

Code.No: 37160

R05

SET-4

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

**Time: 3hours**

**Max.Marks:80**

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

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1. a) Compare the advantages of a tandem rotor helicopter over a conventional helicopter.  
b) What are the advantages of a compound helicopter over other helicopter? [8+8]
2. a) How does a helicopter gain height? Explain the aero dynamics of rotor wings aircraft during climb.  
b) Explain collective and cyclic pitch changes. [8+8]
3. a) Explain 'hover'.  
b) Using ideal actuator disc theory. Find the relationship between power and thrust of the helicopter in hovering flight. [4+12]
4. a) Derive the expression for profile and induced powers.  
b) Describe twist in the context of a helicopter. When do you call it ideal? What are the advantages of having ideal twist? [8+8]
5. a) Describe with illustration, The aerodynamics of forward flight of a single rotor helicopter.  
b) How does it differ from aero dynamics of vertical flight?  
c) What are the differences between hovering and vertical flights? [6+6+4]
6. In the control of helicopter, define  
i) Static stability  
ii) Dynamic stability  
iii) Directional stability  
iv) Contribution of tail rotor to stability. [4 x 4]
7. Describe the difference between VTOL and STOL aircraft in operation. How do you estimate the performance in each case? [16]
8. Write short notes on  
i) Hover height  
ii) Plenum chamber  
iii) Peripheral jet machines.  
iv) Drag of hovercraft. [4\*4]

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