

# GANDHI INSTITUTE OF ENGINEERING AND TECHNOLOGY, ODISHA, GUNUPUR (GIET UNIVERSITY)



B. Tech (Third Semester - Regular) Examinations, November – 2024  
**23BBTES23001 – Fluid Mechanics and Hydraulic Machines**  
(Biotechnology)

Time: 3 hrs

Maximum: 60 Marks

## Answer ALL questions

(The figures in the right hand margin indicate marks)

### PART – A

(2 x 5 = 10 Marks)

Q.1. Answer **ALL** questions

	CO #	Blooms Level
a. Define Specific gravity and Viscosity. Also mention their units.	CO1	K1
b. Define Centre of pressure.	CO1	K1
c. Define Reynold's Number. Express the condition for laminar and turbulent flow.	CO2	K1
d. Discuss the phenomenon of Cavitation.	CO4	K2
e. List the advantages and disadvantages of a Reciprocating pump over a Centrifugal pump.	CO5	K2

### PART – B

(10 x 5 = 50 Marks)

Answer **ALL** the questions

	Marks	CO #	Blooms Level
2. a. A liquid having specific gravity of 0.82 is filled in a vessel, calculate density, specific volume and specific weight.	5	CO1	K1
b. Calculate the capillary rise in a glass tube of 3mm diameter when immersed in water at 20°C. Take surface tension of water at 20 °C as 0.0075 kg/m. What will be the percentage increase in the value of capillary rise if the diameter of the glass tube is 2 mm?	5	CO1	K3
(OR)			
c. Define differential manometers. Explain the types of differential manometers.	5	CO1	K2
d. Explain the different types of pressures.	5	CO1	K1
3.a. Classify the types of fluid flows and explain them.	5	CO2	K2
b. Write short note on flow net.	5	CO2	K4
(OR)			
c. Explain about Reynolds experiment with neat sketch.	5	CO2	K2
d. State Bernoulli's equation with equation. Write the assumptions.	5	CO2	K1
4.a. The water is flowing through a pipe having diameter 20 cm and 10 cm at section A and B. The rate of flow through the pipe is 35 lit/sec. The section A is 6m above datum and section B is 4m above datum. If the pressure at section A is 39.24N/cm <sup>2</sup> find intensity of pressure at section B.	5	CO3	K4
b. A horizontal venturimeter with inlet diameter 20 cm and outlet diameter 10 cm is used to measure the flow of oil having specific gravity 0.7. the discharge of oil through the venturimeter is 60 lit/sec. Find the reading of oil-mercury differential manometer taking C d =0.98.	5	CO3	K3
(OR)			
c. A vertical pipeline 10 cm diameter at the top tapers uniformly to 20 cm at bottom. The length of the pipeline is 2 m. If the discharge through the pipeline is	5	CO3	K4

30 litres/sec find the difference in pressure. Neglect friction.

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|------|---|---|-----|----|
| d.   | A pipe of diameter 400 mm carries water at a velocity of 25 m/s. the pressures at the points A and B are given as 29.43 N/cm <sup>2</sup> and 22.563 N/cm <sup>2</sup> respectively while the datum head at A and B are 28 m and 30 m. Find the loss of head between A and B  | 5 | CO3 | K3 |
| 5.a. | Differentiate between i) Impulse and Reaction turbine ii) Radial and Axial flow Turbines  | 5 | CO4 | K2 |
| b.   | A Pelton turbine is required to develop 9000 KW. When working under a head of 300 m the impeller may rotate at 500 rpm. Assuming a jet ratio of 10 and an overall efficiency of 85% calculate (i) Quantity of water required. (ii) Diameter of the wheel (iii) Number of jets (iv) Number and size of the bucket vanes on the runner. | 5 | CO4 | K5 |
| (OR) |   |   |     |    |
| c.   | Highlight the importance of a draft tube in a Francis turbine. Discuss different types of draft tubes.  | 5 | CO4 | K2 |
| d.   | Write short notes on i) Governing of turbines ii) Water hammer in turbines  | 5 | CO4 | K2 |
| 6.a. | Explain the working of Centrifugal pump with neat sketch.   | 5 | CO5 | K2 |
| b.   | Explain various types of impellers used in centrifugal pump   | 5 | CO5 | K2 |
| (OR) |   |   |     |    |
| c.   | Explain the working of reciprocating pump with neat sketch.   | 5 | CO5 | K2 |
| d.   | Explain about slip of reciprocating pumps. What are the different Hydro power plants  | 5 | CO5 | K2 |

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