Type: DES AAE 3173 Avionics & Navigation Systems Date 04.01.2021

Q1. What are the basic components of ADS-B system? Explain its working principle. (3)

Q2. Explain the need of autopilot system in the context of function of flight management system in the aircraft. (3)

Q3. Derive the equations using DGPS receiver to find the position of aircraft with a neat diagram. How position error correction takes place? (4)

Q4. Sketch a modern Boeing aircraft cockpit layout and explain the 10 avionics subsystems in it. (4)

Q5. Explain the sensor fusion in GNSS-INS to predict position of aircraft using Kalman filter. (3)

Q6. What do you mean by process of engineering a system? Highlight importance of EIA 632 standards. (3)

Q7. Why there are different types of energy driven actuators installed in the same aircraft? Sketch the diagram to justify this with one of the example. (4)

Q8. Airport X has runway ID 27 installed with MLS. Aircraft A320 approached for landing using MLS but missed the landing. How aircraft will be guided in this case? Justify with diagram. (3)

Q9. Avionics subsystems such as-PFD, MFD, HUD, Pilot sticks, Throttle are connected with ARINC-429. Explain the challenges involved during information exchange. How to solve it? (3)

Q10. Sketch and explain the data exchange protocols between RT to RT in MIL STD-1553B. Also highlights the electrical characteristics. (4)

Q11. Draw the V-model for software development of flight control system redundant architecture to elevator actuators. Explain system engineering for software development in it. (3)

Q12. What is A-380 IMA? List the two LRU and two LRM systems. (3)

Q13. Explain the satellite signal structure with neat diagram. (4)

Q14. Why is it recommended that VOR and DME should be available simultaneously during landing? Justify it with diagram. (3)

Q15. Explain the basic components of aircraft electrical systems? (3)

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Q1. Why all aircraft should be compliant with ADS-B and ATC in future? (3)

Q2. Explain the flight management system architecture and its important function. (3)

Q3. Explain the Head Motion Box concept in HUD with neat diagrams? How is different than HMD? (4)

Q4. Compare the cockpit layout of Airbus and Boeing aircraft with neat diagram. (4)

Q5. Derive the Klaman filter estimation equation. (3)

Q6. Explain the redundancy of flight control system in the aircraft with neat diagram. (3)

Q7. Why there are multiple parts of control surface used in place of single in the aircraft? Sketch the diagram to justify this with one of the example and its symmetry design. (4)

Q8. How electrical lights are used in the aircraft? (3)

Q9. Explain the organization involved with aerospace and their responsibility. (3)

Q10. Briefly explain following: WAAS, LAAS, SBAS. C (4)

Q11. What is system engineering? Write all the requirements to design a redundant flight control system. (3)

Q12. How communication protocols works in ARINC-429? Explain with diagrams. (3)

Q13. Draw the instrumented landing system runway and explain the guidance during approach of any aircraft on this runways. (4)

Q14. Aircraft is using VOR and DME for landing. Explain its working principle. (3)

Q15. What is IDG? Explain the working principle with neat diagram. (3)