MODEL QUESTION PAPER

Program name: Mechanical Engineering   Semester: 4

Course code:

Course name: Fluid Mechanics & HydraulicMachines

Time: 3 Hours   Max Marks: 75

I. Answer all the following questions   (9 x 1 = 9 Marks)

1	What you mean by sp.gravity of a fluid?	M 1.01	R
2	What is the relation between kinematic and dynamic viscosity?	M 1.01	R
3	Pitot tube is used to measure----------	M 2.04	R
4	Mention the significance of Hydraulic gradient line.	M 2.07	U
5	Kaplan turbine is ----------- flow turbine	M 3.03	R
6	Why Cavitation is an adverse phenomenon?	M 3.06	U
7	Define slip.	M 4.07	R
8	----------- is the function of air vessel.	M 4.05	R
9	Mention the use of hydraulic ram.	M 4.08	U

II. Answer any Eight questions from the following   (8 x 3= 24 Marks)

1	Explain how a simple manometer is used to measure fluid pressure.	M 1.05	U
2	A fluid has a weight of 7000 N enclosed in a volume of 6 m^3. Solve i) Density, ii) Weigt density, iii) Sp.Gravity	M 1.02	U
3	State Pascal's law and mention its applications.	M 1.03	R
4	State Bernoulli's theorem with assumptions	M 2.02	R
5	Describe the reasons for minor losses.	M 2.07	U
6	Explain the selection of turbines based on specific speed.	M 3.04	U
7	A flat vertical plate is moving with a velocity of 3m/s under the action of a water jet from a nozzle with diameter 10mm. Discharge through the nozzle is 2 m^3/s. Calculate the force exerted on the plate and work done by the jet.	M 3.02	U
8	Compare centrifugal pump and reciprocating pump.	M4.01 M 4.05	U
9	Explain the working of a single acting reciprocating pump with figure.	M 4.05	R
10	Distinguish between mano-metric efficiency and overall efficiency of a centrifugal pump.	M 4.03	U

III. Answer all questions from the following   (6x 7 = 42 Marks)

1	A pipe contains an oil sp.gravity 0.8. A differential manometer is connected at two points A and B of the pipe shows a difference in mercury level as 200mm. Find the difference of pressure at two points.	M 1.06	U
	OR		
2	Explain the working of Bourdon tube pressure gauge with neat	M 1.05	U

	figure.		
3	A venturi-meter with throat diameter 10mm is connected to a pipe with diameter 15 mm. If the differential U tube manometer connected to the venturimeter shows a level difference of 10 cm, Calculate the discharge through the pipe. Mercury is the manometric fluid.	M 2.05	U
	OR		
4	A township requires 600 m^3 of water per day. Water is pumped from a reservoir 5km away from the township. Half the daily requirement is pumped in 2 hours. Diameter of the pipe is 150 mm. determine the loss of the head due to friction if Darcy's co- efficient is 0.006.	M 2.08	A
5	Water flowing through a pipe of 100mm diameter under a pressure of 196.2kPa(Gauge) and with a mean velocity of 3 m/s. find the total head of water at a cross section, which is 8m above the datum line. Assume atmospheric pressure as 103 kPa.	M 2.03	U
	OR		
6	Explain various types of notches and orifices with neat figures.	M 2.06	U
7	A pelton wheel turbine with an overall efficiency of 80% is working under a head of 100m. Discharge through the nozzle is 2m^3/s. Find the maximum power that can be generated from the turbine.	M 3.07	A
	OR		
8	Explain various Draft tubes with neat figure.	M 3.06	R
9	A jet of water of diameter100 mm moving with a velocity of 30 m/s strikes a curved fixed symmetrical plate at the centre. Find the force exerted by the jet of water in the direction of jet, if the jet is deflected through an angle of 120^0 at the outlet of the curved plate.	M 3.02	U
	OR		
10	Explain the working of Francis turbine with neat figure.	M 3.05	U
11	Explain the working of a single acting reciprocating pump with figure.	M 4.05	U
	OR		
12	A centrifugal pump is required to lift 0.05 m^3/s of water from a well with a depth of 40 m. If rating of the pump motor is 32 kW. Find the overall efficiency of the pump.	M 4.04	A

Blue Print
Mark Distribution

Module	Hours/Module (hi)	Marks/Module (hi/∑Hi) * 123 (±5%)	Types of Questions							
			Part A		Part B		Part C		Total	
			No. of questions	Marks	No. of questions	Marks	No. of questions	Marks	No. of questions	Marks
1	12	25	2	2	3	9	2	14	7	25
2	17	36	2	2	2	6	4	28	8	36
3	12	36	2	2	2	6	4	28	8	36
4	17	26	3	3	3	9	2	14	8	26
Total	58	123	9	9	10	30	12	84	31	123

Cognitive Level Distribution

Cognitive Level	Marks	% of Marks
Remembering	22	18
Understanding	87	65
Applying	14	17
Total	123	100