Code.No: 37149 | R05 | SET-4

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
IV.B.TECH - I SEMESTER REGULAR EXAMINATIONS NOV/DEC, 2009
FLIGHT VEHICLE DESIGN
(AERONAUTICAL ENGINEERING)

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

Answer any FIVE questions
All questions carry equal marks

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1. At the concept design phase of an air craft, what do you understand by the performance requirements of the air craft? Explain in detail with suitable sketches? (16)

2. An antisubmarine turbo jet aircraft is designed for a loiter of 3 hours at a distance of 2000 Km from the base. The crew weighs 400Kg and payload weigh 4600 Kg. The aircraft cruises at 0.8 mach at an altitude of 9Km where the speed of the sound is to be 300 m/sec. Take $\frac{L}{D}_{\max} = 16$. Calculate the omission fuel weight fraction of the air craft if specific fuel consumption is 0.015 gm/N/sec (16)

3. a) What are the various wing tip designs and state their advantages & disadvantages?
   b) If you have no limit on the span of the wing would prefer an end plate, using lit or neither? Explain. (8+8)

4. Describe the major differences in the designs of the fuselages of military cargo plane and a bomber. Justify your answer with neat sketches. (16)

5. a) Explain the term `Longitudinal control Line` (4)
   b) With the help of neat sketches explain how do you generate the outer profile of a fuselage of an air craft using longitudinal control lines (12)

6. a) Define specific fuel consumption and derive the equation for endurance of an aircraft in terms of specific fuel consumption. (8)
   b) Describe vectored thrust with the help of neat sketch. (8)

7. a) Define `Drag polar`
   b) Compare the drag polars of a symmetric airfoils and a cambered airfoil. (4+12)

8. Explain in detail about various factors affecting the structural arrangements of a wing? (16)

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