

Roll No:



UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, December 2017

Program Name: M. Tech ASE+UAV
Course Name: Introduction to Avionics

Semester – I
Max. Marks : 100

Course Code : MAEG 703

Duration : 3 Hrs

No. of page/s: 03

Note: Internal choice is given for Question No 10 & 11.

Section – A (5x4=20)

1. The response of a servomechanism is $c(t) = 1 + 0.2 e^{-60t} - 1.2 e^{-10t}$ when subject to a unit step input. Obtain an expression for the system.
2. Differentiate between Fly By Wire Vs. Fly By Light
3. Explain about the DOD-STD-1773 Fiber optic system
4. Explain the Electronic Flight Control System Architecture
5. What are the major factors to consider designing the Helmet mounted Display for civil transport aircraft.

Section – B (4 x 10 = 40 Marks)

6. Explain the **Manchester Bi-Phase coding**? For the following clock Fig (1) pulse explain the **coding** and find the digital Data.

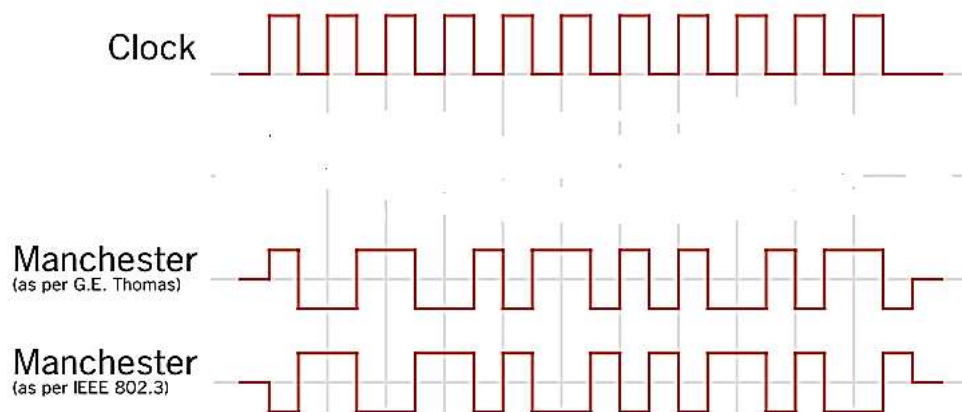


Fig (1)

7. Draw and explain the Packaging unit for Transport Aircraft and Defense Aircraft

- i) ARINC 600 LRU
- ii) DOD-STD 1788 LRU

8. a) Convert the following binary number system **(05+05)**

- i) $(A5c7)_{16}$ to decimal
- ii) Convert the $(291)_{10}$ to Binary
- iii) Convert the $(647015)_8$ to Binary

b) 2's compliments arithmetic's

- i) Add $-64+32$
- ii) Add $-43+(-78)$

9. Briefly explain about the DO 178 Software development and verification standards.

Section – C (20 x 2 = 40 Marks)

10. Explain the following

- i) Specifications & Protocol (MIL-STD 1553B)
- ii) Hardware elements (BC, RT, BM)
- iii) Word Formats (MIL-STD 1553B)
- iv) Coupling Methods

(Or)

11. Briefly Explain the Airbus A 320 Central Fault display System and CFDS classes of failure.

- i) Class I
- ii) Class II
- iii) Class III

12. Explain the following Fault tolerant software

- i) Recovery Blocks
- ii) Multi-version programming
- iii) Exception Handlers
- iv) Run Time Assertions
- v) Analytical Redundancy

7. Briefly Explain the Airbus A 320 Central Fault display System and CFDS classes of failure.

a) Class I

b) Class II

c) Class III

8. Convert the following number Systems

a) $(79.515)_{10}$ to Binary

b) $(753)_8$ to Decimal

c) $(0.011000001)_2$ to Octal

d) $(7D.3374B)_{16}$ to Decimal

e) $(0.256)_{10}$ to Octal

9. Explain the following Fault tolerant software

a) Recovery Blocks

b) Multi-version programming

c) Exception Handlers

Section – C (20 x 2 = 40 Marks)

10. Explain the following Failure mode & effect analysis

a) *Class I*: Catastrophic failure effects

b) *Class II*: Critical Effect

c) *Class-III*: Slight effect

d) *Class IV*: No effect

(Or)

11. Explain the following MILITARY Aircraft Data bus

a) Bus controller & 5-Bit Remote terminal

b) Transformer coupling of MIL-STD 1553B

c) Word Formats

d) Message formats (BC to RT, RT to BC, RT to RT)

12. Explain the following Avionics System Architecture

- a) Federated Architecture (F-16 A/B)
- b) Distributed Architecture (DAIS)
- c) Hierarchical Architecture (F-16 C/D, EAP)
- d) Pave Pillar Architecture (F-22)