Reg. No. : | | | | | | | | | | | |

Question Paper Code: E3134

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2010

Fourth Semester

Mechanical Engineering

ME2252 — MANUFACTURING TECHNOLOGY — II

(Regulation 2008)

Time: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A — (10 × 2 = 20 Marks)

1. How do you classify tool wear?

2. Define Tool Life.

3. Distinguish between Capstan lathe from Turret lathe.

4. State the different methods of taper turning.

5. How do you classify milling cutters?

6. Define Broaching.

7. State the applications of honing and lapping finishing methods.

8. Compare gear forming with gear generation method.

9. State the limitations of CNC machine tools.

10. What is a 'Canned' cycle?

PART B — (5 × 16 = 80 Marks)

11. (a) (i) Discuss the various types of chips produced during metal machining. (6)

(ii) State the parameters that influence the life of tool and discuss. (10)

Or

(b) (i) What is meant by Orthogonal Cutting and Oblique Cutting? (6)

(ii) Explain 'Merchant force circle' along with assumptions. (10)

12. (a) (i) Discuss the main parts of a turret lathe. (6)

(ii) Explain the working of Swiss type auto lathe with a neat sketch. (10)

Or

(b) (i) What is meant by 'tool layout' of a turret lathe? (6)

(ii) Name the various lathe accessories. How does a four jaw chuck differ from a three jaw chuck? (10)

13. (a) (i) What are the operations performed on a milling machine? (6)

(ii) Explain different types of drilling machines with their specific features. (10)

Or

(b) (i) Discuss the various types of broaches. (6)

(ii) Discuss the common work holding devices used on shapers, slotters and planers. (10)

14. (a) (i) Give the specification of grinding wheel. (6)

(ii) What is meant by dressing and truing of grinding wheel? (10)

Or

(b) (i) List the advantages and limitations of gear shaping. (6)

(ii) Explain the principle of gear hobbing with neat sketches. (10)

15. (a) (i) Under what conditions of production the numerically controlled machine tools are employed? (6)

(ii) Explain the various elements of NC machine with closed loop control system. (10)

Or

(b) (i) Explain the main difference between point to point and continuous path type of numerically controlled machine tools. (6)

(ii) List any five motions and control statements of computer assisted NC programming and explain. (10)

Reg. No. : | | | | | | | | | | | |

Question Paper Code : 53199

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2010

Fourth Semester

Mechanical Engineering

ME 2252 — MANUFACTURING TECHNOLOGY — II

(Regulation 2008)

(Common to PTME 2252 Manufacturing Technology — II for B.E. (Part-Time) Third Semester-Mechanical Engineering Regulation 2009)

Time : Three hours Maximum : 100 Marks

Answer ALL questions

PART A — (10 × 2 = 20 Marks)

1. What are objectives and functions of cutting fluids?
2. Briefly explain the effect of rake angle during cutting.
3. Explain following parts of a lathe
   (a) Lathe bed
   (b) Carriage.
4. What is an Apron?
5. Define cutting speed, feed and machining time for drilling.
6. What is broaching?
7. Define hardness of the grinding wheel.
8. Define lapping.
9. What are the types of motion control system used in NC machines?
10. What is mean by APT language?

PART B — (5 × 16 = 80 Marks)

11. (a) In an orthogonal cutting operation on a workpiece of width 2.5 mm, the uncut chip thickness was 0.25 mm and the tool rake angle was zero degree. It was observed that the chip thickness was 1.25 mm. The cutting force was measured to be 900 N and the thrust force was found to be
810 N.

(i) Find the shear angle. (8)

(ii) If the coefficient of friction between the chip and the tool was 0.5, what is the machining constant Cm? (8)

Or

(b) (i) Describe the different types of chips with neat sketches. (8)

(ii) Mention the functions of cutting fluids. (8)

12. (a) Explain the following with an neat sketch

(i) Taper Turning by Swivelling the Compound Rest (5)

(ii) Taper Turning Attachment Method (6)

(iii) Taper Turning with Tailstock set over Method. (5)

Or

(b) (i) Describe the holding devices in an lathe. (9)

(ii) Mention the specification of lathe with a neat sketch. (7)

13. (a) (i) Describe the principle of operation of a shaper with a neat sketch. (8)

(ii) Describe the working of a crank and slotted link mechanism. (8)

Or

(b) (i) With a neat sketch explain the column and knee type milling machine and name its main parts. (8)

(ii) With a line diagram, describe the construction of radial drilling machine. (8)

14. (a) Explain the working principle and various methods of centre less grinding with a neat sketch. (16)

Or

(b) (i) Write short notes on gear forming (8)

(ii) Write short notes on gear shaping. (8)

15. (a) (i) Explain the following in CNC machining (8)

(1) Linear interpolation

(2) Circular interpolation

(3) Cubic interpolation.

(ii) Describe the spindle and feed drives. State the requirement of the drives of CNC machine tools. (8)

Or

(b) (i) Write a part program for that part shown in Fig. 1. (8)

(ii) Write a part program for drilling holes in the part shown in Fig.2. The p1ate thickness is 20mm. (8)

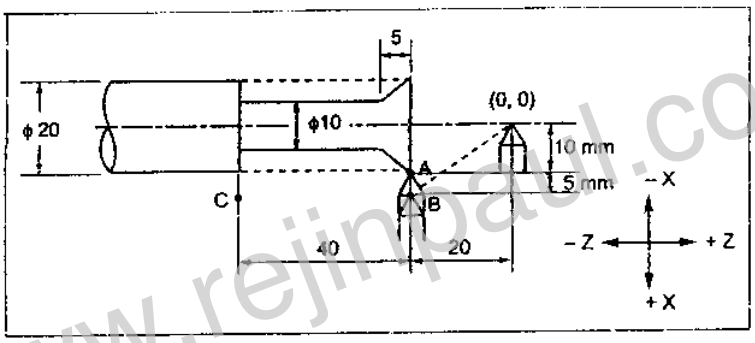


Fig. 1

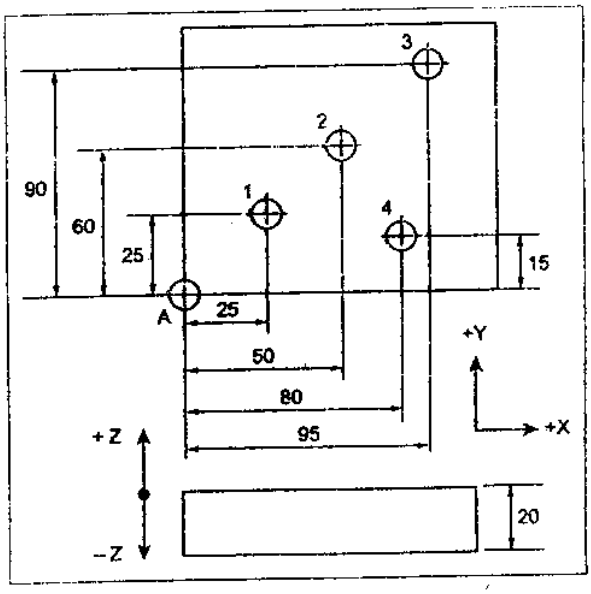


Fig. 2

Reg. No. : | | | | | | | | | | | |

Question Paper Code : 11408

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2011

Fourth Semester

Mechanical Engineering

ME 2252 — MANUFACTURING TECHNOLOGY — II

(Regulation 2008)

(Common to PTME 2252 Manufacturing Technology – II for B.E. (Part-Time) Third Semester – Regulation 2009)

Time : Three hours Maximum : 100 marks

Answer ALL questions

PART A — (10 × 2 = 20 marks)

1. Compare orthogonal and oblique cutting.

2. Define tool life.

3. List any four methods by which taper turning is done in a centre lathe.

4. Draw a neat sketch of 'Geneva mechanism' used in turret lathes for automatic indexing.

5. What is the difference between up milling and down milling?

6. List any four applications of broaching machines.

7. What is meant by "grade" and "structure" of a grinding wheel?

8. What are all the parameters that would affect the MRR in abrasive jet machining?

9. Compare a closed loop NC system with open loop NC system.

10. What is a preparatory function? How is it important in CNC Programming?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Describe the mechanism of metal cutting. (8)

(ii) Discuss the various types of chips produced during metal machining. (8)

Or

(b) (i) The Taylor tool-life equation for machining C-40 steel with a HSS cutting tool at a feed of 0.2 mm/min and a depth of cut of 2 mm is given by $VT^n = C$, where n and C are constants. The following V and T observations have been noted :

V, m/min	25	35
T, min	90	20

Calculate

(1) n and C,

(2) Hence recommend the cutting speed for a desired tool life of 60 min. (8)

(ii) List the various tool materials used in industry. State the optimum temperature of each of the tool materials (8)

12. (a) (i) Calculate the change gears to cut a single start thread M16 of 2 mm pitch on a centre lathe, having a lead screw of 6 mm pitch. Calculate the depth of cut and number of passes preferred. (A typical set contains the following change gears with number of teeth : 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, and 70) (8)

(ii) Draw neat sketches of steady and follower rests and brief their applications. (8)

Or

(b) (i) Explain the bar feeding mechanism used in turret lathe while machining bar stock. (8)

(ii) Describe the constructional features of Swiss type automatic screw machine. (8)

13. (a) (i) Sketch and explain the hydraulic drive of a horizontal shaper. (8)

(ii) How will you cut the following types of surfaces on milling machines?

(1) Flat surfaces

(2) Slots and Splines. (8)

Or

(b) (i) Sketch the Quill mechanism. Write its main parts and their functions. (8)

(ii) With the help of a neat sketch, discuss the working of a surface broaching machine. (8)

14. (a) (i) Discuss the various bonding materials used for making grinding wheels. (8)

(ii) Sketch and explain the three methods of external cylindrical centreless grinding. (8)

Or

(b) (i) List the advantages and disadvantages of gear shaping process. (8)

(ii) Explain how a spur gear is machined in a gear hobbing machine. (8)

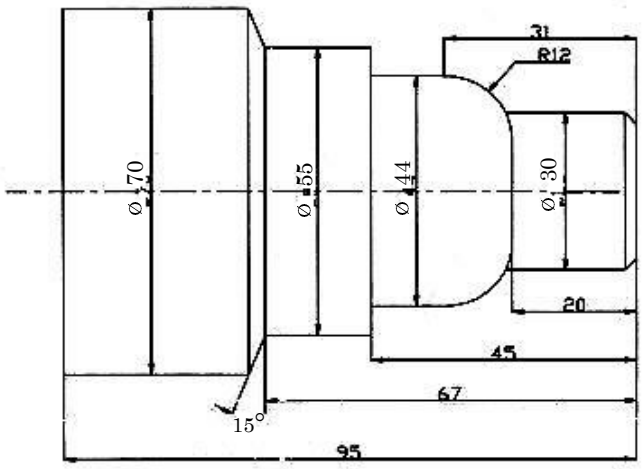
15. (a) (i) List down the main components of an NC machine tool and explain their functions. (8)

(ii) With a neat sketch, explain any one type of axis feed drive of a CNC machine and list its advantages. (8)

Or

(b) (i) With a neat sketch, explain the working of ATC. (6)

(ii) A 110 mm long cylindrical rod of Φ 75 mm is to be turned into a component as shown in Fig-1, using a CNC lathe. Write a CNC program for manufacturing this component. (10)



(All dimensions are in mm)

Fig. 1

Question Paper Code : 55459

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2011.

Fourth Semester

Mechanical Engineering

ME 2252 — MANUFACTURING TECHNOLOGY — II

(Regulation 2008)

(Common to PTME 2252 — Manufacturing Technology II for B.E. (Part-Time) Third Semester Mechanical Engineering Regulation 2009)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. State any two situations where positive rate angle is recommended during turning.

2. Name any two reasons for flank wear in cutting tools.

3. List the different taper turning methods.

4. Mention any two limitations of a centre lathe.

5. What is deep hole drilling? State its applications.

6. What is climb milling? Mention its advantage.

7. What are the types of surface grinders?

8. Mention any two advantages of gear hobbing.

9. Distinguish between point to point and continuous path systems.

10. What do you mean by machining centre w.r.to. N.C. machines?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Discuss the advantages and limitations of the following cutting tool materials.

(1) Cemented carbides.

(2) Cubic Boron Nitride.

Also state the desirable characteristics of a cutting tool material. (8)

(ii) With the help of sketches, explain the following types of chips produced during metal machining.

(1) Continuous chips.

(2) Continuous chips with built-up-edge. (8)

Or

(b) (i) With the help of a sketch, show crater wear and flank wear on a cutting tool. (4)

(ii) Explain the types and applications of different types of cutting tools. (8)

(iii) Enumerate the factors that effect the cutting temperature during machining. (4)

12. (a) (i) Describe the special features of a turret lathe, with a line sketch. Also mention any two advantages of it. (8)

(ii) Describe the operation of the Swiss type automatic lathe, with suitable sketches. (8)

Or

(b) (i) Explain the following with suitable sketches.

(1) Turret Indexing mechanism

(2) Bar feed mechanism. (8)

(ii) Sketch and describe the thread cutting operation in an engine lathe using compound slide. (8)

13. (a) (i) With a neat sketch, describe the working principle of a Jig Boring machine. State its applications. (8)

(ii) Describe the construction of the following milling cutters

(1) Plain milling cutters

(2) End mills. (8)

Or

(b) (i) What is radial drilling machine? Sketch and describe it. (8)

(ii) Sketch and explain the hydraulic drive of a horizontal shaper. Also enumerate any two advantages of hydraulic drive (8)

14. (a) (i) With the help of sketches, describe any two methods of cylindrical grinding. (8)

(ii) Describe with neat sketches a gear hobbing machine and the way it generates the gear tooth. (8

Or

(b) (i) With a neat sketch, describe the working principle of abrasive jet machining. State its product applications. (8)

(ii) Explain the working principle and product applications of the following processes :

(1) Honing

(2) Lapping. (8)

15. (a) (i) Explain the following terms with reference to CNC machines.

(1) Tool Length compensation.

(2) Cutter raidus compensation. (8)

(ii) With a help of an example explain the differences between point to point and continuous path type of numerically controlled machine tools. (8)

Or

(b) (i) Explain the working of a NC machine tool with the help of a diagram. Also state any two advantages and limitations of NC machines. (8)

(ii) Discuss the functions of the following with reference to NC machine

(1) Linear bearings

(2) Ball screws. (8)

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Question Paper Code : 10412

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2012.

Fourth Semester

Mechanical Engineering

ME 2252/114405/ME 43/10122 ME 403/ME 1252/080120016 — MANUFACTURING TECHNOLOGY — II

(Regulation 2008)

(Common to PTME 2252 Manufacturing Technology II for B.E. (Part-Time) Third Semester Mech. - Regulation 2009)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is meant by built up edge?

2. What are the advantages of diamond tools?

3. What is the purpose of tumbler gear mechanism of a lathe?

4. What are the limitations of centre lathe when compared to automatic lathes?

5. How are shaping machines specified?

6. State two major disadvantages of broaching.

7. Name two artificial abrasive materials.

8. Write any four applications of Abrasive jet machining.

9. What is meant by 'tool magazine' in a CNC machine?

10. What is the function of a subroutine in NC part programming?

PART B — (5 × 16 = 80 marks)

11. (a) (i) In an orthogonal cutting test with a tool of take angle 10°, the following observations were made :

Chip thickness ratio = 0.3

Horizontal component of cutting force = 1290 N

Vertical component of cutting force = 1650 N

From Merchant's theory, calculate the various components of the cutting forces and the coefficient of friction at the chip tool interface. (10)

(ii) Describe the mechanism of chip formation in orthogonal cutting. (6)

Or

(b) (i) Explain the following mechanisms of tool wear :

(1) Attrition

(2) Diffusion. (6)

(ii) A cutting tool when used for machining workpiece at a cutting speed of 50 m/min lasted for 100 minutes. Taking n = 0.26 in the Taylor's tool-life equation, determine (1) the life of the tool for an increase in cutting speed by 25% and (2) the cutting speed to obtain a tool life of 180 minutes. (6)

(iii) A specimen of 100 mm length along the stroke of shaper is machined with a tool with 15° rake angle. The uncut chip thickness is 1.5 mm. If a chip length of 40 mm is obtained during one stroke of machining, find the shear plane angle and the thickness of cut-chip. (4)

12. (a) (i) Sketch the following work-holding devices used in a lathe and state when they are used :

(1) Self centering three-jaw chuck

(2) Collet Chuck

(3) Angle plate with face plate. (3 × 3 = 9)

(ii) A blank 180 mm long and 70 mm diameter is to be machined in a lathe to 175 mm long and 60 mm diameter. The workpiece rotates at 450 r.p.m., the feed is 0.3 mm/rev and the maximum depth of cut is 2 mm. For turning operation, the approach plus over-travel distance is 6 mm. Assuming that the facing operation is done after the turning, calculate the machining time. (7)

Or

(b) (i) Sketch a line-diagram of a single spindle automatic lathe and briefly describe its features. (10)

(ii) Make a comparison of operational and other features of single-spindle and multi-spindle automatic lathes. (6)

13. (a) (i) With the help of a line diagram, describe the parts of a planning machine. Also explain the working of this machine. (8)

(ii) Sketch and briefly explain the following operations performed in milling machine :

(1) Plain milling

(2) Face milling

(3) End milling

(4) Dovetail milling. (8)

Or

(b) Sketch the following operations performed in drilling machine :

(i) Drilling

(ii) Reaming

(iii) Boring

(iv) Counter boring

(v) Counter sinking

(vi) Spot facing

(vii) Tapping

(viii) Trepanning

Add one or two lines of explanation for each. (8 × 2 = 16)

14. (a) (i) Sketch the following :

(1) The set up of wheels and workpiece for a 'through-feed' centreless grinding;

(2) The set up of wheels for 'in-feed' and 'end feed' centreless grinding. Add few lines of brief explanation for the above sketches. (4 + 4)

(ii) Explain the factors to be considered to select a grinding wheel and recommended parameters. (8)

Or

(b) Write short notes on the following finishing processes :

(i) Honing (4)

(ii) Super finishing (3)

(iii) Lapping (3)

(iv) Polishing (3)

(v) Buffing. (3)

15. (a) (i) What are the special requirements of feed drives of CNC machines? What types of motors are used for feed drives? Name also the method of speed control for each type. (8)

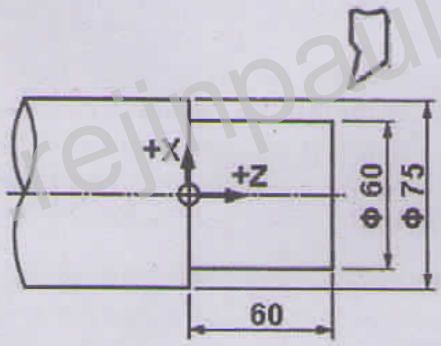
(ii) Sketch and explain the following features of CNC machines :

(1) Hydrostatic slideways. (4)

(2) Linear bearings with balls. (4)

Or

(b)



Write a manual part program to turn the component shown on a CNC Lathe from 75 mm bar stock. The following data may be assumed :

(i) There will be two rough turnings and one finish turning. The first cut is with a depth of 3 mm for a length of 58 mm; the second with a depth of 3 mm for a length of 59 mm; and the third with a depth of 1.5 mm for the full length of 60 mm.

(ii) The shoulder of the work-piece is also machined during each cut.

(iii) The spindle speed is 400 rpm and the feed rate is 0.5 mm/rev.

Make a free-hand sketch showing relevant points of tool positions for each of the three turning operations and then write the manual part program. State also what each line of the program does.

Note : If the exact G-codes and M-codes are not known, the student can use his/her own code-numbers, but the function of such codes must be clearly stated. (16)

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 11523

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2012.

Fourth Semester

Mechanical Engineering

ME 2252/114405/ME 43/10122 ME 403/ME 1252 A/080120016 —
MANUFACTURING TECHNOLOGY — II

(Regulation 2008)

(Common to PTME 2252 Manufacturing Technology II for B.E. (Part-Time) Third Semester Mechanical Engg. – Regulation 2009)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. What is meant by built up edge?

2. Define Tool life.

3. What is the function of *apron* of a lathe?

4. State the purpose of providing lead cam in single spindle automatic screw cutting machine.

5. What is the difference between a plain milling machine and an universal milling machine?

6. What is broaching?

7. Name two artificial abrasive materials.

8. Distinguish between polishing and buffing processes.

9. A stepping motor of 200 steps per revolution is mounted on the lead-screw of a NC machine table. The pitch of the screw is 2.5 mm/rev. If the stepping motor receives pulses at a frequency of 2000 Hz, what is the linear speed of the table?

10. With reference to CNC manual part programming, state what is linear interpolation.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Draw three views of a single point cutting tool and indicate various angles. (6)

(ii) During an orthogonal turning operation of C20 steel, the following data were recorded :

Rake angle = 10°; Chip thickness = 0.48 mm; Width of cut = 2.0 mm; Feed = 0.25 mm/rev;

Tangential cutting force = 1200 N; Feed thrust force = 300 N; Cutting speed = 2.5 m/s;

Find the value of shear force at the shear plane; find also the kinetic coefficient of friction at the chip-tool interface. (10)

Or

(b) (i) During straight turning of a 24 mm diameter steel bar at 300 r.p.m. with an H.S.S. tool, a tool life of 9 min. was obtained. When the same bar was turned at 250 r.p.m., the tool life increased to 48.5 min. What will be the tool life at a speed of 280 r.p.m.? (6)

(ii) Discuss briefly about the following tool materials with respect to composition and properties: (1) High speed steel (2) Cemented carbides. (6)

(iii) The end of a pipe was orthogonally cut with a tool of 20° rake angle. The cut chip length was 85 mm corresponding to uncut chip length of 202 mm. If the depth of cut was 0.5 mm, find the chip thickness and shear plane angle. (4)

12. (a) (i) Explain the following methods of taper turning in a lathe, with suitable sketches :

(1) By a taper turning attachment (5)

(2) By tailstock set over method. (5)

(ii) How will you specify the capacity of a lathe? Indicate the specifications on a line-diagram.. (6)

Or

(b) (i) Sketch a line-diagram of a Capstan lathe and indicate its principal parts. State also the functions of these parts. (8)

(ii) Explain, with a neat sketch, the turret indexing mechanism of a turret lathe. (8)

13. (a) (i) Sketch the drive mechanism of a shaping machine having crank and slotted lever type of quick return. Explain briefly how the ram is made to reciprocate. (10)

(ii) Explain how the stroke length of the ram is altered. (3)

(iii) Explain how the ends of stroke of the ram are positioned relative to the work piece. (3)

Or

(b) (i) Sketch a twist drill and indicate on it the helix angle, the point angle, the chisel edge angle and other names and parameters. (8)

(ii) With the help of a neat sketch, describe the major parts of a Radial drilling machine. (8)

14. (a) (i) Sketch a block diagram of a plain cylindrical grinding machine and briefly explain its working. Distinguish clearly between 'traverse grinding' and 'plunge grinding' done in this type of cylindrical grinding machine. (8)

(ii) Sketch the set up of grinding wheel and workpiece for the following and add few lines of brief explanation :

(1) Chucking type internal grinding (3)

(2) Centreless internal grinding (5)

Or

(b) (i) Sketch a schematic diagram of Abrasive Jet machining setup and the name the major components. Briefly explain the process. (8)

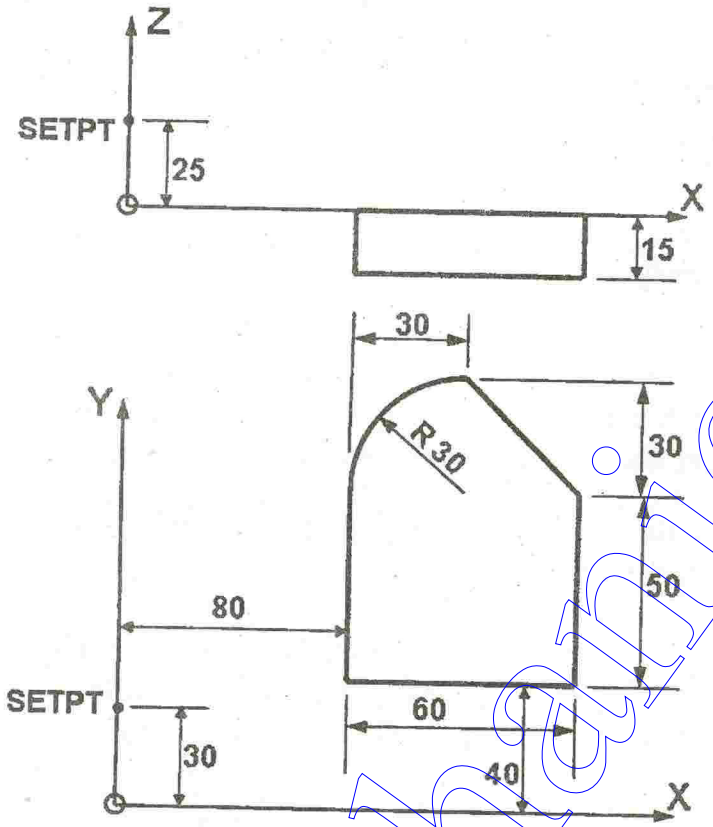
(ii) Explain the 'lapping' and 'buffing' processes, indicating clearly the tools involved. (8)

15. (a) (i) State the specific advantages of Recirculating ball-screws in CNC machines. Also explain briefly the purpose and method of pre-loading of ball-screws. (8)

(ii) What are the special requirements of motors for spindle drives of CNC machines? What types of motors are used for spindle drives? Name also the method of speed control for each type. (8)

Or

(b)



The bracket shown in figure is 15 mm thick. Its profile is slightly oversized by about 1 mm. Write a APT program to do finish milling of the profile of the bracket. The following data may be assumed :

(i) A 20 mm end-mill cutter is to be used.

(ii) The X, Y, Z axes are as shown in the figure.

(iii) The start point is at (0, 30, 25)

(iv) For milling, the spindle speed is 1740 rpm and the feed rate is 500 mm/min.

(v) The post processor statement is MACHIN/UNI. (16)

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 21563

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2013.

Fourth Semester

Mechanical Engineering

ME 2252/ME 43/10122 ME 403/ME 1252 A/080120016 – MANUFACTURING TECHNOLOGY – II

(Common to Industrial Engineering, Industrial Engineering and Management and Mechanical and Automation Engineering)

(Regulation 2008/2010)

(Common to PTME 2252 Manufacturing Technology II for B.E. (Part-Time) Third Semester Mechanical Engineering – Regulation 2009)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Classify the tool wear.
2. When will be the negative rake angles be used?
3. State the various parts mounted on the carriage.
4. What are the types of single spindle automatic lathes?
5. Mention any four shaper specifications.
6. State the uses of planer.
7. How is the grinding wheel designated?
8. List the gear generating process.
9. Mention the advantages of stepping motor.
10. Define subroutine.

PART B — (5 × 16 = 80 marks)

11. (a) The Taylorian tool-life equation for machining C-40 steel with a 18:4:1 H.S.S. cutting tool at a feed of 0.2 mm/min and a depth of cut of 2 mm is given by $VT^n = C$, where n and C are constants. The following V and T observations have been noted.

V_1 m/min	25	35
T_1 min	90	20

Calculate :

(i) n and C. (8)

(ii) Hence recommend the cutting speed for a desired tool life of 60 minutes. (8)

Or

(b) (i) Enumerate the essential requirements of a tool material. (8)

(ii) Discuss the various of cutting fluids. (8)

12. (a) (i) Explain the working principle of turret lathe. (8)

(ii) Discuss any two special attachments on lathes. (8)

Or

(b) (i) Explain any four work holding devices that can be used on a lathe. (8)

(ii) Describe a single spindle automatic lathe. (8)

13. (a) (i) List out the various milling operations. (8)

(ii) Describe the working principle of column and knee type milling machine with a neat sketch. (8)

Or

(b) (i) With a neat sketch, explain the working of a vertical boring machine. (8)

(ii) Explain the various operations performed by a broaching machine. (8)

14. (a) (i) Classify the grinding machines. (4)

(ii) Explain the working principle of centreless grinding process. (12)

Or

(b) (i) Describe two types of lapping operations. (6)

(ii) Explain the principle of operation of gear hobbing process. (10)

15. (a) (i) What are the requirements of slideways? (4)

(ii) Explain the machining centre with a neat sketch. (12)

Or

(b) (i) Classify linear interpolation. (4)

(ii) Explain the part programming procedure with a suitable example. (12)

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Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 31563

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2013.

Fourth Semester

Mechanical Engineering

ME 2252/ME 43/10122 ME 403/ME 1252 A/080120016 — MANUFACTURING TECHNOLOGY – II

(Common to Industrial Engineering, Industrial Engineering and Management and Mechanical and Automation Engineering)

(Regulation 2008/2010)

(Common to PTME 2252 Manufacturing Technology II for B.E. (Part-Time) Third Semester Mechanical Engineering – Regulation 2009)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. State any two differences between orthogonal and oblique cutting.

2. Name the different types of tool wear.

3. Name the specifications of a centre lathe.

4. What is the need of automatic lathes?

5. State the differences between upmilling and downmilling.

6. Draw the nomenclature of a standard drill.

7. State the difference between turning and dressing of a grinding wheel.

8. Name the process parameters involved in the lapping process.

9. What is meant by numeric control? State their advantages.

10. State the differences between CNC and DNC.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Write a short note on different tool weal mechanism in metal cutting. (8)

(ii) Write a short note on cutting fluids in metal cutting. (8)

Or

(b) Write briefly about different cutting tool materials used in metal cutting. (16)

12. (a) Explain with neat sketches the working principle of taper turning operation using a form tool and by swiveling the compound rest. (16)

Or

(b) (i) State the differences between capstan and turret lathes. (10)

(ii) Write a short note on automatic screw type machines. (6)

13. (a) (i) State the difference between shaper and planer. (10)

(ii) State the difference between horizontal and vertical spindle column and knee type milling machines (use simple sketches). (6)

Or

(b) (i) Write a short note on BTA deep hole drilling. (8)

(ii) Write briefly about tool and cutter grinder. (8)

14. (a) Explain with simple sketches the working principles and process parameters of honing process. (16)

Or

(b) Write briefly about broaching machines and its operations with neat sketches. (16)

15. (a) Write briefly about machining centers. (16)

Or

(b) Write briefly about open loop, closed loop and adaptive control systems in CNC machine tool. (16)

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Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 51630

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2014.

Fourth Semester

Mechanical Engineering

ME 2252/ME 43/ME 1252 A/080120016/10122 ME 403 — MANUFACTURING TECHNOLOGY — II

(Common to Industrial Engineering, Industrial Engineering and Management and Mechanical and Automation Engineering)

(Regulation 2008/2010)

(Common to PTME 2252 Manufacturing Technology II for B.E. (Part-Time) Third Semester Mechanical Engineering — Regulation 2009)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is orthogonal rake system?
2. Why is lubrication not required while machining cast iron?
3. What is a centre gauge that is used in threading?
4. What are programmed automatic lathes?
5. Give the functions of flutes on taps.
6. List some of the materials of broaching tools.
7. What are grinding points? Sketch the various grinding points?
8. What is a tool post grinder?
9. List the main elements of a NC machine tool.
10. What do you understand by 'canned cycle' in manual part programming?

PART B — (5 × 16 = 80 marks)

11. (a) (i) How is metal removed in metal cutting? Explain the process with simple sketch. (10)

(ii) Explain the various methods to be applied while using the cutting fluids during machining. (6)

Or

(b) (i) List the important characteristics of a cutting tool material. (6)

(ii) What is the main function of cutting fluids? and its types. (10)

12. (a) (i) Explain the method of thread cutting using compound slide in a lathe. (10)

(ii) List the type of work holding devices and tool holding devices that are generally used in a lathe. (6)

Or

(b) (i) Explain parallel action and progressive action multispindle automatics. (12)

(ii) Write the procedure of tool layout for automatic screw machine. (4)

13. (a) (i) Explain the hydraulic drive mechanism of a horizontal shaper with neat sketch. (10)

(ii) What is 'deep hole drilling'? List the measures that are taken to avoid drill run off and to drill straight holes. (6)

Or

(b) (i) Explain the indexing mechanism of a dividing head on milling machine. (12)

(ii) Write short note on reaming operation. (4)

14. (a) (i) Discuss the various types of bonding materials generally used for making grinding wheels. (10)

(ii) Write short notes on Abrasive belt grinding. (6)

Or

(b) (i) Why is gear finishing required? Discuss the various types of gear finishing operations. (12)

(ii) Write short note on super finishing. (4)

15. (a) (i) Explain the working of NC machine tool with the help of a diagram. (12)

(ii) List the advantages of CNC systems over conventional NC systems. (4)

Or

(b) (i) Explain the various steps to be followed while developing the CNC part Programs. (12)

(ii) What is 'Adaptive control'? (4)

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Reg. No. | | | | | | | | | | | | |

Question Paper Code : 91642

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2014.

Fourth Semester

Mechanical Engineering

ME 2252/ME 43/ME 1252 A/080120016/10122 ME 403 — MANUFACTURING TECHNOLOGY – II

(Common to Industrial Engineering, Industrial Engineering and Management and Mechanical and Automation Engineering)

(Regulation 2008/2010)

(Common to PTME 2252/10122 ME 403 Manufacturing Technology II for B.E. (Part–Time) Third Semester Mechanical Engineering – Regulation 2009/2010)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Classify the types of metal cutting process.

2. How is tool life estimated?

3. State the various feed mechanisms used for obtaining automatic feed.

4. What is the use of mandrels?

5. Draw the nomenclatures of drill.

6. Differentiate between up milling and down milling.

7. What is need of honing process?

8. What are the various types of gear generating process?

9. State any four advantages of N.C. machines.

10. Define subroutine.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Briefly differentiate between orthogonal cutting and oblique cutting. (8)

(ii) What are the functions of cutting fluid? (8)

Or

(b) (i) Explain the various types of chip formation with neat sketches. (8)

(ii) The useful tool life of a HSS tool machining mild steel at 18 m/min is 3 hours. Calculate the tool life when the tool operates at 24 m/min (Assume $\eta = 0.125$). (8)

12. (a) Explain the working principle of capstan and turret lathe. (16)

Or

(b) (i) Name the various types of taper turning methods and explain any one of them. (8)

(ii) Describe the working principle of Swiss type automatic lathes. (8)

13. (a) (i) Explain the principle and operation of horizontal broaching machine. (8)

(ii) Sketch and explain the working of a slotter. (8)

Or

(b) (i) Write the applications of shapers. (4)

(ii) Describe the working principle of column and knee type milling machine with a neat sketch. (12)

14. (a) (i) Explain the working principle of centreless grinding process. (8)

(ii) How the grinding wheels are designated? And explain with a suitable example. (8)

Or

(b) (i) Explain the gear shaping process with sketches. (12)

(ii) What are the advantages of gear hobbing process? (4)

15. (a) List the various drive systems in a CNC machine tool. Explain the principle of any two drive systems. (4 + 6 + 6)

Or

(b) (i) State the different types of CNC machines. (4)

(ii) What is meant by machining centre? Explain in detail. (12)

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 77214

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2015.

Fourth Semester

Mechanical Engineering

ME 6402 — MANUFACTURING TECHNOLOGY – II

(Common to Industrial Engineering, Industrial Engineering and Management and Mechanical and Automation Engineering)

(Regulation 2013)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Write a short note on Heat zones in cutting.

2. Write a short note on any two modern tool materials.

3. What is meant by "swing of the lathe"?

4. What do you mean by copy turning?

5. What do you mean by differential indexing?

6. Why is milling a versatile machining process?

7. How does loading differ from glazing in grinding process?

8. What are the principal types of Broaching machines?

9. Define CNC and DNC.

10. What is adaptive control?

PART B — (5 × 16 = 80 marks)

11. (a) (i) With reference to orthogonal cutting, explain the following terms: Shear stress in shear plane, Shear strain, Cutting ratio, Shear angle. (8)

(ii) Prove that in orthogonal cutting, the kinetic coefficient of friction (μ) is given by $\mu = \dfrac{F_c \sin\alpha + F_t \cos\alpha}{F_c \cos\alpha - F_t \sin\alpha}$. (8)

Or

(b) (i) Tool life tests in turning yield the following data: (1) V = 110m/min, T = 20 min; (2) V = 85 m/min, T = 40 min. (A) Determine the n and C values in the Taylor tool life equation. Based on the equation, compute (B) the tool life for a speed of 95 m/min and (C) the speed corresponding to a tool life of 30 min. (8)

(ii) Explain different types of chips produced in cutting with neat sketches. (8)

12. (a) (i) Enumerate the purpose of various attachments used on a centre lathe. (8)

(ii) Explain with a neat sketch single spindle automatic lathe. (8)

Or

(b) (i) Describe a Universal type milling machine. (8)

(ii) Explain the salient features of an automatic screw machines. (8)

13. (a) (i) Explain with neat sketches the procedure for carrying out the following operations on a shaper: Horizontal cutting, Vertical cutting, concave surface, keyway cutting. (8)

(ii) List out the gear finishing processes. Explain any two with neat sketches. (8)

Or

(b) (i) Enumerate with a neat sketch Gear shaping. (8)

(ii) Compare Plain and Universal milling machine. (8)

14. (a) (i) Enumerate the advantages and disadvantages of centreless grinding. (8)

(ii) Explain the following in grinding (1) Dressing of (2) Truing. (8)

Or

(b) (i) The performance of a grinding wheel depends upon type of abrasive, grain size, grade, structure and bonding material. Discuss the effect of each. (8)

(ii) Discuss with neat sketch Vertical Broaching machine. (8)

15. (a) (i) Discuss the programming of NC machines. (8)

(ii) Discuss the constructional features of a NC machine tool and explain their functions. (8)

Or

(b) (i) List and explain the advantages of CNC systems over conventional NC systems. (8)

(ii) Explain the main difference between point to point and continuous path type numerically controlled machine tools. (8)

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 27359

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2015.

Fourth Semester

Mechanical Engineering

ME 6402 — MANUFACTURING TECHNOLOGY – II

(Common to Industrial Engineering, Industrial Engineering and Management and Mechanical and Automation Engineering)

(Regulations 2013)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Mention the condition that induces the formation of Built up edge.
2. How tool life is estimated?
3. What are the differences between automatic lathe and capstan lathe?
4. Give a sketch illustrating the principle of operation of Swiss type automatic lathe.
5. Distinguish Up Milling and Down Milling.
6. Sketch the nomenclature of a drill bit.
7. List the factors involved in the selection of a grinding wheel.
8. What is the principle of a broaching process?
9. How are various functions timed in NC machines?
10. Distinguish a fixed zero and floating zero.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Discuss briefly the various types of tool wear with neat sketches. (12)

(ii) Mention the desirable properties of a cutting tool material and the improvements caused by coated carbides. (4)

Or

(b) (i) In an orthogonal cutting test with a tool of rake angle 10° the following observations were made :

Chip thickness ratio = 0.3;

Horizontal component of the cutting force = 1290 N

Vertical component of the cutting force = 1650 N. From the Merchant's theory, calculate the various components of the cutting forces and the coefficient of friction at the chip tool interface. (8)

(ii) What are the functions of a cutting fluid? Explain in detail, the guidelines adopted for the selection of cutting fluid based on material and tool characteristics. (8)

12. (a) (i) Enumerate the various methods of producing taper. (12)

(ii) Explain the purpose of centres used in lathe. (4)

Or

(b) Briefly explain with a neat sketch, the types of work holding devices that are commonly employed in automatic lathe. Also specify its limitations.

13. (a) (i) Explain with a neat sketch, the quick return motion mechanism of a shaper. (12)

(ii) How the stroke length and position of the ram is adjusted? (4)

Or

(b) Explain the following with a neat sketch :

(i) Gear Generation Process. (8)

(ii) Gear Finishing Process. (8)

14. (a) (i) Describe the terms dressing and trueing of Grinding Wheels. (8)

(ii) Explain, how a wheel is balanced and mounted? (8)

Or

(b) Describe the construction and operation of a vertical broaching machine with a neat sketch. Also sketch a broach tool with nomenclature.

15. (a) (i) Explain the advantages and limitations of NC machines. (8)

(ii) Describe four main features of CNC machines, which distinguish them from conventional machine tools. (8)

Or

(b) Explain the various types of statements used in APT language, with suitable examples.

Reg. No. | | | | | | | | | | | | |

Question Paper Code : 57550

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2016

Fourth Semester

Mechanical Engineering

ME 6402 – MANUFACTURING TECHNOLOGY – II

(Common to Industrial Engineering, Industrial Engineering and Management and Mechanical and Automation Engineering and also common to sixth semester Mechanical Engineering (SANDWICH))

(Regulation 2013)

Time : Three Hours **Maximum : 100 Marks**

Answer ALL questions.

PART – A (10 × 2 = 20 Marks)

1. Differentiate between orthogonal and oblique cutting.
2. The useful tool life of an HSS tool, machining mild steel at 25 m/min is 5 hours. Calculate the tool life when tool operates at 40 m/min.
3. How do you specify a lathe ?
4. What are the differences between automatic lathe and capstan lathe ?
5. Distinguish between up milling and down milling.
6. Why gear finishing is required ?
7. How do you specify a grinding wheel ?
8. What are the three methods of external cylindrical centreless grinding ?
9. State the functions of the following G & M codes :
   G00 G03 M06 M03
10. Define "micromachining" with the help of an example.

PART – B (5 × 16 = 80 Marks)

11. (a) (i) Discuss any four cutting tool materials used in metal cutting. (8)

(ii) In an orthogonal cutting test with a tool of rake angle 8°, the following observations were made :

Chip thickness ratio : 0.2

Horizontal component of the cutting force = 1190 N

Vertical component of the cutting force = 1450 N

From Merchant's theory, calculate the various components of the cutting forces and the coefficient of friction at the chip tool interface. (8)

OR

(b) (i) Enumerate with neat sketch, measurement of cutting temperature using work-tool thermocouple method. (8)

(ii) Describe various methods of applying cutting fluid at the cutting zone. (8)

12. (a) (i) Discuss any two operations that can be performed on a lathe ? (8)

(ii) What are the various methods available for supporting long components and fragile components in a lathe ? Explain with sketches. (8)

OR

(b) (i) Enumerate with neat diagram the principal parts of capstan and turret lathe. (8)

(ii) Describe various types of multi spindle automats. (8)

13. (a) (i) List out various operations carried out on drilling machine. Explain any three. (8)

(ii) What are the various types of milling cutters that are used in milling ? Discuss any three. (8)

OR

(b) (i) What are the various methods used for gear finishing ? Discuss any two methods. (8)

(ii) Enumerate with neat sketch kinematics of gear shaping machine. (8)

14. (a) (i) List out various abrasives used in grinding wheel. Explain any three. (8)

(ii) Explain with neat sketches the three methods of external cylindrical centreless grinding. (8)

OR

(b) (i) Explain with neat sketches Horizontal pull broaching operation and Vertical push broaching operation. (8)

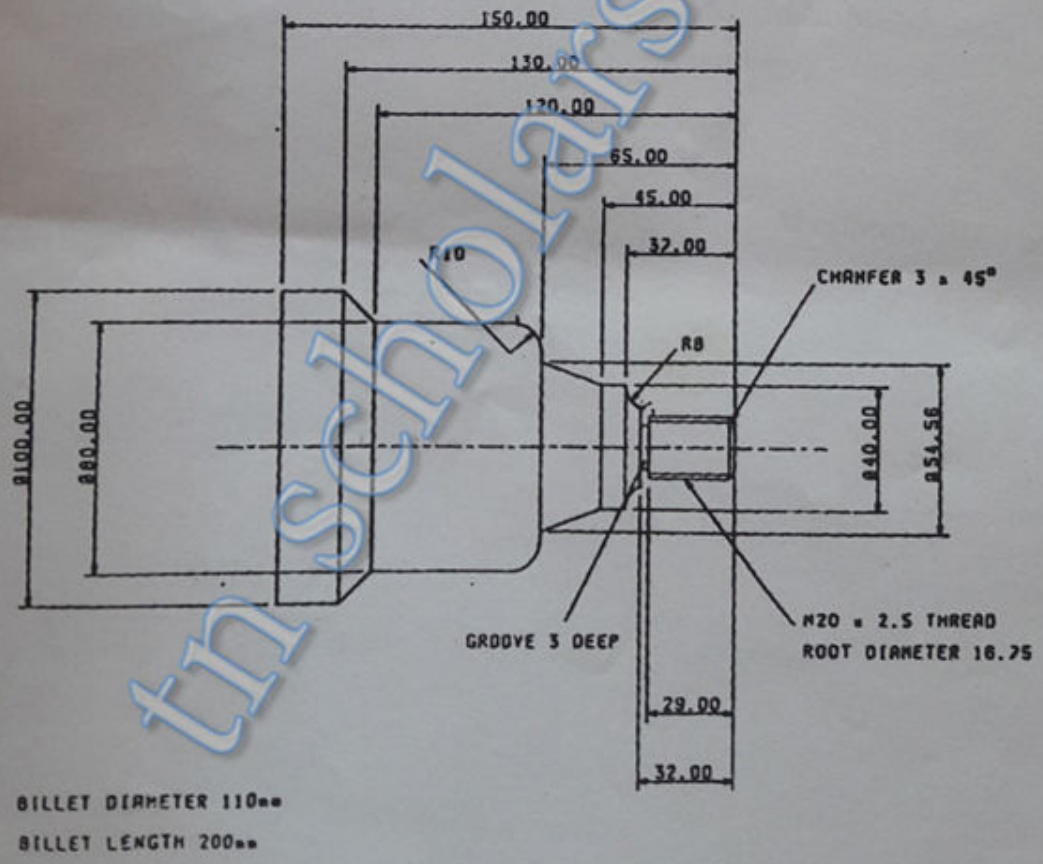
(ii) List out various types of bonding materials used in grinding wheel. Explain any three. (8)

15. (a) (i) Enumerate the constructional features of CNC machining centre. (8)

(ii) Describe various type of CNC machine based on tool motion. (8)

OR

(b) Write CNC part program for the component shown in Fig. Mention the assumptions made. (16)



All dimensions in mm.

Fig. Q 15(b)

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Question Paper Code : 80657

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2016

Fourth Semester

Mechanical Engineering

ME 6402 – MANUFACTURING TECHNOLOGY – II

(Common to Industrial Engineering, Industrial Engineering and Management and Mechanical and Automation Engineering and also common to Sixth Semester Mechanical Engineering (sandwich))

(Regulation 2013)

Time : Three hours | Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are the Conditions that would allow a continuous chip to be formed in metal Cutting?

2. If the Taylor's tool life constants for a given operation are specified as n=0.5 and C = 400, what is the percentage increase in tool life when the Cutting speed is reduced by half?

3. What are the various methods available for taper turning in a lathe?

4. Differentiate between an automatic and a semi automatic lathe

5. Make a comparison between gear shaping and gear hobbing

6. What is gear finishing? Why is it done?

7. What are the advantages and limitations of using centreless grinding?

8. Define Grinding ratio.

9. State the functions of the following G and M codes

   G01 G04 M04 M30

10. Compare bulk and surface micro machining processes

PART B — (5 × 16 = 80 marks)

11. (a) (i) Show schematically the merchants force circle in orthogonal Cutting and derive the expressions for various components of cutting force. Mention the assumptions made. (10)

(ii) In an Orthogonal cutting test with a tool of rake angle 8°, the following observations were made:

Chip thickness ratio = 0.2

Horizontal component of the cutting force = 1050 N

Vertical component of the cutting force = 1450 N

From Merchant's theory, calculate the various components of the cutting forces and the coefficient of friction at the chip tool interface. (6)

Or

(b) (i) Describe with neat sketch the measurement of average chip tool interface temperature using tool-work thermocouple. (8)

(ii) How are cemented carbides classified by ISO? Explain the general applications of each category? (8)

12. (a) (i) Enumerate with neat sketch, constructional features of a centre lathe. (10)

(ii) For the component (C40 steel) shown in Fig Q 12 a(ii), the feed for roughing is 0.24 mm/rev while that for finishing is 0.10 mm/rev. The maximum depth of cut for roughing is 2 mm. Finish allowance may be taken as 0.75 mm. Blank to be used for machining is 50 mm in diameter. Calculate the power required for roughing and finishing passes.

Assume the value of k as 1600N/mm². (6)

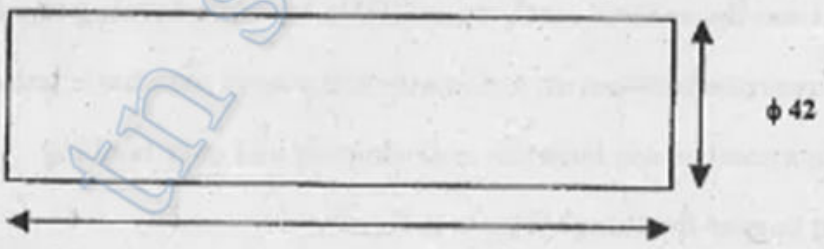

Fig. Q. 12 a (ii)

Or

(b) (i) Explain with neat diagram the principal parts of turret lathe. (6)

(ii) Differentiate between parallel action and progressive action multi spindle automatics. (10)

13. (a) (i) Describe with neat sketch the quick return mechanism used in shaper. (8)

(ii) What are the various types of milling cutters that are used in milling? Discuss any three. (8)

Or

(b) (i) Discuss with neat sketches gear grinding and gear lapping methods. (10)

(ii) Enumerate with neat sketch, gear cutting on a gear shaper using a rotary gear shaper. (6)

14. (a) (i) Discuss any four abrasives used in grinding wheel. (8)

(ii) Explain with neat sketches the four different types of surface grinding operations. (8)

Or

(b) (i) Sketch and indicate various elements of a pull broach (6)

(ii) Describe various types of broaching machine used in industry (10)

15. (a) (i) Discuss salient features of CNC machining centre. (8)

(ii) Enumerate various steps involved in wafer preparation. (8)

Or

(b) Write CNC part program for the component shown in Fig Q.15(b) Mention the assumptions made. (16)

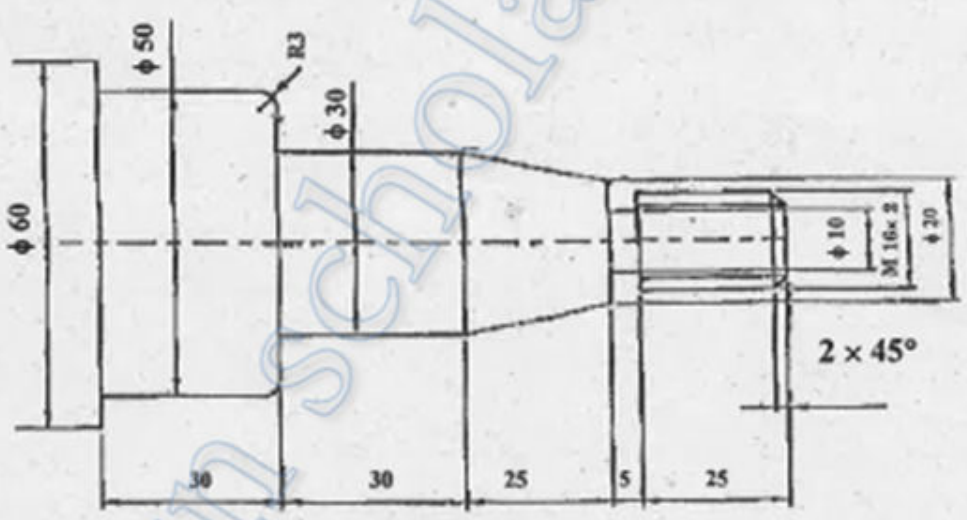

Fig. Q. 15 (b)

ALL DIMENSIONS ARE IN MM

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