Total number of printed pages: 5

Diploma/4th sem/ DFET401

2024

DFET401: 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)	What is specific weight, specific gravity, specific volume and capillarity	4*2 = 8
	b)	A liquid has a mass of 50 grams and the volume of the water (reference material) is 10 ml. Calculate: specific gravity of the object.	10
	c)	Specify whether the object will sink or float in the water?	2
2.	a)	What is surface tension?	5
	b)	Find the surface tension of the liquid with a dragging force of 30 N when the length at which the force acts is 6 m.	10
	c)	Find the dragging force on the 3 m surface of the liquid if the surface tension is 7 N/m.	5
3	a)	What is Hagen-Poiseuille equation?	5
	b)	What is head loss and what are the types of head loss?	5
	c)	Find head loss due to the friction in units for a 100 m length of pipe. The oil has a specific gravity of 0.90. Reynold's number is 774. Velocity of 5 m/s. Radius is 10 m.	10
4.	a)	What is the continuity equation?	4
	b)	Derive the continuity equation.	6
	c)	Calculate volume flow rate (Q) and fluid velocity at point no. 2 where D_1 = 4m, D_2 = 2 m, V_1 = 10 m/s.	10

5.	a)	What is Fick's law of diffusion?	5
	b)	State Fick's 1st and 2nd law of diffusion along with equation.	10
	c)	Mention its applications.	5
6.	a)	What is convective mass transfer?	5
	b)	What are the two types of convective mass transfer.	5
	c)	What is mass transfer coefficient K_c and what are the factors affecting it.	10
7.	a)	What is psychrometry?	2
	b)	Mention its properties along with definition.	8
	c)	Also mention the types of psychrometric processes.	10