Unit-III STEAM TURBINES

S.No.		Questions	BT	CO	PO
Part – A (Short Answer Questions)					
1		Write the equation for blade efficiency (or) diagram efficiency derivation for impulseTurbine.	L2	CO3	PO2,PO4
2		Write the equation for blade efficiency (or) diagram efficiency derivation for impulse turbine	L3	CO3	PO2,PO4
3		Draw velocity triangle for 50% reaction steam turbine	L2	CO3	PO2,PO4
4		What is the difference between impulse and reaction blading.	L1	CO3	PO2,PO4
5		Explain the working of a single stage impulse turbine with the help of sketch.	L2	CO3	PO2,PO4
6		Derive the equation optimum work out put in impulse turbine.	L2	CO3	PO2,PO4
7		Why compounding is necessary in the steam turbines? What are the types and explain any one type of compounding with neat sketch.	L2	CO3	PO2,PO4
8		Explain the concept of critical pressure ratio	L3	CO3	PO2,PO4
9		Briefly explain the saturated flow through the nozzle.	L2	CO3	PO2,PO4
10		Sketch the velocity diagram of a single stage impulse turbine and determine the expression for the force, work done, diagram efficiency and axial thrust.	L2	CO3	PO2,PO4
Part – B (Long Answer Questions)					
11	a)	Draw the line diagram and velocity triangles and explain the working details of impulse turbine	L2	CO3	PO2,PO4
	b)	Steam leaves the nozzle of a single stage impulse turbine at 850 m/s. The nozzle angle is 180 and the blade angles are 290 at the inlet and outlet. The friction coefficient is 0.9. Calculate blade velocity and steam mass flow rate in kg/hr to develop 300 W power	L2	CO3	PO2,PO4
12	a)	Derive the condition for maximum efficiency and blade height of reaction turbine.	L2	CO3	PO2,PO4
	b)	In a Parson reaction turbine, the angles of receiving tips are 350 and of discharging tips, 200. The blade speed is 100 m/s. Calculate the tangential force, power developed, diagram efficiency and axial thrust of the turbine, if its steam consumption is 1 kg/min	L2	CO3	PO2,PO4
13	a)	Describe construction of inlet and exit velocity triangles of simple impulse turbine	L2	CO3	PO2,PO4
	b)	A simple impulse turbine has one ring of moving blades running at 150 m/s, absolute velocity of steam at exit is 85 m/s at an angle 800 with the tangent of wheel, friction coefficient is 0.82, rate of steam flowing 2 Kg/s. Assuming the moving blades to be a symmetrical, find the i) Blade angles ii) Nozzle angle iii) absolute velocity of steam at entrance and iv) power developed.	L2	CO3	PO2,PO4

14		A single stage steam Turbine is supplied with steam at 5bar and 200^0C at the rate of 50Kg/min. It expands into a condenser at a pressure of 0.2bar. The blade speed is 400m/sec. The nozzles are inclined at an angle of 20^0 to the plane of wheel and outlet blade angle is 30^0. Neglecting friction losses. Determine the power developed, blade efficiency and stage efficiency	L3	CO3	PO2,PO4
15	a)	Sketch the velocity diagram of a single stage impulse turbine and determine the expression for the force, work done, diagram efficiency and axial thrust.	L4	CO3	PO2,PO4
	b)	The reaction turbine runs at 300 rpm and the steam consumption is 20000 kg/h. The pressure of steam at a certain pair is 2 bar, its dryness fraction is 0.93 and the power developed by the pair is 50 kW. The discharge blade angle is 20^0 for both the fixed and Moving blades and the axial velocity of flow is 0.72 times the blade velocity. Find the drum diameter and the blade height. Take the tip leakage steam as 8%. Neglect the blade thickness.	L4	CO3	PO2,PO4
16	a)	. Define the following: i) Blade efficiency ii) Stage efficiency iii) Overall efficiency	L2	CO3	PO2,PO4