Register Number ……

B.E. DEGREE EXAMINATIONS: APRIL / MAY 2010

Second Semester

AERONAUTICAL ENGINEERING

U07AR201: Elements of Aeronautics

Time: Three hours **Maximum Marks: 100**

Answer ALL the Questions:-

PART A (10 x 1 = 10 Marks)

1. The first practical airplane was tested on

   (A) 1903 Dec 7th (B) 1903 Dec 14th (C) 1903 Nov 7th (D) 1903 Jan 7th

2. Actual pressure of the fluid which is associated not with its motion but its state is referred as

   (A) Dynamic pressure (B) Static pressure

   (C) Total pressure (D) Centre of pressure

3. An aircraft yawing moment can be controlled by

   (A) Ailerons (B) Elevators (C) Rudder (D) Trimming Tab

4. In the Hydromechanical flight control system, which part converts hydraulic pressure into control surface movement?

   (A) Servo motor (B) pump (C) Control cable (D) Actuators

5. …….. are fixed or movable surfaces found at the leading edge of the wing and are airfoils in shape.

   (A) Slot (B) Ailerons (C) Slat (D) Trimming Tab

6. Which combination of drags will give Parasite drag

   (A) Form drag & Skin friction drag (B) Skin friction drag & profile drag

   (C) Form drag & Profile Drag (D) Total drag & Surface drag

7. The speed at which a body moves through the air (or) at which the air moves past a body is called

   (A) Engine speed (B) Air speed (C) Ground speed (D) Mach number

8. The NACA 12345 airfoil has lift coefficient

   (A) 0.50 (B) 0.12 (C) 0.23 (D) 0.15

9. The main advantage of high aspect ratio is

   (A) Decreasing Induced Drag (B) Increasing Induced Drag

   (C) Decreasing Skin friction Drag (D) Increasing Skin friction Drag

10. The minimum starting speed of scram jet engine is

(A) At least Mach 4 (B) At least Mach 2

(C) At least Mach 6 (D) At least Mach 0.44

PART B (10 x 2 = 20 Marks)

11. Define AOA.
12. List out the advantages of biplanes.
13. Mention important basic flight instruments.
14. Distinguish between IAS and TAS.
15. Define Compressible and incompressible flow.
16. Define lift coefficient.
17. Give the essential parts of fuselage structure.
18. Mention the chemical composition of duralumin.
19. What is meant by mono-propellant?
20. Define scram jet.

PART C (5 x 14 = 70 Marks)

21. (a) With a neat illustration, explain in detail the salient features of air planes with biplane and monoplane design from aerodynamics point of view. Bring out the advantages and limitations of each type.

(OR)

(b) Briefly explain the development of aviation field in all aspects.

22. (a) (i) Explain the working principle of Fly-by-wire control systems. (7)

(ii) Explain the role of Turn Coordinator and Altimeter. (7)

(OR)

(b) With a neat sketch explain the different parts of an airplane and their functions.

23. (a) Explain in detail about the structure of the atmosphere.

(OR)

(b) (i) Draw the cambered airfoil and its nomenclature. (7)

(ii) Define Mach number. Write the importance of Mach number. How the aircrafts are classified based on Mach number. (7)

24. (a) Explain the classification of materials with examples and discuss metallic and non-metallic materials.

(OR)

(b) Explain the wing construction with a neat sketch.

25. (a) (i) State and classify rocket engines. (8)

(ii) Explain the solid propellant rocket with a neat sketch. (8)

(OR)

(b) Explain the parts arrangement of gas turbine engine and discuss the working principle of turbo prop engine.

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