QUESTION BANK OF FMM

1) Write short notes on:
   a) Viscosity.
   b) Surface tension.
   c) Capillarity.
2) Define the terms kinematic viscosity, flash point, fire point in case of hydraulic fluid.
3) Define the terms weight density, mass density and specific gravity.
4) State newton's law of viscosity.
5) Differentiate between:
   a) Adhesion and cohesion.
   b) Dynamic viscosity and kinematic viscosity.
6) State the SI units of :
   a) Kinematic viscosity.
   b) Dynamic viscosity.
   c) Surface tension.
7) A capillary tube having internal diameter 6mm is immersed in water in 20°c. Calculate the height of water rise in the capillary. Take angle of contact as α=60° and surface tension of water in contact with air as 0.073 N/m.
8) Differentiate between simple manometer and differential manometer.
9) Explain bourdon's tube pressure gauge with neat sketch.
10) Draw the neat sketch of inverted U-Tube manometer and state its use.
11) Drive and expression to determine the depth of centre of pressure of vertically immersed surface in liquid.
12) Convert 40m of oil column into pressure in N/cm².take specific gravity of oil as 1.2.
13) Find the depth of oil of relative density 0.8 which will produce a pressure intensity of 441.45KN/m².
14) A circular lamina 2m in diameter is immersed in water so that the distance of its perimeter measured vertically below the water surface varies between 1m and 2.5m.find the total force due to water acting on one side of lamina and the vertical depth of the centre of pressure.
15) The pipe of 3m diameter contains oil of specific gravity 0.8 and is fitted with gate valve. The pressure at the centre of pipe is 3×10⁵N/m². Find the total pressure force exerted by the oil on gate and depth of centre of pressure.
16) Determine the total pressure and centre of pressure on an isosceles triangular plate of base 6.5m when the plate is immersed vertically in an oil of specific gravity 0.85. The base of the plate is 1m below the free surface of oil.
17) What are different methods of studying fluid flows? Explain in brief.
18) State law of continuity. Explain in brief.

19) State and prove Bernoulli's theorem for flow of fluids.
20) State use of venturimeter, Pitot tube. Drive an expression for discharge thorough a venturimeter with neat sketch.
21) A pipe of 40m long has a slope of 3in 10 and tapers from 1m diameter at higher end to 0.6m at lower end. Quantity of water flowing is 5.4 m³/min. if the pressure at the higher end is 0.7 bar, find pressure at the lower end.

State Bernoulli's theorem. Explain how it can be applied to Pitot tube by using mathematical equation.

22) State the continuity equation.
23) Explain the working principle of pitot tube with neat sketch.
24) Define rotational and irrotational flows. Define rate of flow with its unit in SI system

SUB-FLUID MECHINICS & MACHINERY

Ch.4 Turbines   marks

1) Draw a layout of hydroelectric power plant and explain its working briefly.   4
2) Give the classification of hydraulic turbines.   3
3) State the function of draft tube and draw the neat sketches of draft tube.   3
4) Differentiate impulse turbine with reaction turbine.   4
5) Differentiate Francis turbine with Kaplan turbine   4
6) Explain the working of Pelton wheel turbine.   3
7) A Pelton wheel has mean bucket speed of 30 m/s with a jet of water flowing at the rate of 1cubic meter per sec under a head of 250m. The bucket deflect jet through angle of 170 degree. Calculate power developed and the efficiency of the turbine. Assume Coefficient of velocity= 0.98   4
8) A Francis turbine has external and internal diameters as 1m and 0.6m respectively . The hydraulic efficiency of turbine is 90% when the head on the turbine is 36m . The velocity of flow at outlet is 2.5m/sand discharge at outlet is radial. If the vane angle at outlet is 15degree and width of the wheel is 100mm at inlet and outlet. Determine (i) Guide blade angle (ii)speed of turbine (iii) power developed.   4

Ch.5 Centrifugal Pump

1) Explain the construction and working of centrifugal pump.   4
2) Explain submersible pump with neat sketch.   3
3) What did you understand by the term cavitation? How it can be avoided?   3
4) What is priming? Why it is required?   4
5) State any two faults and their remedies on centrifugal pump.   3
6) What are the different types of impellers? Where these types are specially used?   3

Ch.6 Reciprocating pump

1) Describe the principle and working of a reciprocating pump with neat sketch.   4
2) Differentiate between centrifugal pump and reciprocating pump.   4
3) What is an air vessel? Describe the function of air vessel for reciprocating pump. 3
4) Define slip, percentage slip and negative slip of a reciprocating pump.   3

5) Mention the applications of reciprocating pump.   3
6) Explain the working of double acting reciprocating pump.   4