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B.Tech. (ANE) (Sem.–5) AIRCRAFT PROPULSION-II Subject Code : ANE-314 M.Code : 60523

Time: 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

- 1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
- 2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
- 3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

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Q1. Answer briefly :

- a) Define under expanded nozzle.
- b) Define polytropic efficiency.
- c) Define propellant burning rate.
- d) Define specific impulse in a rocket engine.
- e) Define effective exhaust velocity of a rocket.
- f) Define work done factor for an axial flow compressor.
- g) Define blade loading coefficient for an axial flow turbine.
- h) Define a trivial flow.
- i) Define internal efficiency of a rocket propulsion system.
- j) Define gross thrust coefficient for a nozzle.



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SECTION-B

- Q2. Describe fanno flow in details.
- Q3. Explain the working of an axial flow compressor with the help of velocity triangles.
- Q4. Write early history of rocket flights.
- Q5. Explain the working of a solid rocket motor with the help a neat figure. Draw any two grain configurations.
- Q6. Describe subsonic inlets with the help of neat figures.

SECTION-C

- Q7. Discuss simple flows in details.
- Q8. Explain the working of subcritical and supercritical supersonic inlets, with the help of neat figures.
- Q9. The following particulars relate to a single stage turbine of free vortex design :

Inlet total-head temperature	=1000°К
Inlet total head pressure	$= 3.8 \text{ Kg}_{\text{f}}/\text{cm}^2$
Static head efficiency	= 88%
Nozzle efficiency	= 96%
Outlet static pressure	$= 1.2 \text{ Kg}_{\text{f}}/\text{cm}^2$
Outlet velocity	= 280 m/sec.
Blade speed at root	= 277 m/sec.

If there is outlet swirl and the turbine is designed for impulse conditions at the root radius, find the work output.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.

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