

Code No: 07A72104

R07

Set No. 2

IV B.Tech I Semester Examinations, November 2010

AVIONICS

Aeronautical Engineering

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. There are 3 types of TCAS (Traffic Collision Avoidance System) as used by civil aircraft. Explain. [16]
2. What does a communication system for an aircraft comprise of? Explain a typical communication system based on VHF radio transmitter receiver. [6+10]
3. Discuss the typical avionic sub-systems used in civil aircrafts. [16]
4. (a) Draw a simple schematic of Take-off/STALL warning system for an Airliner.
(b) "Auto-pilot" can be coupled to "NAVO-MATIC" of a civil airliner to obtain Integrated Auto-Flight control system. Explain the methodology. [8+8]
5. Give an overview of American "GPS" Satellite Navigation System for both civil and military users. [16]
6. What is the function of DME? Explain the transmitter and receiver characteristics of DME. [6+10]
7. "Glass Cock-pit" - a concept of modern civil airliners Flight Deck Display. Explain in detail. [16]
8. Differentiate "Analytical Frame of Reference" of Strapped Down INS, "Space Stabilized INS" and "Stabilized, Levelled & Initialized Platform version of INS" with its applications. [16]

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R07**Set No. 4****IV B.Tech I Semester Examinations, November 2010****AVIONICS****Aeronautical Engineering****Time: 3 hours****Max Marks: 80**

Answer any FIVE Questions
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1. (a) Explain the methodology of Navigation over Earth using NAVSTAR satellites profiles and the loci of the Receivers position especially for aeronautical applications.
(b) Emergency Locator Beacon fitted on aircraft designed to work in conjunction with SAT-NAV for search & rescue. Explain. [8+8]
2. Explain the straight scale and digital methods of quantitative display of instrument on the instrument panel. List their merits and demerits. [6+6+4]
3. (a) What are the various sub-systems of "Instrument Landing System (ILS)"? Explain briefly.
(b) List out various Radio - aids to approach & landing. [8+8]
4. Under ICAO/JAR regulations a minimum capability of Auto-Pilot is mandatory for any civil aircraft including trainer. Draw the Lay-out of 4-stage, 3-axes Auto-pilot and explain this capability in detail. [16]
5. The 3 types of INS are Local Inertial Platform, Strap Down, and Space Stabilized Platform used for aircraft, missile and spacecraft respectively. Explain these 3 types of INS in detail. Also "Hybrid-Navigation" is the order of the day. Explain about it? [16]
6. Classify and explain briefly the special navigation systems and discuss the following:
(a) Area Navigation
(b) Electronic Combat Systems and Techniques. [4+6+6]
7. ATC Surveillance Radar situated on any Aircraft is a primary Radar for the recovery of the craft. Write down briefly regarding two elements of ATC Radar namely SRE & PAR and how this Radar System can be used for safe landing of the aircraft on to the Runway. [16]
8. List and briefly explain the various types of radio-navigation systems. [16]

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R07**Set No. 1****IV B.Tech I Semester Examinations, November 2010****AVIONICS****Aeronautical Engineering****Time: 3 hours****Max Marks: 80****Answer any FIVE Questions****All Questions carry equal marks**

1. Explain in detail with suitable block-diagram the Flight Deck Display Methodology using "Head-Up-Display & Multi Function Display (HUD & MFD)". [16]
2. Gyroscopic Principle is used for "Auto - Pilot" of a transport aircraft. Briefly explain with the help of a block-diagram its functions. [16]
3. (a) Draw the block-diagram of Amplitude Modulated Radio - Telephony Transmitter.
(b) Explain the function of each basic building block. [8+8]
4. Write down the various hyperbolic navigation systems. Explain the principle and operation of OMEGA. [4+12]
5. Compare & contrast the space vehicle and military aircraft with respect to avionic subsystems. [16]
6. (a) List out basic differences (functional) between "Strapped Down" and "Stable Platform" INS.
(b) Why "Strapped Down INS" is generally not used for Aircraft Navigation? [8+8]
7. Ground Proximity Warning System is a Radar System using Doppler's principle. With the help of block diagram explain its Task. [16]
8. Draw a detailed block-diagram of GPS Receiver and explain the methodology of depicting ρ, v, t (position, Velocity, Time) on the Control & Display unit of the Flight Deck. [16]

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R07**Set No. 3****IV B.Tech I Semester Examinations, November 2010****AVIONICS****Aeronautical Engineering****Time: 3 hours****Max Marks: 80****Answer any FIVE Questions
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1. Discuss the principles of avionic systems/subsystems. [16]
2. Draw the block-diagram of Digital Version Air-Data Computer and explain its function for Auto-Flight Control. [16]
3. (a) Explain basic principles of operation of the three segment GPS system.
(b) What is the signal structure of "NAVSTAR" Satellite Broadcasts and velocity? [8+8]
4. List the various instruments/equipments along with their function installed on the flight deck of a light aircraft. What are the various methods of grouping instruments and which method is mostly used? [10+4+2]
5. Differentiate Instrument Landing System (ILS) and ATC Radar (GCA) for the safe landing of the aircraft. [16]
6. Categorize and briefly explain the radio waves. What are the advantages and limitations of ground waves? How these limitations can be taken care of? [6+6+4]
7. Explain the operation of VOR with the help of block diagrams of VOR transmitter and receiver. [16]
8. Explain the methodology of stabilization, Levelling, Initialization & Updation of INS to enhance the accuracy of Navigation in a Long haul civil airline using state-of-art technology. [16]
