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B.E. / B.TECH. DEGREE EXAMINATIONS, DEC 2019

Third Semester

MR18301 – MARINE HYDRAULICS AND FLUID MACHINERY*(Marine Engineering)***(Regulation 2018)****Time: Three Hours****Maximum : 100 Marks**

Answer ALL questions

PART A - (10 X 2 = 20 Marks)

	CO	RBT
1. What is meant by Buoyancy?	1	R
2. Define center of pressure.	1	R
3. What are the types of fluid flow?	2	R
4. State Bernoulli's theorem and give its mathematical expression.	2	R
5. What is Reynolds number of a fluid?	3	R
6. Write Darcy weisbach's equation.	3	R
7. Give some advantages of multistage centrifugal pump.	4	R
8. What is meant by priming in centrifugal pump?	4	R
9. List some application of the Kaplan turbine.	5	R
10. Name some parts of Francis turbine.	5	R

PART B - (5 X 16 = 80 Marks)

11. (a) List out the various types of pressure measuring instrument and explain the different types of manometer with neat sketch. **(16)** 1 U
- (OR)**
- (b) A solid cylinder of 10 cm diameter and 40 cm long consists of two parts made of different materials. The first part at the base is 1 cm long and of specific gravity of 6. The other part of the cylinder is made of the material having specific gravity 0.6. State, if it can float vertically in water. **(16)** 1 AP
12. (a) Derive the expression for Bernoulli's equation and list out the assumption to derive the expression. **(16)** 2 AP

(OR)

- (b) The water is flowing through a pipe having diameters 20 cm and 10 cm at sections 1 and 2 respectively. The rate of flow through pipe is 35 liters/sec. The section 1 is 6m above datum and section 2 is 4m above datum. If the pressure at section 1 is 39.24 N/cm^2 , Find the intensity of pressure at section 2. **(16) 2 AP**
13. (a) (i) Write short notes on major and minor loss in pipes. **(8) 3 U**
(ii) Derive the expression for Head loss due to friction. **(8) 3 U**
- (OR)**
- (b) (i) Write short notes on pipes in series and pipes in parallel. **(8) 3 U**
(ii) Explain the various regions of boundary layer. **(8) 3 U**
14. (a) The pressure difference ΔP in a pipe of diameter D and length L due to viscous flow depends on velocity V , viscosity μ and density ρ . Use Buckingham's pi theorem to obtain the expression for ΔP . **(16) 4 AP**
- (OR)**
- (b) A centrifugal pump having outer diameter equal to two times the inner diameter and running at 1000 rpm. Works against a total head of 40 m. The velocity of flow through the impeller is constant and equal to 2.5 m/s. The vanes are set back at an angle of 40 degree at outlet. If the outer diameter and width are 500 mm, 50 mm.
Determine
1. Vane angle at inlet
2. Work done by impeller
3. Manometric efficiency. **(16) 4 AP**
15. (a) How will you classify the turbines? Explain the tangential flow turbine with neat sketch. **(16) 5 U**
- (OR)**
- (b) A Kaplan turbine under a head of 20 m develops 11772 KW shaft power. The outer diameter of the runner is 3.5 m and hub diameter 1.75 m. The guide blade angle of the runner is 35degree. The hydraulic and overall efficiency are 88% and 84% respectively. If the velocity of the whirl is zero at the outlet. Find
1. Runner vane angle at inlet and out let
2. Speed of the turbine. **(16) 5 AP**