

- d) Explain the working of a hydraulic crane with the help of a neat sketch.

OR

Explain the differential type of hydraulic accumulator with a neat sketch.

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Roll No

ME - 502

B.E. V Semester

Examination, June 2016

Turbo Machinery

Time : Three Hours

Maximum Marks : 70

- Note:** i) Answer five questions. In each question part A, B, C is compulsory and D part has internal choice.
- ii) All parts of each question are to be attempted at one place.
- iii) All questions carry equal marks, out of which part A and B (Max. 50 words) carry 2 marks, part C (Max. 100 words) carry 3 marks, part D (Max. 400 words) carry 7 marks.
- iv) Except numericals, Derivation, Design and Drawing etc.

Unit - I

1. a) What do you understand by turbo machines.
- b) Define degree of reaction.
- c) Write the difference between impulse and reaction turbine.
- d) Derive Euler's equation of motion for one dimensional flow.

OR

Derive steady flow energy equation in a control volume.

Unit - II

2. a) Give the detailed classification of steam turbines.
- b) Enlist the advantages of velocity compounded impulse turbine.

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- c) Derive an equation for height of turbine blade.
- d) In an impulse turbine the following observations are recorded: Steam velocity = 500m/s, Blade Speed = 200m/s, exit angle of moving blade = 25° measured from tangential direction, Nozzle angle = 20° , Neglecting the effect of friction, when passing through blade passages, calculate:
- Inlet angle of moving blade
 - Exit velocity and direction
 - Work done per kg of steam,
 - Blade efficiency

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OR

Discuss the performance characteristics of steam turbines.

Unit - III

- Define hydraulic machines, hydraulic turbines and pumps.
 - Define hydraulic efficiency and mechanical efficiency.
 - What is the purpose of draft tube? List any two types of draft tubes with neat sketch.
 - Describe with the help of a neat sketch, the governing of a reaction turbine.

OR

With the help of a neat sketch, describe the working of a kaplan turbine.

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Unit - IV

- Define Fans and Blowers.
 - Write the advantages and disadvantages of centrifugal compressors.
 - Draw and explain the velocity triangle at the inlet and exit for the axial flow compressor.
 - An axial flow compressor has a mean diameter of 60cm and runs at 15000 rpm. If the actual temperature rise and pressure ratio developed are 30°C and 1.3 respectively. Determine :
 - Power required to drive the compressor while delivery 57kg/s of air, assuming mechanical efficiency 86% and initial temperature of 35°C .
 - The stage efficiency; and
 - The degree of reaction if the temperature at the rotor exit is 55°C .

OR

Draw and explain characteristic curves of fan.

Unit - V

- Define slip of a fluid coupling. Show that slip, $S = 1 - \eta$. Where η is the fluid coupling efficiency.
 - What is a torque converter? Draw its neat sketch.
 - With the help of neat sketch discuss the main parts of reciprocating pump.