

Code No: **R31036****R10****Set No. 1****III B.Tech I Semester Supplementary Examinations, May/June - 2015****METAL CUTTING & MACHINE TOOLS****(Mechanical Engineering)****Time: 3 hours****Max. Marks: 75****Answer any FIVE Questions****All Questions carry equal marks**

- 1 a) During an orthogonal cutting a chip length of 160mm was obtained from an uncut chip length of 350 mm. The cutting tool has 22° rake angles and a depth of cut is 0.8mm. Determine the shear plane angle and chip thickness. [7]
b) Explain constructional features of feed gear box with neat sketch. [8]
- 2 a) Sketch and explain a method used for taper turning of long jobs. [8]
b) What are the difference between a face plate and a drive plate? Explain when you use them. [7]
- 3 a) A shaper is operated at 130 cutting strokes per minute and is used to machine a work piece of 300mm in length and 122mm in width. Use a feed of 0.7mm per stroke and a depth of cut of 5mm. Calculate the total machining time for machining the component. The forward stroke is completed in 220° . Calculate the percentage of time when the tool is not contacting the work piece. [8]
b) Discuss the mechanisms involved in a shaper and a planing machine? [7]
- 4 a) Explain with a neat sketch the feed mechanism used on drilling machines. [10]
b) Describe the specifications of horizontal boring machines. [5]
- 5 a) How can sawing be done on milling machine? [5]
b) Describe any one indexing method with its merits and demerits. [10]
- 6 a) Bring out the differences between Lapping and Honing. [7]
b) Sketch and explain the tool and cutter grinding machine. [8]
- 7 a) Explain briefly the important features of following: [8]
i) Turning Fixtures ii) Indexing fixtures.
b) What is meant by 3-2-1 principle? Explain. [7]
- 8 a) Discuss various features of CNC meeting. [8]
b) Explain the principle of operation of CNC with neat sketch. [7]

Set No. 2

- *****

Code No: **R31036****R10****Set No. 3****III B.Tech I Semester Supplementary Examinations, May/June - 2015****METAL CUTTING & MACHINE TOOLS****(Mechanical Engineering)****Time: 3 hours****Max. Marks: 75****Answer any FIVE Questions
All Questions carry equal marks**

- 1 a) In an orthogonal cutting experiment with a tool of rake angle $\alpha = 7^\circ$, the chip thickness was found to be 2.5mm when the uncut chip thickness was set to 1mm. Find [8]
(i) the shear angle and
(ii) the friction angle assuming that Merchant's formula holds good.
- b) Write short notes on crater wear and flank wear. [7]
- 2 a) What are the advantages of using collet chuck? [8]
- b) Explain in detail the single-spindle automatic lathe and compare it with multi-spindle automatic lathe. [7]
- 3 a) Sketch and explain the working of Slotting machine. [8]
- b) Describe the principle of a hydraulic drive quick return mechanism. [7]
- 4 a) Differentiate between multi-spindle and gang drilling machines. [8]
- b) Explain with neat sketches any five machining operations performed on vertical boring machines. [7]
- 5 a) Explain the following milling operations: [8]
i) Straddle milling
ii) Gang milling
- b) Sketch and describe a vertical milling machine. [7]
- 6 a) Write short notes on finishing operations that are used in grinding. [8]
- b) Describe the working principle of surface grinders. [7]
- 7 a) Discuss the following jigs with a neat sketch. [8]
i) Template Jig
ii) Leaf Jig
- b) Write a short note on work holding devices. [7]
- 8 a) What are the advantages and disadvantages of CNC machines over NC machines? [8]
- b) Explain the coordinate system used for vertical CNC milling machines. [7]

Set No. 4

III B.Tech I Semester Supplementary Examinations, May/June - 2015

METAL CUTTING & MACHINE TOOLS

(Mechanical Engineering)

Time: 3 hours**Max. Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks

- | | | |
|---|--|------|
| 1 | a) How is metal removed in metal cutting? Explain the process with neat sketch? | [7] |
| | b) A cutting tool at 35m/min gave a life of one hour twenty minutes, when operating on roughening cuts. What will be the probable life when engaged on light finishing cuts? Take $n=0.125$ for rough cut $n=0.1$ for finishing cut. | [8] |
| 2 | a) How is the size of a lathe specified? | [5] |
| | b) A taper pin of length 80 mm has a taper length of 48mm. the larger diameter of taper is 83mm and the smaller diameter is 73mm. Determine (i) taper in mm/meter and in degrees (ii) the angle to which the compound rest should be set up (iii) the tail stock setting over. | [10] |
| 3 | a) Describe the automatic feed of the shaper table with a suitable sketch. | [7] |
| | b) Explain briefly shaper driving mechanisms. | [8] |
| 4 | a) Explain the working principle of Jig boring machine with a neat sketch. | [8] |
| | b) How does a radial drilling machine work? | [7] |
| 5 | a) Describe the construction of milling cutters. | [8] |
| | b) What are the differences between face milling and end milling? Explain their applications. | [7] |
| 6 | a) What are the various abrasive machining operations you are familiar with? Explain their application and imitations. | [8] |
| | b) Name the various types of abrasive bonds and explain them in detail. | [7] |
| 7 | a) What are the differences between jigs and fixtures? | [8] |
| | b) Sketch a typical drill jig and explain its features. | [7] |
| 8 | Discuss the applications of CNC machine. | [15] |
