Code No: 07A72104 **R07** **Set No. 2**

**IV B.Tech I Semester Examinations,May 2011**
**AVIONICS**
**Aeronautical Engineering**

**Time: 3 hours** **Max Marks: 80**

**Answer any FIVE Questions**
**All Questions carry equal marks**

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1. (a) Explain the salient feactures and operating procedure of "Surveillance Radar Element".
   (b) What is function of Pecision Approach Radar (PAR) and the PAR display both in Azimuth and Elevation? [8+8]
2. (a) Explain system wise radio-frequency utilization in any aeroplane.
   (b) Elucidate the types of Air-to-Ground/ Ground-to-ground communcation systems. [8+8]
3. (a) Explain the principle of position fix using Hyperbolic Navigation.
   (b) Briefly explain the methodology of satelite navigation in general. [8+8]
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 civilairliner to obtain Integrated Auto-Flight control system. Explain the methodology. [8+8]
5. (a) Differentiate DME airborne interragator Vs SSR airborne transponder.
   (b) Simple explanation of Distance Measuring Equipment. [8+8]
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. Briefly explain the various technologies available for flight deck display. Explain the principle and working/operation of LCD with the help of a diagram. [7+9]
8. Draw a block diagram to explain the "Integration" of AVIONIC SUITE in a military (typical fighter) aircraft. [16]

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Code No: 07A72104 **R07** **Set No. 4**

**IV B.Tech I Semester Examinations,May 2011**
**AVIONICS**
**Aeronautical Engineering**

**Time: 3 hours** **Max Marks: 80**

**Answer any FIVE Questions**
**All Questions carry equal marks**

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1. Draw the block-diagram of Digital Version Air-Data Computer and explain its function for Auto-Flight Control. [16]
2. (a) What is "ATIS - Air Traffic Information Service" explain.
   (b) Explain Air Craft Radio - Audio Frenquency band designation. [8+8]
3. (a) What is the difference between "Rate Gyro" and "Ring Laser Gyro (RLG)"? And its applications?
   (b) Draw a brief diagram of RLG and explain its advantages to enhance the accuracy of INS. [8+8]
4. Discuss the maintainability and reliability of avionic systems. Mention the factors affecting the maintainability and reliability of avionic system. [5+5+6]
5. What is electronic flight instrument system (EFIS)? Explain EFIS with help of a typical architecture. [6+10]
6. Explain in detail the applications of GPS for Airbone applications using Interferometric GPS (IGPS) Flight Reference System. [16]
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. What is VORTAC? Explain the principle and working of VORTAC. [6+10]

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Code No: 07A72104 **R07** **Set No. 1**

**IV B.Tech I Semester Examinations,May 2011**
**AVIONICS**
**Aeronautical Engineering**

**Time: 3 hours** **Max Marks: 80**

**Answer any FIVE Questions**
**All Questions carry equal marks**

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1. (a) Draw the signal Format of Interrogation and Reply Standards of Airborne Transponder of the ATC Serveillance System.
   (b) Depict in detail the "Code & Mode" control & display availble to the pilot in the Cock-pit with special refernce to "Encoding Altimeter". [8+8]
2. What is the purpose of ADF? What device enables an ADF receiver to determine the direction? Explain the working of this device. [4+4+8]
3. Draw a simplified block-diagram of Electronic Flight Control System (EFCS - FBW-FBL) and briefly explain the function in any aircraft. [16]
4. (a) What is "Four -axis Stable Platform of INS"?
   (b) On the control pannel of CDU in the Cock-pit, there are 4 modes namely
      i. Stand-By
      ii. Align
      iii. Navigate
      iv. Update. Explain these modes. [8+8]
5. Show the categorization of avionics systems with the help of a block diagram. Discuss the importance of any one of the categories in the field of aviation. [7+9]
6. What is the function of ATC transponder? Explain the principle of transponder operation with the help of a diagram. [6+10]
7. (a) What are Director Displays? Explain with the help of diagram(s).
   (b) What is EL display? What are its merits and demerits? [8+8]
8. Draw a detailed block-diagram of GPS Receiver and explain the methodology of depicting $\rho$,$v$,t(position, Velocity, Time) on the Control & Display unit aof the Flight Deck. [16]

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Code No: 07A72104 **R07** **Set No. 3**

**IV B.Tech I Semester Examinations,May 2011**
**AVIONICS**
**Aeronautical Engineering**

**Time: 3 hours** **Max Marks: 80**

**Answer any FIVE Questions**
**All Questions carry equal marks**

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1. Explain the straight scale and digital methods of quantitative display of instrument on the instrument panel. List their merits and demerits. [6+6+4]

2. Draw a "Block-diagram " to explain the "Integrated Flight" concept of Avionic System of a typical Civil Airliner. [16]

3. (a) Explain the methodology of Navigation over Earth using NAVSTAR satellites profiles and the loci of the Receivers position eapecially for aeronautical applications.
   (b) Emergency Locator Beacon fitted on aircraft designed to work in conjunction with SAT-NAV for search & rescue. Explain. [8+8]

4. (a) Draw a schematic lay-out of a modern civil transport airplane Avionics architecture using triplex redundant ARINC-429 DATA Bus.
   (b) Using the above schematic layout explain Boeing-777 Airplane Control and Management System. [8+8]

5. What are the guidance and control requirements laid down by FAA for instrument landing? Explain how flare and lateral guidance is achieved. [6+10]

6. (a) Explain the methodology to enhance the functional/ operational accuracy of Airborne INS on an aircraft.
   (b) "Electronics unit" of INS is vital for aeronatical applications. Explain how Navigation parameters are extracted out of the this INS. [8+8]

7. TTCAS (Terralin and Traffic Collision Avoidance System) is the on-board Radar System for the "ultimate safety in the Air". Explain with full details its functions. [16]

8. A 1000-MHz DME transponder on the ground is triggered by a signal 10 dB above its receiver-noise level. The receiver-noise figure is 10 dB. What transmitter power is needed on an aircraft to produce triggering from a distance of 100 nm? Assume simple dipoles at each end of the link, no transmission-line losses, a transponder-receiver bandwidth of 1 MHz and a temperature of $293^o$ Kelvin. (Boltzmann's constant = $1.38 \times 10^{-23}$ Joules/Kelvin). [16]

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