Reg. No. : E N G G T R E E . C O M

Question Paper Code : 30013

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2023.

Third Semester

Aeronautical Engineering

AE 3302 – AIRCRAFT SYSTEMS AND INSTRUMENTS

(Regulations 2021)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. How does hydraulic systems differ from pneumatic systems?
2. Mention the major components of landing gear systems.
3. Sketch and mark the parts of the push pull rod system of an aircraft.
4. What is the purpose of primary control surfaces used in aircraft?
5. Categorize the gas turbine engine based on operation condition.
6. Draw the simple sketch for multi engine fuel system.
7. Differentiate air cycle and vapor cycle system.
8. Indicate the uses of anti – icing system.
9. Mention the purpose of navigation systems.
10. List out the basic flight instruments.

PART B — (5 × 13 = 65 marks)

11. (a) How does hydraulic systems in aircraft works? Describe the construction and working principle of any one system.

Or

(b) Mention the role of shock absorber in aircraft safety. Discuss its responsibility on sudden load variation condition of an aircraft. Also suggest the suitable material for overcome the structural destruction.

12. (a) With neat sketch explain the primary control surface movement mechanism with respect to the aircraft axis.

Or

(b) Describe with neat outline the working principle and advantage of auto pilot system.

13. (a) Distinguish piston engine and gas turbine engine fuel system. Also explain the gas turbine engine fuel system in aircraft.

Or

(b) Point out the consequence faced in starting system and ignition system of an aircraft engine and explain any one ignition system with neat sketch.

14. (a) Explain with suitable illustration, how does fire protection system work in aircraft?

Or

(b) In engineering point of view, describe the difference between anti icing and deicing methods in aircraft parts. Indicate the parts of aircraft required for anti – icing.

15. (a) Explain the operating principle and construction details of air speed indicator and Mach meter.

Or

(b) What are all the input and output axes of a gyroscope? Explain with a diagram how does a gyroscope process behaves under the influence of an applied force.

PART C — (1 × 15 = 15 marks)

16. (a) Draw the design layout of cockpit instruments required for subsonic and supersonic aircraft. List the instruments used for above mention situations and justify the reason for selecting those instruments.

Or

(b) List out the gas turbine engine parameters to be measured at flying conditions. Also suggest the suitable measurement technique and instruments to measure that parameter with your comments.

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