

**III B.Tech. II Semester Regular Examinations, April/May -2005  
ADVANCED MANUFACTURING TECHNOLOGY  
(Mechatronics)**

**Time: 3 hours**

**Max Marks: 80**

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

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1. (a) What is tool life? State its importance in industries.  
(b) What are the currently used tool materials? Describe their importance in present industries.
2. (a) How a centre lathe is specified? Discuss.  
(b) What are constructional features of tail stock? Explain with the help of neat sketch.
3. (a) Explain with neat sketch any one type of shaper feed mechanisms  
(b) Sketch the typical tool forms for planning operations and explain their applications.
4. (a) Explain briefly the construction of a radial drilling machine with emphasis on how the requisite motions are obtained.  
(b) What is the function of the tap drill? How is the tap drill size found?
5. (a) Define cutting speed, feed and depth of cut in milling process.  
(b) With the help of neat sketch explain the working of straddle milling.
6. What are the various types of surface grinding machines? Describe their principle, advantages and limitations
7. (a) State the various elements of a jig and explain the salient features of each element.  
(b) Explain the dividing head setups for differential indexing.
8. (a) Discuss the important functions of electrolyte in Electro Chemical Machining.  
(b) Discuss the applications and limitations of Electron Beam Machining.

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1. (a) Name and explain the various materials used for cutting tools.  
(b) What are the various forces acting on a single point tool? Discuss briefly with the help of neat sketch.
2. (a) When is the compound rest used for taper turning? Explain the methods briefly.  
(b) With a suitable diagrams explain how the required spindle speeds are achieved in a machine tool.
3. (a) Describe the operation of cutting square holes on shaper.  
(b) Explain the principle parts of a planer.
4. (a) Describe the working of horizontal boring machine.  
(b) Sketch and describe the essential elements of a two lipped twist drill.
5. Describe the different types, applications and relative merits of the following milling cutters that are used in milling operation
  - (a) Plain milling cutters
  - (b) End mill cutters
6. What are the various types of surface grinding approaches that are possible? Give their individual advantages and applications.
7. (a) Define tools, jigs and fixtures. What are their applications?  
(b) Distinguish between simple, compound and differential indexing.
8. (a) Explain with the help of neat sketch, the working principle of Ultrasonic machining.  
(b) Explain the various industrial applications of Electric Discharge Machining.

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1. (a) Discuss the importance of different tool angles and other parameters associated with the geometry of a single point cutting tool.  
(b) In an orthogonal cutting operation, the orthogonal rake is  $10^\circ$  while the principal cutting edge angle is  $60^\circ$ . Calculate
  - i. Back rake angle
  - ii. Side rake angle.
2. (a) Explain how threads are formed on the shaft by using the lathe machine.  
(b) What are the steps to be followed while performing machining operations on lathe?
3. (a) Explain briefly the slotting operation.  
(b) Describe the table feed mechanism in shaper.
4. How is the drilling machine specified? Give a brief description of various types of drilling machines.
5. Explain the working principle and constructional details of Horizontal milling machine with the help of neat sketch. Discuss the important cutting tools required to perform the various operations on this machine.
6. (a) How is the abrasive selected for a grinding operation? Give the reasons for selection.  
(b) Explain the principle of centreless grinding and its uses.
7. (a) In the present context of mass production, what is the role of jigs and fixtures? State its advantages.  
(b) When is compound gearing required for differential indexing?
8. (a) What is Electro Chemical Machining? Explain the principle involved  
(b) With the help of the neat setup, explain the principle of operation of Electron Beam Machining process.

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1. (a) Explain with the help of sketches the different systems of specifying tool geometry.  
(b) Calculate
  - i. Back rake
  - ii. Side rake and
  - iii. Normal rake for cutting tool having an inclination of  $5^0$  and an orthogonal rake of  $12^0$  with a side cutting edge angle of  $15^0$ .
2. (a) Describe the different types of work holders used in a lathe.  
(b) Discuss the various turning operation. Draw the necessary sketches.
3. (a) Explain with a neat sketch the operation and the need for a clapper box in a mechanical shaper.  
(b) Name the important shaping tools and explain their applications.
4. (a) Discuss the problems faced in a drilling operation with their causes and possible remedies.  
(b) Is boring similar to turning? Explain.
5. (a) Draw the sketches of any five types of milling cutters and explain them briefly.  
(b) Define and discuss the following milling operations and mention the most commonly used method.
  - i. Up milling
  - ii. Down milling
6. (a) Describe a grinding wheel structure with the help of neat sketch and state different bonding and abrasive materials used in it.  
(b) What are the various operations that can be performed on a grinding machine? Explain them briefly.
7. (a) Define tools, jigs and fixtures. What are their applications?  
(b) Distinguish between simple, compound and differential indexing.
8. (a) What is Electro Chemical Machining? Explain the principle involved  
(b) With the help of the neat setup, explain the principle of operation of Electron Beam Machining process.

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