

Code No: 07A82101

**R07**

**Set No. 2**

**IV B.Tech II Semester Examinations, APRIL 2011  
AIRCRAFT SYSTEMS AND INSTRUMENTS  
Aeronautical Engineering**

**Time: 3 hours**

**Max Marks: 80**

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

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1. Write short notes on the following related to modern electrical power generation types:
  - (a) DC power generation using an Engine-Driven Integrated Drive-Generator (IDG)
  - (b) Variable speed-constant Frequency power generation. [8+8]
2. Write a short note on the following:
  - (a) Fuel quantity flow function
  - (b) Fuel management function. [8+8]
3. Discuss a full authority control system (FADEC) of a modern aircraft with electrical throttle signalling. Bring out the major differences that the mechanism possesses over a simple control system of a trainer aircraft. Use neat diagrams for explanation. [16]
4. Discuss the need for development of three-dimensional and four-dimensional display formats that provide the pilot with real time and predictive pictorial information. Explain the technical details of such formats. [16]
5. Discuss in detail the A.C. and D.C. type fuel quantity flow measurement systems employed in aircraft. [16]
6. With the help of a neat sketch, discuss main features of A320 Integrated flight Management system. [16]
7. Write a detailed note on cabin pressurization procedures in an aircraft. [16]
8. Write a detailed note on braking and anti-skid mechanisms of an aircraft. How these mechanisms have been modified in a multiple wheel systems as in Boeing 777 aircraft? [16]

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1. Compare the working principles of the following actuators:
  - (a) Electro-mechanical type of actuators
  - (b) Electro-hydrostatic type of actuators. [8+8]
2. (a) Discuss various terminology in use to indicate the altitude of an aircraft in different contexts.  
(b) Write a short note on the need and use of air data computers. [8+8]
3. Write a detailed note on the conditioning of the hydraulic fluid intended for aviation purpose. [16]
4. Write short notes on the following:
  - (a) Need for cabin conditioning
  - (b) Need for avionics conditioning. [8+8]
5. Write short notes on the following related to typical aircraft product life cycle:
  - (a) Design phase
  - (b) Build phase. [8+8]
6. Write a note on the following with reference to an aero engine starting and operation:
  - (a) Fuel control
  - (b) Ignition control
  - (c) Engine starting
  - (d) Engine Re-start. [4+4+4+4]
7. Explain various tasks addressed by the Fuel management, quantity gauging system and thermal management functions in a bombardier Global Express family of systems. [16]
8. Write a detailed note on 220 VDC systems as used by Modemairliners. [16]

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1. Explain the working principle of radar and how weather radar works. [16]
2. Explain in detail:
  - (a) Top-down approach, and
  - (b) Bottom-down approach. [8+8]
3. Write short notes on the following:
  - (a) RAM AIR COOLING
  - (b) Bleed air system isolation valve. [8+8]
4. With the help of a neat sketch, discuss main features of Boeing 777 primary flight control system (PFCS). [16]
5. Describe working principle of a BAE146 family Blue hydraulic system with a simple sketch. [16]
6. Provide a summary over developments that took place in engine control systems starting from simple to modern design aircraft. Use neat diagrams wherever necessary. [16]
7. Write a detailed note on integrated civil aircraft fuel systems. [16]
8. Write a detailed note on the following:
  - (a) Various electric Loads in any aircraft
  - (b) Electrical system displays requirements. [8+8]

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**Set No. 3**

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**Time: 3 hours**

**Max Marks: 80**

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

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1. Write a detailed note on Fault tree analysis. [16]
2. (a) Distinguish between primary and secondary flight control surfaces.  
(b) Write a short note on flight control linkage systems. [8+8]
3. Provide a detailed note on development of aviation aircraft fuel systems starting from piston engine usage to the present day design of more complex systems. [16]
4. Write a detailed note on electrical load management systems (ELMs). Provide necessary circuit diagram to support the discussion. [16]
5. Write short notes on the following with regard rejecting aircraft heat load:
  - (a) Ram air cooling
  - (b) Fuel cooling. [8+8]
6. Describe working principle of a BAE146 family yellow hydraulic system with a simple sketch. [16]
7. (a) Discuss the effects of tilting the antenna of a radar above or below over the datum reference in predicting the presence of clouds, or precipitation or turbulence coming across in its flight path.  
(b) Three basic modes of operation of a typical weather radar system. [8+8]
8. Integrated Flight Management in Air Bus 320 aeroplane is with built in Flight & Propulsion control. Explain with the help of a simple block-diagram. [16]

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