F 3276　　　　　　　　　　　　(Pages : 2)　　　　　　　Reg. No..........................

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B.TECH. DEGREE EXAMINATION, NOVEMBER 2014

Eighth Semester

Branch : Mechanical Engineering

ME 010 804 L01 – AEROSPACE ENGINEERING (Elective III) [ME]

(New Scheme – 2010 Admissions – Supplementary)

Time : Three Hours　　　　　　　　　　　　　　　　　　　　Maximum : 100 Marks

Part A

*Answer **all** questions.*

Each question carries 3 marks.

1. How does atmospheric pressure and temperature vary with altitude ?

2. What are high lift devices ? Give examples.

3. Define the following with respect to an aerofoil : (i) Camber ; (ii) Chord.

4. What is escape velocity ?

5. List out the merits of liquid propellant rocket engine.

(5 × 3 = 15 marks)

Part B

*Answer **all** questions.*

Each question carries 5 marks.

6. Write a short note on troposphere.

7. Explain the structure of atmosphere.

8. Explain service ceiling and absolute ceiling.

9. How is the airspeed measured in airplanes ?

10. Explain the concept of horse shoe vortex with the help of neat diagram.

(5 × 5 = 25 marks)

Part C

*Answer **all** questions.*

Each question carries 12 marks.

11.　(a)　Derive the continuity equation for Compressible flow.

　　 (b)　Simplify Navierstoke's equation for two dimensional steady, inviscid and incompressible flows.

Or

Turn over

12. (a) Find density, pressure and temperature of air at 1000 m, 5000 m, 15000 m. Sea level temperature may be assumed.

     (b) Determine the Mach number of a flying object with 1200 km/hr at these altitudes.

13. Explain in detail about angle of attack V/S Coefficient of lift and drag, angle of attack V/S center of pressure of an aerofoil with necessary diagrams.

Or

14. Explain the concept of boundary layer, predict velocity profile of a laminar and turbulent boundary layers over a plate.

15. Explain how a propeller generates thrust, on the basis of momentum theory. Derive the momentum theory for propeller. State its assumptions.

Or

16. With neat sketch, explain Turbo-Fan engines. Define By-pass ratio in turbo fan engines. Explain its necessity.

17. Derive an expression for runway distance of an airplane for take-off.

Or

18. Draw and explain V-*n* diagram. Also mark absolute and service ceiling on it. Explain briefly.

19. Explain a typical solid propellant rocket engine with neat diagram. List out their merits and demerits.

Or

20. Explain the following instruments used in airplanes :

     (i) Air speed Indicators.

     (ii) Altimeters.

     (iii) Gyroscope.

(5 × 12 = 60 marks)