

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-V (NEW) EXAMINATION – WINTER 2018****Subject Code:2150102****Date:11/12/2018****Subject Name:Fundamentals of Turbo Machines****Time: 10:30 AM TO 01:00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1 (a) Difference between rotor blade and stator blade. 03
(b) Explain high reaction stages for axial compressor stage. 04
(c) Difference between positive displacement machine and turbomachines. 07
- Q.2 (a) Draw surging in compressors. 03
(b) Define Degree of reaction for axial compressor and axial turbine. 04
(c) Explain H-S diagram for axial compressor stage. 07
- OR
- (c) Draw and explain variation of air angles and degree of reaction along the blade height in a free vortex stage. 07
- Q.3 (a) Draw a pressure and velocity variation through a compressor stage. 03
(b) Explain ideal and actual performance curves for an axial compressor. 04
(c) Write a short note on stall propagation in a compressor blade row. 07
- OR
- Q.3 (a) Difference between compressor and turbine. 03
(b) Draw an energy flow diagram for an axial flow compressor stage. 04
(c) Write a short note on free vortex flow for axial compressor stage. 07
- Q.4 (a) Explain zero degree reaction stage for axial turbine stage. 03
(b) Derive relation for total to total efficiency for axial turbine stage. 04
(c) Draw and explain a velocity triangle for axial turbine stage. 07
- OR
- Q.4 (a) Draw stodola's model of flow with slip. 03
(b) Draw entry and exit velocity triangles for impeller blades only in the radial section, backward swept blades for centrifugal compressor. 04
(c) Explain elements of a centrifugal compressor stage. 07
- Q.5 (a) Write an equation of Balje's formula. 03
(b) Draw and explain an Impulse turbine stage. 04
(c) Explain Counter rotating blade rings of a Ljungstrom turbine with neat sketch. 07

- Q.5 (a) Explain with equation spouting velocity. 03
(b) Draw a performance chart for various axial turbine stages. 04
(c) Explain elements of a radial turbine stage with neat sketch. 07

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