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II SEMESTER M.TECH (THERMAL SCIENCES AND ENERGY SYSTEMS) END SEMESTER EXAMINATIONS, MAY 2019

SUBJECT: STEAM AND GAS TURBINES [MME 5274]

REVISED CREDIT SYSTEM

Time: 3 Hours

MAX. MARKS: 50

Instructions to Candidates:

- Answer ALL the questions.
- Missing data may be suitably assumed.
- ♦ Use of thermodynamic data hand book is permitted.

1A.	Derive momentum equation for the nozzle flow.	05
1B.	Obtain the expression for maximum efficiency for a parson's turbine.	05
2A.	A stage of an Impulse turbine consists of a ring of nozzles followed by a ring of moving blades. The nozzle angle is 20° and moving blades have both inlet and outlet tips at 30° with respect to axial direction. If the velocity of steam at the exit of the nozzle is 300 m/s find the blade speed, diagram efficiency and Power developed if the steam consumption is 1000 kg/h.	05
2B.	Explain the state point locus of an impulse turbine.	05
3A.	Steam which is initially dry and saturated is expanded in a multistage turbine, in each stage of which 30% of heat available is reconverted into heat. If adiabatic index is 1.135, calculate the reheat factor for a pressure ratio of 180. What will be the reheat factor if there are 15 stages? Assume polytropic efficiency as 70%.	05
3B.	Explain the effect of blockages in axial compressor annulus.	05
4A.	Describe the phenomena of surging in compressors.	05
4B.	Explain various methods of blade cooling.	05
5A.	Explain free vortex flow theory of designing axial turbines.	05
5B.	Differentiate between ramjet engine and pulse jet engine with the help of neat sketches.	05