

UNIT V- TURBINES**PART – A (2 MARKS)**

01. Define hydraulic machines
02. Give example for a low head, medium head and high head turbine.
03. What is impulse turbine? Give example.
04. What is reaction turbine? Give example
05. What is axial flow turbine?
06. Define mechanical efficiency?
07. Define volumetric efficiency?
08. Define unit discharge?
09. Define unit power?
10. What is draft turbine?
11. What is the function of spear and nozzle?
12. Define hydraulic efficiency?
13. Define overall efficiency?
14. Define unit speed of turbine?
15. Write the function of draft tube in turbine outlet?

PART-B (16 Marks)

01. The nozzle of pelt on wheel gives a jet of 9cm dia and velocity 75m/s. co-efficient of velocity is 0.978. The pitch circle dia is 1.5m and the deflection angle of the buckets is 170 degree. The wheel velocity is 0.46 times the jet velocity. Estimate the speed of the pelt on wheel turbine in rpm, theoretical power developed and efficiency of the turbine.

(APR-05)

02. A pelt on wheel has to be designed for the following data

Power to be developed= 6000Kw

Net head available =300rpm

Speed = 550rpm

Ratio of the jet diameter to wheel diameter =1/10

Speed ratio =0.48

Overall efficiency =85%

Find the number of jet, diameter of jet, diameter of the wheel and the quantity of water required.

(Dec-06)

03. A pelt on wheel is having a mean bucket dia of 1m and is running at 1000 rpm .The net head on the pelt on wheel is 700m if the size clearance angle is 15° and discharge through the nozzle is $0.1\text{m}^3/\text{s}$. Find i) power available at nozzle ii) Hydraulic efficiency of the turbine. (Take $CV=1$)
04. A pelt on turbine is required to develop 9000Kw when working under a head of 300m the impeller may rotate at 500rpm. Assuming a jet ratio of 10 and an overall efficiency of 85%. Calculate
- Quantity of water required
 - Dia of the wheel
 - Number of jet
 - Number and size of the bucket vanes on the runner. **(NOV-03)**
05. A turbine is to operate under a head of 25m at 200rpm .The Discharge is $9\text{m}^3/\text{s}$ if the efficiency is 90%, Determine specific speed of the machine power Generated and type of turbine. **(DEC-07)**
06. A turbine is to operate under a head of 25m at 200rpm, the available discharge is 90% determine
- Specific speed
 - Power generated
 - Performance under a head of 20m
 - The type of turbine **(NOV-02)**
07. A vertical reaction turbine operates under 60m head at 400rpm the area and dia of the runner at inlet are 0.7m^2 and 1m respective the absolute and relative velocities of the fluid entering are 15° and 60° to the tangential direction . Calculate hydraulic efficiency
08. An outward flow reaction turbine has internal and external dia of the runner as 0.5m and 1.0m respectively. The turbine is running at 250rpm and the rate of flow of water through the turbine is $8\text{m}^3/\text{s}$. The width of the runner is constant at inlet and outlet and is equal to 30cm. The head on the turbine is 10cm and discharge at outlet is radial. Determine i) Vane angle at inlet and outlet ii) Velocity of flow at inlet and outlet **(NOV-03)**
09. A centrifugal pump of 20cm dia running at 1430rpm delivers $0.1\text{m}^3/\text{s}$ of water against a head of 40m with an efficiency of 90%. What is non-dimensional specific speed?
10. Find the power required to drive a centrifugal pump which delivers $0.04\text{M}^3/\text{s}$ of water to a height of 20m through a 15cm diameter pipe and 100m long. The overall efficiency of 10