

**III B.Tech II Semester Supplementary Examinations,  
November/December 2005  
TOOL DESIGN  
(Production Engineering)**

**Time: 3 hours**

**Max Marks: 80**

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

\*\*\*\*\*

1. Write at least four applications of the following tool materials.
  - (a) Carbon tool steels
  - (b) HSS
  - (c) Cast cobalt base alloys
  - (d) Cemented carbides
  - (e) Ceramics
  - (f) Coated cemented carbides
  - (g) Diamond tools
  - (h) Cubic boron nitride

[8x2=16]
2.
  - (a) What are the various ways of specifying drill sizes?
  - (b) With neat sketch explain clearly the geometry of twist drill.

[6+10]
3.
  - (a) Sketch the shape of a broach teeth and write briefly about its elements.
  - (b) Discuss the design features of broaches.

[10+6]
4.
  - (a) What is bending? Explain.
  - (b) Define the following:
    - i. Bend allowance
    - ii. Angle of bend
    - iii. Set back.

[7+9]
5.
  - (a) Describe the method to determine blank size to manufacture a cup.
  - (b) A shell is to have its wall thickness reduced from 1.8 mm by 11%. The new shell will have a new diameter of 40 mm. Determine
    - i. Mean height of the shell
    - ii. Shell diameter needed to draw the ironed shell.

[8+8]
6.
  - (a) Explain with the aid of suitable sketches the principles of jig and fixture design.
  - (b) What are important points to watch in respect of clamping? How should clamps be disposed of with respect to location points?

[8+8]
7. (a) With neat sketches describe Renewable bushings.

- (b) Describe the design principles for drilling jigs. [8+8]
8. (a) What is the difference between standard guage and a limit guage?
- (b) Differentiate between workshop guage, inspection guage and master guage.
- (c) What is guage maker's tolerance? How is it applied in the design of gauges? [2+6+8]

\*\*\*\*\*

**III B.Tech II Semester Supplementary Examinations,  
November/December 2005  
TOOL DESIGN  
(Production Engineering)**

**Time: 3 hours**

**Max Marks: 80**

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

\*\*\*\*\*

1. (a) What are factors which demand newer cutting tool materials.  
(b) Why are high carbon steels generally not used for metal cutting? Why high carbon steels can not be totally eliminated from the family of cutting tool materials.  
(c) What are the constituents of 18-4-1 steel? Discuss the role of each element.  
(d) What are some machining operations that may use diamond cutting tools? What precautions are needed when working with diamond tools? [4+4+4+4]
2. (a) Explain clearly the forces that act on the twist drill.  
(b) Explain the variation of torque and thrust with respect to various geometrical parameters.  
[8+8]
3. (a) Define broaching tool and broaching operation.  
(b) How do you classify broaching operations?  
(c) Sketch and discuss a typical internal branch.  
[4+6+6]
4. Write short notes on the following:  
(a) Cutting action in die  
(b) Die set materials  
(c) Methods of punch support  
(d) Methods of die support.  
[4x4=16]
5. (a) Describe the method to determine blank size to manufacture a cup.  
(b) A shell is to have its wall thickness reduced from 1.8 mm by 11%. The new shell will have a new diameter of 40 mm. Determine
  - i. Mean height of the shell
  - ii. Shell diameter needed to draw the ironed shell.[8+8]
6. (a) What is meant by angular location? Explain it for locating a connecting rod for machining.  
(b) What is meant by V - Location? Show by a sketch how V - Location can be applied to locate a small lever.  
[8+8]

7. Describe the various drill bushings. [16]
8. (a) Explain the cam design for single spindle automatics for simple components.  
(b) Explain the tool layout estimation of cycle. [8+8]

★ ★ ★ ★ ★

**III B.Tech II Semester Supplementary Examinations,  
November/December 2005  
TOOL DESIGN  
(Production Engineering)**

**Time: 3 hours**

**Max Marks: 80**

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

\*\*\*\*\*

1. Write at least four applications of the following tool materials.
  - (a) Carbon tool steels
  - (b) HSS
  - (c) Cast cobalt base alloys
  - (d) Cemented carbides
  - (e) Ceramics
  - (f) Coated cemented carbides
  - (g) Diamond tools
  - (h) Cubic boron nitride [8x2=16]
2. What do you understand by form tools? For what applications these are used? How many types of form tools are in common use? Describe them. [16]
3. Explain the following with neat sketches:
  - (a) Profile sharpened milling cutter
  - (b) Form relieved milling cutter. [8+8]
4. Write short notes on the following:
  - (a) Cutting action in die
  - (b) Die set materials
  - (c) Methods of punch support
  - (d) Methods of die support. [4x4=16]
5. (a) What is drawing? What type of components can be made by drawing operation?
  - (b) Sketch and describe a simple drawing die. [8+8]
6. (a) Define a jig and a fixture. What are the functions of jigs and Fixtures?
  - (b) Name the essential elements which make up a jig or a fixture. [8+8]
7. (a) Write short notes on drill bush materials and manufacture?
  - (b) What is the economic tool life for maximum profit rate? [8+8]

8. (a) What is a Template gauge? Sketch and describe them .  
(b) Explain various steps for the design of forging dies. [8+8]

★ ★ ★ ★ ★

**III B.Tech II Semester Supplementary Examinations,  
November/December 2005  
TOOL DESIGN  
(Production Engineering)**

**Time: 3 hours**

**Max Marks: 80**

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

\*\*\*\*\*

1. Write a short notes on the following:
  - (a) Brazed tipped tool
  - (b) Mechanically clamped tipped tools
  - (c) Solid bit tools. [4+6+6]
2. (a) With neat sketches explain the following :
  - i. Double cone drills
  - ii. Chip breaker drills

(b) How drill point grinders can be classified? [10+6]
3. (a) Sketch the shape of a broach teeth and write briefly about its elements.

(b) Discuss the design features of broaches. [10+6]
4. (a) What is bending? Explain.

(b) Define the following:
  - i. Bend allowance
  - ii. Angle of bend
  - iii. Set back. [7+9]
5. (a) What is drawing? What type of components can be made by drawing operation?

(b) Sketch and describe a simple drawing die. [8+8]
6. (a) Define a jig and a fixture. What are the functions of jigs and Fixtures?

(b) Name the essential elements which make up a jig or a fixture. [8+8]
7. (a) With neat sketches describe Renewable bushings.

(b) Describe the design principles for drilling jigs. [8+8]
8. (a) How the gauges should be cared for before and after use?

(b) With an example explain the procedure to be followed for estimation of limits on GO and NO GO gauges.

(c) Discuss the manufacturing allowance provided on gauges. [4+6+6]

\*\*\*\*\*