

**IV B.Tech I Semester Regular Examinations, November 2005****TOOL STEELS****(Metallurgy & Material Technology)****Time: 3 hours****Max Marks: 80**

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

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1. (a) What are the main application of tool steels?  
(b) What are the defects observed in tool steels while in service?  
(c) Write short notes on:
  - i. Stellites
  - ii. Cemented carbides.[5+5+3+3]
2. (a) Explain briefly the various types of water hardening tool steels.  
(b) What are the precautions taken while manufacturing water hardening tool steels.  
(c) What are the advantages and disadvantages of water hardening tool steels?[6+5+5]
3. (a) What are the principal alloying elements used, role of alloying elements in oil hardening medium alloy tool steels?  
(b) Discuss the heat treatment and microstructure of oil hardened medium alloy tool steels.[6+10]
4. (a) Explain the required properties of hot work tool steels? Give the classification.  
(b) What is the role of alloying elements, how they influence the microstructure and properties in Chromium base hot work tool steels?[8+8]
5. (a) Discuss the properties and applications of high-speed steels.  
(b) Describe the basis for selection of a tool steel to be used as a thread rolling die.[8+8]
6. (a) Explain the properties and applications of shock resistance tool steels  
(b) What are the effects of carbon, chromium, manganese and molybdenum in medium Alloy type (group A) tool steels.[8+8]
7. (a) Discuss the manufacturing process of Cermets.  
(b) Discuss the manufacturing of steel bonded titanium carbide cermets.[8+8]
8. (a) Discuss the role of powder metallurgy for the manufacture of high performance tool steels.  
(b) Discuss the advantages and disadvantages of P/M tool steels over conventional tool steels.[8+8]

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