Roll No. | | | | | | | | | | | |

Total No. of Pages : 02

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B.Tech.(Aerospace Engg.) (2012 Onwards) (Sem.–4)

AEROSPACE PROPULSION – I

Subject Code : ASPE-207

M.Code : 71531

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

1) Answer briefly :

a. Name two types of gas turbine engines which primarily provides shaft power output.

b. Write trust equation for a jet engine which is operating at fully expanded nozzle condition.

c. How is an isentropic flow different from an adiabatic flow?

d. Define total pressure.

e. Which thermodynamic cycle does a gas turbine works on?

f. Write the relation for isentropic efficiency of a compressor.

g. Which thrust augmentation is utilized during take-off in hot weather?

h. Name any 4 categories of rocket engine types based on propellants.

i. What is uninstalled thrust?

j. What is the maximum achievable exit Mach number in convergent nozzle?

SECTION-B

2) Obtain thrust equation for a rocket engine.

3) Mention the property variation across an oblique shock on a neat diagram.

4) For isentropic flow, obtain the relation for pressure ratio vs temperature ratio.

5) Show that the least pressure ratio required across a nozzle to reach sonic speed is 1.89.

6) Briefly explain about any two parameters affecting the takeoff thrust of an engine.

SECTION-C

7) Classify aircraft engines based on their operational flight Mach no. and explain their limitations.

8) With neat diagram, explain the various configurations of solid propellant structures and state their advantages.

9) Explain the over expanded and under expanded rocket nozzle operating conditions with help of a neat diagram.

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.