

B.E DEGREE EXAMINATIONS: MAY/JUNE 2014

(Regulation 2013)

Second Semester

AERONAUTICAL ENGINEERING

U13AET201: Elements of Aeronautics

Time: Three Hours

Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. When the elevator is deflected upwards, the lift on the _____ is increased.
 - a) Port wing
 - b) Starboard wing
 - c) Nose
 - d) Tail
2. The straight line connecting the leading and trailing edges is the _____ of the airfoil.
3. _____ are heavy strips that run the length of the fuselage and are attached to the outer edge of the bulkheads.
 - a) Longerons
 - b) Spars
 - c) Keelson
 - d) Stringers
4. _____ has a better strength-to-weight ratio than aluminium and retains its strength at higher temperatures.
5. The reduction of power available with altitude can be delayed if a _____ is used on the engine.
 - a) Afterburner
 - b) Supercharger
 - c) Bypass Duct
 - d) Preheater
6. The work supplied by the compressor serves to increase the _____ of the flow.
7. The flow field throughout the SCRAMJET is _____.
 - a) Subsonic
 - b) Partly Subsonic & Supersonic
 - c) Supersonic
 - d) Partly Subsonic & Transonic
8. To minimize reentry heating, the space reentry vehicle must have a _____.
9. Find the odd man out
 - a) Aileron
 - b) Elevator
 - c) Rudder
 - d) Flaps
10. _____ is armed with weaponry and has no onboard human pilot.

PART B (10 x 2 = 20 Marks)

(Not more than 40 words)

11. Expand : (i) NACA (ii) NASA
12. Define camber of the airfoil.
13. Differentiate Monocoque and Semi-monocoque Construction.
14. What are the advantages of using Composite Structures over Conventional sheet-metal structure?
15. Name the two methods of thrust augmentation employed in a jet engine?
16. Define Propeller efficiency.
17. Why multistage rockets are preferred over single stage rocket?
18. State the Kepler's Laws of Planetary motion.
19. What is a MAV? State its applications.
20. List the components of a basic hydraulic system.

PART C (5 x 14 = 70 Marks)

(Not more than 400 words)

Q.No. 21 is Compulsory

21. (i) Draw and explain the working of RAMJET Engine. (12)
(ii) Is a RAMJET engine self starting? Justify your answer. (2)

22. a) Draw the three views of an aircraft and show all the major parts? Explain the major components and their functions.

(OR)

- b) Draw a neat sketch of the International Standard Atmosphere? Explain the effect of altitude on Pressure, Temperature and Density.

23. a) What are the different types of fuselage construction? Explain them with neat sketches.

(OR)

- b) What is the role of composite materials in the modern airplane construction?
What are the prime components of the modern airplane which are considered for composite materials?

24. a) Explain with neat sketches the working and operation of Turbojet engine with afterburner. What are its advantages and limitations?

(OR)

- b) With a neat sketch explain the principle of operation of a Turbo fan engine.
Discuss their merits and demerits.

25. a) Identify & explain the various system related to Avionics, Navigation, Guidance, Communication and weapon delivery system installed a typical combat aircraft.

(OR)

- b) What is the need for Air-conditioning and Pressurization systems in an aircraft?
Explain the operation of a basic Air-conditioning system with a neat sketch.
