



B.E DEGREE EXAMINATIONS: MAY 2015

(Regulation 2009)

Sixth Semester

AERONAUTICAL ENGINEERING

AER113: Avionics

Time: Three Hours

Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. The main task or function of any avionics system is performed by
 - a) Sensors
 - b) Processors
 - c) Analog circuits
 - d) Data connectors
2. Which one of the following information is obtained from Air Data System?
 - a) Heading
 - b) Altitude
 - c) Attitude
 - d) Ground Speed
3. The memory size of a digital computer with 16-bit address bus is
 - a) 8 KB
 - b) 16 KB
 - c) 32 KB
 - d) 64 KB
4. Which one of the following avionics architecture uses AFDX network?
 - a) Centralized architecture
 - b) Federated architecture
 - c) Pave Pillar architecture
 - d) Integrated Modular Avionics architecture
5. The fiber optic equivalent of MIL-STD-1553 data bus is
 - a) MIL-STD-1553C
 - b) MIL-STD-1553F
 - c) MIL-STD-1663
 - d) MIL-STD-1773
6. The modulation technique used in ARINC 429 data bus is
 - a) Unipolar Return-to-Zero
 - b) Bipolar Return-to-Zero
 - c) Unipolar Non-return-to-Zero
 - d) Bipolar Non-return-to-Zero
7. The major drawback of HUD compared to HMD is its
 - a) Optics arrangement
 - b) Weight
 - c) FOV
 - d) Display resolution

8. A typical frequency range in VHF band for aviation applications is
 - a) 3 – 30 MHz
 - b) 30 – 100 MHz
 - c) 108 – 136 MHz
 - d) 1530 – 1660 MHz
9. Which one of the following navigation system is a 'self-contained and autonomous' one?
 - a) VOR/DME
 - b) TACAN
 - c) GPS
 - d) Inertial Navigation System
10. Which one of the following is an effect of ECCM in electronic warfare?
 - a) Rejection of false targets
 - b) Denial of detection
 - c) Tracking of an invalid target
 - d) Computer overloading

PART B (10 x 2 = 20 Marks)

11. Mention the preliminary design requirements for an avionics system.
12. What is meant by 'Electromagnetic compatibility'?
13. What is the need for analog-to-digital converter in a flight control computer?
14. What are the various steps involved in executing microprocessor programs written in high-level languages?
15. What are the functions performed by Vehicle Management Processing area in Pave Pillar architecture?
16. Draw the Manchester II Bi-phase waveform for a digital data '1011'.
17. Mention the various functions performed by the display processor of HUD.
18. What is meant by 'data fusion' in synthetic vision display? Give an example.
19. What are the advantages of ADS-B system in Air Traffic Control?
20. Name any four utility systems in a civil aircraft.

PART C (5 x 14 = 70 Marks)

21. a) (i) Draw the block diagram of typical avionic systems for a modern civil aircraft. (6)
 (ii) List out the various avionic systems in a naval strike aircraft and describe the function(s) of each system. (8)

(OR)

- b) Explain the detailed process for developing an avionics system for a military aircraft starting from mission requirements to system testing.
22. a) With a neat block diagram explain the internal components of a digital computer and the various types of its memory.

(OR)

b) With a neat block diagram explain the typical architecture of a microprocessor suitable for aerospace applications.

23. a) Compare the features, advantages and disadvantages of the following Avionics architectures:

(i) Centralized architecture

(ii) Federated architecture

(iii) Distributed architecture.

(OR)

b) (i) Discuss the following message formats of MIL-STD-1553B data bus: (8)

Normal Information Transfer: BC-RT, RT-BC, RT-RT;

Broadcast Information Transfer: RT-RT.

(ii) Write short notes on ARINC 629 messages. (6)

24. a) (i) Discuss the various design factors to be considered in designing a conventional aircrew helmet for HMD and mention the basic functions of the helmet. (8)

(ii) Write short notes on Helmet Mounted Sights. (6)

(OR)

b) (i) Explain the operation of moving map display system in cockpit. (8)

(ii) Write short notes on Intelligent displays management system for aircrafts. (6)

25. a) Explain in detail the various components, working principle and operation of TCAS II with necessary block diagrams. How it differs from TCAS I?

(OR)

b) (i) Explain the principle of operation of differential GPS in detail. (7)

(ii) With a neat diagram explain the working of quadruplex actuation system used in FBW flight control. (7)
