



Sanjay Ghodawat University, Kolhapur

Established as State Private University under Govt. of Maharashtra. Act No XL, 2017

2018-19

EXM/P/09/01

Year and Program: 2018-19

School of Technology

Department of Aeronautical Engg.

S. Y. B. Tech

Course Code: AET207

Course Title: Fluid Mechanics

Semester – III

Day and Date

4 DEC 18

End Semester Examination

Time: 03.00 Hrs.

Max Marks: 100

Tuesday 2:30 pm to 5:30 pm

(ESE)

**Instructions:**

- 1) All questions are compulsory.
- 2) Assume suitable data wherever necessary.
- 3) Figures to the right indicate full marks.

Q. No.	Question	Marks	Bloom's Level	CO
Q.1	a) Describe the effect of vapour pressure and cavitation.	06	L <sub>2</sub>	CO1
	b) Calculate the capillary effect in millimeter in a glass tube of 4mm diameter when immersed in i) Water ii) Mercury	06	L <sub>2</sub>	CO1
Q.2	a) State the Bernoulli's theorem and state assumption for the same; write Bernoulli's equation for real fluid and Ideal fluid.	06	L <sub>4</sub>	CO2
	b) A flow is given by $V = 2x^3i - 5x^2yj + 4tk$ . Determine velocity and acceleration at point (1,2,3) at time $t = 1$	06	L <sub>3</sub>	CO2
OR				
	b) Two pipes of lengths 2500 m each and diameters 80 cm and 60 cm respectively, are connected in parallel. The co-efficient of friction for each pipe is 0.006. The total flow is equal to 250 litres/s. Find the rate of flow in each pipe.	06	L <sub>3</sub>	CO2
Q.3	a) Derive Darcy Weisbach equation for head loss due to friction.	06	L <sub>4</sub>	CO3
	b) Water is flowing through a pipe of diameter 200mm with velocity of 3m/s find the head loss due to friction for a length 5m if the coeff. of friction $f = 0.021$ .	6	L <sub>3</sub>	CO3
OR				
	b) Three pipes of 400 mm, 200 mm and 300 mm diameters have lengths of 400 m, 200 m, and 300 m respectively. They are connected in series to make a compound pipe. The ends of this compound pipe are connected with two tanks whose difference of water levels is 16 m. If	6	L <sub>3</sub>	CO3

co-efficient of friction for these pipes is same and equal to 0.005, determine the discharge through the compound pipe neglecting the minor losses.

Q.4	<b>Write a short note (Any three)</b>	12	L <sub>2</sub>	CO4
	a. Boundary layer separation.			12
	b. Boundary layer theory.			
	c. Methods of preventing the separation of boundary layer.			
	d. Types of similarities.			
Q.5	<b>Write a short note (Any three)</b>	18	L <sub>2</sub>	CO5
	i. Types of drags			
	ii. Classifications of turbines.			18
	iii. Stream line body and bluff body			28
	iv. Velocity triangle for Pelton Turbine.			
	a) A man weighing 90 kg descends to the ground from an aeroplane with the help of a parachute against the resistance of air. The velocity with which the parachute, which is hemispherical in shape, comes down is 20 m/s. Find the diameter of the parachute. Assume $C_D = 0.5$ and density of air = $1.25 \text{ kg/m}^3$ .	10	L <sub>3</sub>	CO5
Q.6	a) Explain construction and working of Francis Turbine with neat sketch.	12	L <sub>2</sub>	CO6
	OR			
	a) Explain construction and working of Centrifugal pump with neat sketch.	12	L <sub>2</sub>	CO6
	b) A Pelton wheel is to be designed for a head of 60 m when running at 200 rpm. The Pelton wheel develops 95.6475 kW shaft power. The velocity of the buckets = 0.45 times the velocity of jet, overall efficiency = 0.85 and coefficient of the velocity is equal to 0.98.	12	L <sub>3</sub>	CO6

\*\*\*\*\*