Register Number: ……..

B.E DEGREE EXAMINATIONS: APRIL/MAY 2014

(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. Which one of the following avionic system gives attitude and heading information?
   a) Air Data System b) AHRS
   c) Doppler Radar System d) GPS
2. The basic information obtained from radio navigation system is
   a) Ground Range b) Position
   c) Velocity d) Bearing
3. The number of quantization levels in a 10-bit A-to-D converter are
   a) 128 b) 256
   c) 512 d) 1024
4. Which one of the following is not an internal component of microprocessors?
   a) Memory b) Register
   c) Decoder d) ALU
5. The inter-message gap in MIL-STD-1553B data bus is
   a) 4 microseconds b) 8 microseconds
   c) 12 microseconds d) 14 microseconds
6. The length of ARINC 629 word is
   a) 8 bits b) 16 bits
   c) 20 bits d) 32 bits
7. When a speech recognition system in cockpit incorrectly identifies a word from the vocabulary is termed as
   a) Substitution error b) Insertion error
   c) Rejection error d) Operator error
8. Which one of the following optical component shows display symbology with the outside world scene in a HUD?
   a) Collimator b) Combiner

   c) Converger d) Reflector
9. Which one of the following gyroscopes works under the principle of Sagnac effect?
   a) Conventional gyros b) Mechanical gyros
   c) Optical gyros d) MEMS gyros
10. A measure of actions taken to prevent or reduce enemy's effective use of EM spectrum is
   a) Electronic Protection b) ECM
   c) ECCM d) ESM

PART B (10 x 2 = 20 Marks)

11. What are the functions performed by Navigation Management System in civil aircrafts?
12. Show the breakdown of aircraft functional requirements from the aircraft level to the avionics function level.
13. Define 'sampling' in signal processing.
14. Distinguish between static RAM and dynamic RAM.
15. List out the functional areas and software elements of Pave Pillar avionics architecture.
16. Why ARINC 429 data bus is called a 'simplex' bus?
17. What is meant by 'stroke' in HUD system?
18. Name all the primary flight information shown on a PFD.
19. Compare the features of FBW and FBL flight control systems.
20. Name any two aircraft utility systems and what is the importance of utility systems in civil aviation?

PART C (5 x 14 = 70 Marks)

21. a) (i) List out the various avionic systems and its function in a naval strike aircraft and explain the need for integrating the avionic systems in such aircrafts. (8)
    (ii) Explain the importance of EMI/EMC requirement for military avionic systems. (6)

    (OR)

    b) Explain the following civil avionics systems in detail:
    (i) Radar and Infrared Sensor Systems
    (ii) Flight Management System
    (iii) Engine Control and Management System
    (iv) House Keeping Management System

22. a) (i) With a neat block diagram explain the internal components of Von Neumann digital computer. (10)

(ii) What is meant by 'aliasing' in signal processing and How to avoid aliasing? (4)

(OR)

b) (i) Explain the various types of non-volatile memory in a digital computer. (10)

(ii) Explain the role of microprocessor in avionic systems. (4)

23. a) (i) Name the First generation and Second generation Avionics Architectures. (4)

(ii) Discuss the Integrated Modular Avionics architecture in detail. (10)

(OR)

b) (i) Show the command word and status word of MIL-STD-1553B data bus and give the description of each bit in detail. (8)

(ii) Explain the file transfer protocol in ARINC 429 data bus. (6)

24. a) (i) Compare CRT, LED and EL display technologies in terms of resolution, color, viewing angle, power, temperature range and MTBF. (8)

(ii) Explain the Virtual Cockpit and Virtual Instrument Display for pilots. (6)

(OR)

b) (i) Discuss the eight advantages of moving map color displays in cockpit. (8)

(ii) Write short notes on Synthetic Vision Display system for cockpits. (6)

25. a) (i) Explain the principle and working of Secondary Surveillance Radar in Air Traffic Control. (7)

(ii) Explain the basic principle and operation of VOR navigation system in detail. (7)

(OR)

b) Explain the working of TRSB Microwave Landing System with various functions and discuss how this system is better than Instrument Landing System.

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