

B.E DEGREE EXAMINATIONS: NOV/ DEC 2014

(Regulation 2009)

Fourth Semester

AERONAUTICAL ENGINEERING

AER107: Aircraft Systems and Instrumentations

Time: Three Hours

Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Push pull rod controls are generally used for
 - a) FLAPS
 - b) Brakes
 - c) Primary Flight Controls
 - d) Secondary Flight Controls
2. “Artificial feel” is introduced in
 - a) Cable Control
 - b) Push pull rod controls
 - c) Torque tube controls
 - d) Powered controls
3. No. of spark plugs used in aero engine per cylinder is
 - a) 0
 - b) 1
 - c) 2
 - d) 3
4. High bypass ratio of a large engine is around
 - a) < 1.0
 - b) 2.5
 - c) > 5
 - d) > 10
5. The frequency of the AC power used in aircraft is
 - a) 440 Hz
 - b) 400 Hz
 - c) 60 Hz
 - d) 50 Hz
6. Ni-Cd batteries use _____ as electrolyte.
 - a) Water
 - b) Sulphic Acid
 - c) Mineral Water
 - d) KOH
7. The hydraulic fluid used in commercial aviation hydraulic systems is
 - a) OM - 11
 - b) DTD 585
 - c) Skydrol
 - d) Castrol

8. Anti – icing fluids added to fuel is called
- | | |
|---------|------------|
| a) DIce | b) Phenol |
| c) Nice | d) Benzene |
9. Chined tyres are used in
- | | |
|---------------|---------------|
| a) Wheel | b) Nose Wheel |
| c) Main Wheel | d) Fly Wheel |
10. The frequency band of operation of automatic radio compass is
- | | |
|-----------------------|-------------------|
| a) Low Frequency | b) High Frequency |
| c) Very Low Frequency | d) Medium Wave |

PART B (10 x 2 = 20 Marks)

11. What is Active Control Technology?
12. What is meant by CCV?
13. What is the principle of Anti-skid system?
14. What are the power sources for hydraulic system?
15. List out few aircraft fuels.
16. Explain the procedure for In -flight restart.
17. Briefly explain Boot-strap system in air conditioning.
18. Describe Fire detection & extinguishing system in a typical airline class of aircraft.
19. List the various uses of gyroscopes & accelerometers in aircraft systems / instruments.
20. State the requirement for measurement of air data and indicate the system where each such data is used in aircraft.

PART C (5 x 14 = 70 Marks)

21. a) (i) Identify the application and use of Push pull rod controls and flexible transmission in flight control systems.
- (ii) Explain the classification of precision approaches associated with instrument landing system with neat diagrams.
- (OR)**
- b) (i) Explain the working and features of the digital-fly-by-wire aircraft control system with neat sketch.
- (ii) Explain the working of piston pump with simple sketch.
22. a) Explain the working of Pratt & Whitney Electronic Engine Control with neat sketches.

(OR)

- b) Draw a neat schematic diagram of a hydraulic system used in the modern jet airliner and describe the various function of the components and sub-systems with typical operating parameters.

23. a) (i) Compare the ignition systems of gas turbine and reciprocating engines.
(ii) Write down the complete specifications of any commercial gas turbine engine and define each item.

(OR)

- b) Explain the fuel systems used in the multi (four) engine aircraft with Booster pumps, transfer pumps, cross feed and dump valves.

24. a) (i) Identify atleast three grades of refrigerants. Write down their required properties and give examples.
(ii) Explain the working of rain repellent system with neat sketches.

(OR)

- b) Explain the working of different de-icing, defogging and anti-icing systems with neat sketches in a typical pressurized aircraft.

25. a) Explain the functions of:
(i) EHSI
(ii) EADI
(iii) ADS
(iv) Multi Function Display.

(OR)

- b) Explain the operating principles of the following instruments systems with neat sketches:
(i) DME
(ii) Area Navigation
(iii) Inertial Navigation system.
(iv) Automatic Direction Finder.
