UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, May 2019

Program/course: B.Tech (FSE)   Semester –VI
Subject: Water Supply, Sanitation and Refugee Health in Emergency Situation   Max. Marks : 100
Code   : HSFS3014   ration   : 3 Hrs
No. of page/s:2

SECTION A

S. No.		Marks	CO
	Answer all the question.		
Q 1	A compound piping system consists of 1800m of 0.50m 1200m of 0.4m and 600m of 0.3m new cast iron pipes connected in series. (a)Find the length of equivalent pipe having diameter 0.4m (b)Equivalent size pipe of length 3600m.	4	CO5
Q 2	What do you understand by continuous and intermittent system of water supply? What are their relative advantage and disadvantages?	4	CO1

Q 3	Describe following,
	    a. Hypo chlorination
	    b. Drawbacks of UV light Filtration
		4	CO2

Q 4	A pump is a device that moves fluids (liquids or gases), or sometimes slurries, by mechanical action. Pumps can be classified into different groups according to the method they use to move the fluid. Differentiate displacement pump and Reciprocating pump.	4	CO2
Q 5	Illustrate water hammer and list out its disadvantage in water supply.	4	CO1
	SECTION B		
	Answer four questions.		
Q 6	Extrapolate different methods of laying out water distribution system with their advantage and disadvantage.	10	CO3
Q 7	What is hygiene promotion? Mention various areas of Concern in Hygiene promotion. Explain the key principles of hygiene promotion. Mention various areas of training to promote hygiene. **OR** Studies on the incidence of phages and various microbes in water have been reported from most parts of the world therefore it is important to check the quality of water before supply else it will lead to multiple water born disease, discuss short notes on water born disease.	10	CO1,4
Q 8	The population of a city is 800 000 and it is to be supplied with water from a reservoir	10	CO5

	6.4 km away. Water is to be supplied at the rate of 140 liters per head per day and half the supply is to be delivered in 8 hours. The full supply level of the reservoir is R. L. 180.00 and its lower water level is R. L. 105.00. The delivery end of the main at R. L. 22.50 and the head required there is 12 m. Find the diameter of the pipe. Take f = 0.04.		
Q 9	A pipe in 100 mm diameter has a nozzle attached to it at the discharge end, the diameter of the nozzle is 50 mm. the rate of discharge of water flowing through the nozzle is 20 LPS and the pressure at the base of the nozzle is 5.886 N/cm^2 Calculate the coefficient of discharge. Assume that the base of the nozzle and outlet of the nozzle are at the same elevation.	10	CO5
	SECTION-C		
	Answer two question.		
Q 10	A 180m long pipeline runs (through three points ABC) at an upward slope of 1 in 60. The length of the portion AB is 90m and its diameter is 0.15m. At B, the pipe section suddenly enlarges to 0.3m diameter and remains so for the remainder of its length BC, which is 90m. A flow of 50 L/sec is pumped into the pipe at its lower end A and is discharged at the upper end C into a closed tank. The pressure at the supply end A is 137.34 KN/m^2. Sketch the hydraulic grade line and energy grade line and also find the pressure at the discharge end C. Take f=0.02.	20	CO5
Q 11	In a 45 degree bend a rectangular air duct of 1 m^2 cross sectional area is gradually reduced to 0.5 m^2 area. Find the magnitude and direction of the force required to hold the duct in position if the velocity of flow at the 1 m2 section is 10 m/s and pressure is 2.943 N/cm^2. Take density of air 1.16 kg/ m^3 **OR** The water is flowing through a taper pipe of length 100m having diameters 600 mm at the upper end and 300 mm at the lower end at the rate of 50litres/s. The pipe has a slope of 1 in 30. Find the pressure at the lower end if the pressure at the higher level is 19.62 N/cm2. .	20	CO3,5

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SECTION A

S. No.		Marks	CO
	Answer all the question.		
Q 1	A pump is a device that moves fluids (liquids or gases), or sometimes slurries, by mechanical action. Pumps can be classified into different groups according to the method they use to move the fluid. Differentiate Piston pump &Diaphragm pump.	4	CO2

Q 2	Describe following with their application,
	    a. Hypo chlorination
	    b. Drawbacks of ozonation
		4	CO3

Q 3	A compound piping system consists of 1200m of 0.50m 1000m of 0.4m and 500m of 0.3m new cast iron pipes connected in series. (a)Find the length of equivalent pipe having diameter 0.4m (b)Equivalent size pipe of length 3600m.	4	CO3
Q 4	Illustrate water hammer and list out its disadvantage in water supply.	4	CO1
Q 5	What do you understand by continuous and intermittent system of water supply? What are their relative advantage and disadvantages?	4	CO2

SECTION B

	Answer four questions.		
Q 6	Find the diameter of the pipe. If population of a city is 800 000 and it is to be supplied with water from a reservoir 6.4 km away. Water is to be supplied at the rate of 140 liters per head per day and half the supply is to be delivered in 8 hours. The full supply level of the reservoir is R. L. 180.00 and its lower water level is R. L. 105.00. The delivery end of the main at R. L. 22.50 and the head required there is 12 m. Take f = 0.04.	10	CO4
Q 7	A pipe in 50 mm radius has a nozzle attached to it at the discharge end, the diameter of the nozzle is 50 mm. the rate of discharge of water flowing through the nozzle is 20 LPS and the pressure at the base of the nozzle is 5.886 N/cm^2 Calculate the coefficient of discharge. Assume that the base of the nozzle and outlet of the nozzle are at the same elevation.	10	CO5
Q 8	Extrapolate different methods of laying out water distribution system with their advantage and disadvantage.	10	CO3

Q 9	What is hygiene promotion? Mention various areas of Concern in Hygiene promotion. Explain the key principles of hygiene promotion. Mention various areas of training to promote hygiene. **OR** Studies on the incidence of phages and various microbes in water have been reported from most parts of the world therefore it is important to check the quality of water before supply else it will lead to multiple water born disease, discuss short notes on water born disease.	10	CO2,3
	SECTION-C		
	Answer two question.		
Q 10	In a 45 degree bend a rectangular air duct of 2 m^2 cross sectional area is gradually reduced to 0.5 m^2 area. Find the magnitude and direction of the force required to hold the duct in position if the velocity of flow at the 1 m2 section is 20 m/s and pressure is 2.943 N/cm^2. Take density of air 1.16 kg/ m^3 **OR** The water is flowing through a taper pipe of length 100m having diameters 500 mm at the upper end and 200 mm at the lower end at the rate of 50litres/s. The pipe has a slope of 1 in 30. Find the pressure at the lower end if the pressure at the higher level is 19.62 N/cm2. .	20	CO4,5
Q 11	A 180m long pipeline runs (through three points XYZ) at an upward slope of 1 in 60. The length of the portion AB is 90m and its diameter is 0.15m. At B, the pipe section suddenly enlarges to 0.3m diameter and remains so for the remainder of its length BC, which is 90m. A flow of 50 L/sec is pumped into the pipe at its lower end A and is discharged at the upper end C into a closed tank. The pressure at the supply end A is 137.34 KN/m^2. Sketch the hydraulic grade line and energy grade line and also find the pressure at the discharge end C. Take f=0.02.	20	CO5