B.E. Sem V Mechanical Engineering
Subject :- Fluid Power Engineering
Gujarat University
Question Bank

1.	Write short note on Hydraulic ram
2.	Write short note on Hydraulic Accumulator
3.	Write short note on Hydraulic Press
4.	Explain with neat sketch governing mechanism of Francis Turbine.
5.	With neat sketch explain construction and working of hydraulic crane.
6.	Explain how hydraulic turbines are classified.
7.	Describe principle construction and working of centrifugal compressor.
8.	Why governing of water turbine is required? Explain governing of any one hydraulic turbine with neat sketch.
9.	Enlist the various types of impeller used in centrifugal pump and explain any one from it with a neat sketch.
10.	A tank, which is free to move, is provided with an orifice on side, through which jet of water is coming out. Obtain an equation for work done per sec on tank and efficiency of propulsion.
11.	Explain (i) minimum starting speed of centrifugal pump and (ii) cavitation in centrifugal pump.
12.	Explain Hydraulic Power Plant with neat sketch
13.	With neat sketch explain construction and working of hydraulic torque convertor.
14.	Write short notes on: Hydraulic intensifier
15.	With usual notations derive Darcy-Weisbach expression for calculating head loss due to friction in a pipe.
16.	State function of draft tube and explain with neat sketch different types of draft tubes.
17.	Explain following terms: Net positive suction head, Priming, Cavitation in pump
18.	Prove that head loss due to friction is equal to one third of total head inlet for maximum power transmission through nozzle.
19.	Show that in case of jet striking the flat plates mounted on wheel, the efficiency will be maximum when the tangential velocity of wheel is half of the jet.
20.	Explain the following terms with reference to water turbines. Give expression of each efficiencies. (1) Hydraulic efficiency (2) Mechanical efficiency and (3) Overall efficiency
21.	Enlist the various types of impeller used in centrifugal pump and explain any one from it with a neat sketch
22.	Derive an expression for the optimum value of the intercooler pressure in a two stage reciprocating air compressor for perfect inter cooling condition.
23.	Give classification of Reciprocating pump. Draw neat sketch of single acting reciprocating pump
24.	Explain the phenomenon of water hammer. Obtain an expression for the rise of pressure when the flowing water in a pipe is brought to rest by closing the valve gradually.

25.	How will you obtain an expression for the minimum speed for starting of a centrifugal pump?
26.	Explain the following terms : (1) Major losses (2) Minor losses and (3) Equivalent pipe
27.	Compare Reciprocating pump with Centrifugal pump.
28.	With usual notations derive an expression for head loss due to sudden enlargement in pipe.
29.	Sketch and describe a modern method of regulation to maintain constant speed for Pelton turbine.
30.	A jet of water moving with velocity 22m/s impinges on a curved vane at the one end tangentially. The jet leaves the vane at an angle of 120° to the direction of motion of the vane. The velocity of vane is 10m/s and angle of nozzle is 20°.Determine i. Vane angle at inlet and outlet, ii. Work done per second per init mass of water.
31.	The impeller of centrifugal pump is 1m in diameter and rotates at 1500 rpm. The blades are curved backward and make an angle of 30° to the tangent at the periphery. Calculate the power required if the velocity of flow at outlet is 20m/s. Determine the head to which water can be lifted when a diffuser casing reduces the outlet velocity to 60%.
32.	A water jet of 80 mm diameter impinges on a curved vane at its centre and is deflected through an angle of 1400. The water flowrate is 80 lit/s and vane moves with velocity of 5 m/s in direction of jet. Neglecting friction, find (i) component of force in direction of motion and (ii) the power developed by vane and its efficiency.
33.	A single stage, single acting reciprocating air compressor compresses 7x 10-3 m3 of air /s from pressure of 1.013 bar to 14 bar. The index of polytropic compression process is 1.3 and mechanical efficiency is 82%. Neglecting effect of clearance, determine power required to drive the compressor and show the process on P-V diagram.
34.	A pipe line 300 mm dia. and 3200 m long is used to pump up 50 kg/s of an oil whose density is 950 kg/m3 and whose kinematic viscosity is 2.1 stokes. The centre of the pipe line at the upper end is 40 m above than that at the lower end. The discharge at the upper and is atmospheric. Find the pressure at the lower end
35.	A jet of water impinges on a symmetrically curved vane at its center. The velocity of the jet is 60 m/s and the diameter 120 mm. the jet is deflected through an angle of 120° Calculate the force on the vane if the vane is fixed. Also determine the force if the vane moves with a velocity of 25 m/s in the direction of the jet. What will be the power and efficiency?
36.	A jet of water moving with a velocity of 27m/s impinges tangentially to a single curved blade which is moving in the direction of jet with a speed of 12m/s. Jet is deflected through 45°. If the friction reduces the relative velocity by 20% calculate the angle through which the jet will leave the blade, work done /kg of water and efficiency.

37.	A Pelton turbine is to be designed for following specifications: shaft power=11770KW, Head=380m, speed=750rpm, overall efficiency=86%, jet diameter not to exceed one sixth of wheel diameter, Determine the wheel diameter, number of jets required, diameter of jet. assume Cv=0.985, v=0.45(2gH)0.5
38.	The diameter of a horizontal pipe which is 300mm is suddenly enlarged to 600mm. The rate of flow of water through this pipe is 0.4 m3/sec. If the intensity of pressure in smaller pipe is 125 KN/m2, determine loss of head due to sudden enlargement, intensity of pressure in large pipe, power loss due to enlargement.
39.	A jet delivers water at the rate of 60 liters per second with velocity 30 m/s. The jet strikes tangentially on the vane moving in the direction of the jet with the velocity of 15 m/s. The vane is so shaped that if stationary it would deflect the jet through an angle 50°. Calculate: (1) angle made by absolute velocity at outlet and (2) work done per sec.
40.	Francis turbine designed to develop 160 kw working under a head 10 m and running at 200 rpm. The hydraulic losses in turbine are 15% of available energy. The overall efficiency of turbine is 80%. Assume flow ratio=0.94 and speed ratio=0.25. Calculate: (1) guide blade angle and runner vane angle at inlet and (2) diameter and width at inlet.