	8	
	(b)	Bio-gas is a mixtute of gases with about 2/3 portion methane and the remainder is Co2 along with small amount of nitrogen, hydrogen, oxygen, H2S, ammonia etc,. Bio-gas can be generated from animal dung, human excreta, vegitable waste, agricultural waste etc,. Ferro-cement tank is constructed for the digestion of wastes. Bio-gas digester may be fixed dome, flexible bag, floating gas holder, prototype digester. Fixed dome digester is more popular due to low cost and is a underground structure with reduced maintenance. Khadi and Village Industries (KVIC) also designed bio-gas plants. The plant gives high calorific, ashless and smokeless fuel. The sludge is used as manure.		7	15
X	(a)	(i) Effects on certain materials:- Air pollutants causes abration, corrosion, deposition and removal, direct and indirect chemical attack etc,.	2		
		(ii) Effects on human health:- Human health is affected by inhaling undesirable gases.	2		
		(iii) Effects on physical features of atmosphere:- Due to the presence of pollutants like dust, the visibility is reduced. Urben air pollution is due to smoke, fog, dust and other aerosols. The increased presence of Co2 causes air pollution.	2		
		(iv) Effects on vegitation:- Low concentration of ozone, nitrogen dioxide, So2 may damage the vegitation. Human health is affected by the consumption of such vegitation.	2	8	
	(b)	To advice local bodies. To advice state govt. on any matter relating to water pollution. To carryout river surveys. To conduct seminars and training courses. To develop public openion through media like television, radio, news paper etc,. To encourage ingestigations and research programmes relating to pollution control. To evolve efficient sewage disposal methods.		7	15
