Register Number: ……

B.E. DEGREE EXAMINATIONS: NOV/DEC 2010

Second Semester

AERONAUTICAL ENGINEERING

U07AR201: Elements of Aeronautics

Time: Three Hours **Maximum Marks: 100**

Answer ALL Questions:-

PART A (10 x 1 = 10 Marks)

1. First flight was flown on 17th Dec

(a) 1807 (b) 1903 (c) 1703 (d) 1913

2. Angular motion about the longitudinal axis is called

(a) yawing (b) pitching (c) rolling (d) moment

3. Canards are usually used------ of the wing.

(a) Top (b) ahead (c) bottom (d) back

4. Dihedral provides------- stability.

(a) Longitudinal (b) lateral (c) axial (d) none of these

5. The main longitudinal strength carrying member of an aircraft fuselage is

(a) Stringer (b) former (c) longeron (d) truss

6. A small reinforcing member used to support the corners of a structure is called

(a) bulkhead (b) gusset (c) frame (d) truss

7. The contents of carbon in cast iron are ------- %.

(a) 2.2- 4.5 (b) 6.1- 8.2 (c) 5.3- 5.5 (d) 10- 15

8. In composite materials mostly used binder is

(a) glue (b) epoxy (c) rubber (d) polymer

9. Nozzle is device which is used to increase the

(a) pressure (b) Kinetic energy (c) volume (d) mass

10. Optimum expansion is achieved when exit pressure of nozzle is------- ambient pressure.

(a) Greater than (b) equal to (c) less than (d) none of these

PART B (10 x 2= 20 Marks)

11. Differentiate between biplane and monoplane.

12. What are the forces acting on an airplane during level flight?

13. What are the different types of instruments? Mention some engine instruments.

14. List out the classification of flight vehicles.

15. Define ISA and what its significance is.

16. Sketch an airfoil and mark all its nomenclature?

17. What are the main structural components of an aircraft wing?

18. Differentiate between pratt and warren trusses of the fuselage construction.

19. Classify the different types of rocket engines.

20. Differentiate between reciprocating and gas turbine engines.

PART C (5 x 14= 70 Marks)

21. a) Briefly explain how the modern developments in the subject of aerodynamics and aerospace materials influenced aircraft design?

(OR)

b) Explain in detail the major components and control surfaces of airframe of an airplane and their function.

22. a) Explain with neat sketches the working principle of any two instruments used for flying.

(OR)

b) Discuss the classification of flight vehicles with respect to principle of operation and configuration.

23. a) Explain the basic structure of atmosphere with a neat sketch. Derive the relation for pressure and temperature variations with altitude. **(OR)**

b) Define Mach number, angle of attack, C_L, C_D, C_p and C_M.

24. a) State the importance of composite materials used in aircraft. Also explain with neat sketches about monocoque and semi monocoque. **(OR)**

b) Briefly discuss about the application of aluminium alloy and titanium in aircraft industry.

25. a) What are relative merits and demerits of ramjet, pulsejet, turbojet, turboprop and turbofan engines.

(OR)

b) Explain with neat sketches the construction and working of solid propellant rocket engine system.

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