Total number of printed pages: 02 **Diploma/4th Semester/DFET401**

2023

ELEMENTS OF FOOD ENGINEERING-II

Full Marks: 100

Time: Three hours

The figures in the margin indicate full marks for the questions.

*Answer **any five** questions.*

1.	a)	Define :Weight density and Specific volume	2 ×2=4
	b)	State Continuity equation and derive an equation for incompressible fluids.	2+4 = 6
	c)	Calculate the density, specific weight and weight of 7 litre of petrol of specific gravity 0.7.	2+1+2=5
	d)	A 30 cm diameter pipe, conveying water, branches into two pipes of diameters 25 cm and 20 cm respectively. If the average velocity in the 30 cm diameter pipe is 3 m/s, find the discharge in this pipe. Also determine the velocity in 20 cm pipe if the average velocity in 25 cm diameter pipe is 4 m/s.	2+3=5
2.	a)	Explain the classification of fluid flows.	8
	b)	What is viscosity? Explain how viscosity varies with temperature.	2+5=7
	c)	A flat plate of area 2×10^5 mm^2 is pulled with a speed of 0.7 m/s relative to another plate located at a distance of 0.20 mm from it. Find the force and power required to maintain this speed, if the fluid separating them is having viscosity as 2 poise.	2+3=5
3.	a)	State and derive Euler's equation.	2+8=10
	b)	A pipe, through which water is flowing, is having diameters, 20 cm and 10 cm at the cross-sections 1 and 2 respectively. The velocity of water at section 1 is given 7 m/s. Find the velocity head 1 and 2 and also rate of discharge.	4+4+2=10
4.	a)	What are the different types of losses of energy in pipes?	3
	b)	Derive Darcy and Chezy's formula for loss of head due to friction in pipes.	7+3=10
	c)	Find the diameter of a pipe of length 2500 m when the rate of flow of water through the pipe is 250 litre/s and head lost due to friction is 7 m. Take C=50 in Chezy's formula.	7

5.	a)	State and explain Fick's law of diffusion.	2+4=6
	b)	Explain the Reynold's experiment with neat sketch.	8
	c)	Explain the application of refrigeration for food preservation..	6
6.	Write short notes on any four of the following		4×5=20
	a)	Classification of Fluids	
	b)	Relationship between S.I. unit and C.G.S. unit of Viscosity.	
	c)	Kinematic Viscosity	
	d)	Bernoulli's equation	
	e)	Discharge	
	f)	Specific gravity	

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