

**III B.Tech II Semester Supplementary Examinations, April/May 2005**  
**AIRCRAFT DESIGN PRACTICE**  
**(Aeronautical Engineering)**

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

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

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1. Compare design features of Wright Flyer with a bi-plane of World War II era. What changes are prominent there in? Make use of sketches and plots to illustrate your answer.
2. Elaborate with examples and theory, why should an airplane wing have an airfoil as its cross-section and not a flat plate or a circular cylinder. Make use of sketches and plots to illustrate your answer.
3. Consider a new design of airplane, Crew of 5, 40 passengers with 40 Kgs baggage each. Make use of std. data and trends for such designs. Estimate power requirements for a cruise speed of 350 Kms / hr. Assume parameters accordingly. Provide initial size and configuration lay out for this airplane.
4. Consider a low wing airplane for civil applications. Recommend horizontal and vertical tail arrangement for this airplane with two options of engine locations. Make use of sketches and plots in support of your answers.
5. (a) Write down the advantages and disadvantages of nose wheel and tail wheel type of undercarriage.  
(b) Sketch the various options for main landing gear retracted positions along with their advantages and disadvantages.
6. (a) How the factors affecting the cost of a civil transport aircraft differ from the cost of a jet fighter aircraft?  
(b) How will you analyse the preliminary cost of a basic trainer aircraft?
7. Draw the three views and neatly label the various components of a high wing twin-turboprop cargo aircraft. Estimate the performance and stability characteristics of this aircraft and compare them with a similar aircraft having low wing configuration.
8. (a) Explain general considerations taken into account while designing the aircraft structure.  
(b) Define stress concentration and its causes. What are the various methods employed to avoid/reduce the stress concentration?

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