6. (a) Explain the procedure for determining the index circles using compound indexing. (8 Marks)

(b) With a neat sketch, explain arbor assembly in milling. (8 Marks)

(c) Differentiate up-milling and down milling. (4 Marks)

7. (a) Explain with an example, the specification of a grinding wheel. (6 Marks)

(b) Write a note on dressing and turning of grinding wheel. (4 Marks)

(c) Explain the following with sketches (10 Marks)

i) Honing ii) Lapping.

8. (a) With a neat sketch, explain the working principle of abrasive jet machining. List its advantages. (10 Marks)

(b) Explain with a neat sketch, the operation of ECM. List its industrial applications. (10 Marks)

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NEW SCHEME

USN

Fifth Semester B.E. Degree Examination, January/February 2005

ME/IM/IP/MA/AU

Manufacturing Process-II

Time: 3 hrs. [Max.Marks : 100

Note: *Answer any FIVE full questions.*
2. Write neat sketches.

1. (a) Name the seven parameters specified in the same order in orthogonal system. (4 Marks)

(b) Mention atleast four factors which improve cutting efficiency. (4 Marks)

(c) Sketch Merchant's circle diagram and explain the different quantities involved. What are the assumptions made by Merchant while constructing a Merchants diagram? (12 Marks)

2. (a) Explain with a neat sketch crater wear and flank wear. (6 Marks)

(b) Explain the term Machinability Index. (4 Marks)

(c) During orthogonal turning operaton, the following data was obtained:

Cutting force F_H =	1200N
Feed force F_v=	300N
Rake angle =	10^0
Feed=	0.2mm/ revolution
Width of cut=	2.3mm
Chip thickness=	0.4mm
Cutting speed=	120m/min

Determine the following:

i) Chip thickness ratio.

ii) Shear angle.

iii) Shear stress. (10 Marks)

3. (a) With a neat sketch explain the turret indexing mechanism. (6 Marks)

(b) List out the differences between capston and turret lathe. (6 Marks)

(c) A manufacturing company is to manufacture 45 components to fill an order. A turret lathe and an engine lathe are available. The record shows the following data.

Contd.... 2

Turret lathe:

Machining time=	4 minutes
Direct labour cost=	Rs. 3 per hour
Over head cost=	Rs. 4.5 per hour
Setup time=	6 hours
Setup labour rate=	Rs. 5.5 per hour

Engine lathe:

Machining time=	12 minutes
Direct labour cost=	Rs.4 per hour
Overhead cost=	Rs.2 per hour
Setup time=	1 hour
Setup labour rate=	Rs.5 per hour

Determine if the job should be done on the turret lathe or engine lathe. (8 Marks)

4. (a) Describe:
   i) Gang drilling,
   ii) Multiple spindle drilling operation. (6 Marks)

   (b) Show with neat sketches the constructional features of a hand reamer and label the improtant features. (8 Marks)

   (c) A hole of 40mm diameter and 50mm depth is to be drilled in a mild steel component, the cutting speed can be taken as 65m/min and the feed rate as 0.25mm/rev. Calculate the machining time and the material removal rate. Take α as 59^0. (6 Marks)

5. (a) Compare shaper and planer in terms of their operation and type of workpiece. (4 Marks)

   (b) Describe the operation of the quick return motion in a machanical shaper. (8 Marks)

   (c) Find the time required to reduce the thickness of $600mm \times 900mm$ plate from 55mm to 50mm with following specifications on a shaper.

Cutting speed=	9m/min
Feed=	3mm/stroke.
Depth of cut=	1.5mm.
Length of approach and over travel=	each 3cms
Side clearance on each side=	5m.m
$\frac{returntime}{cuttingtime}$ =	$\frac{1}{4}$

(8 Marks)

...contd.... 3

6. (a) Clearly explain the various steps involved in differential indexing. (8 Marks)

   (b) A C50 steel flat surface of $100 \times 250mm$ is to be produced on a horizontal axis milling machine. A HSS slab mill of 100mm diameter and 150mm width is to be used for the purpose. The milling cutter has 8 teeth. Calculate the machining time assuming that the entire stock can be removed in one depth of 2mm. Take cutting speed as 20m/min & feed 0.13mm/tooth. (8 Marks)

   (c) Show the calculations for indexing 111 divisions in a milling machine. The following index plates are available.

Plate No.1,	15	16	17	18	19	20
plate No.2,	21	23	27	29	31	33
Plate No.3,	37	39	41	43	47	49

(6 Marks)

7. (a) Differentiate between:
   i) Plunge cut and traverse grinding.
   ii) Infeed and through feed grinding. (6 Marks)

   (b) Discuss the advantages and limitations of the centreless grinding process. (8 Marks)

   (c) With a neat sketch explain a process used for superfinishing cylindrical holes. (8 Marks)

8. (a) Briefly explain the principle of EDM and ECM. (6 Marks)

   (b) Explain with neat sketches:
   i) Water jet machining.
   ii) Electron beam machining. (14 Marks)

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IP54

NEW SCHEME

Reg. No.

Fifth Semester B.E. Degree Examination, January/February 2006

ME/IM/IP/MA/AU

Manufacturing Process-II

Time: 3 hrs.) (Max.Marks : 100

Note: *1. Answer any FIVE full questions.*
2. All questions carry equal marks.

1. (a) What are the various forms of wear found in single point tool. How do they affect the metal cutting performance. Also explain the effect of process parameters on the tool wear. **(8 Marks)**

   (b) Discuss the importance of shear angle in metal cutting. Derive an expression for shear angle in orthogonal cutting in terms of rake angle and chip thickness ratio. **(6 Marks)**

   (c) Explain the different types of chips that are formed in metal cutting. **(6 Marks)**

2. (a) Define tool life and also briefly explain how cutting conditions and tool geometry control the tool life of a single point cutting tool. **(6 Marks)**

   (b) What are the desirable properties of a cutting tool material? Explain how these are satisfied in the case of high speed steels and cemented carbides. **(8 Marks)**

   (c) Discuss the salient features of coated carbides and ceramics. Comment on their suitability as cutting tool material.. **(6 Marks)**

3. (a) Describe the constructional features of a turret lathe. How is it different from an engine lathe? **(6 Marks)**

   (b) Discuss any two methods of tool holding devices used in turret lathe. **(6 Marks)**

   (c) Draw a tool layout for hexagonal headed bolt in a capstan lathe. **(8 Marks)**

4. (a) Explain briefly the construction features of a radial drilling machine with a sketch. **(8 Marks)**

   (b) With a neat sketch describe the important elements of a twist drill. **(6 Marks)**

   (c) Explain briefly the following operations: reaming, boring and counter boring. **(6 Marks)**

5. (a) Explain the functioning of a hydraulic shaper with a schematic sketch. **(6 Marks)**

   (b) Describe the importance of quick return motion in a shaper. Also explain the crank and slotted link mechanism to obtain such quick return motion. **(8 Marks)**

   c) A shaper is operated at 120 cutting strokes per minute and is used to machine a workpiece 250mm in length and 120mm in width. Assuming a feed rate of 0.6mm per stroke and a depth of cut 3mm, calculate the total time of machining the component. The forward stroke is completed in 230^0 of crank rotation. Also determine the percentage of time when the tool is not contacting the workpiece. Assume a approach distance of 25mm. **(6 Marks)**

Contd.... 2

NEW SCHEME

USN

Fifth Semester B.E. Degree Examination, July/August 2005

ME/IM/IP/MA/AU

Manufacturing Process-II

Time: 3 hrs. | [Max.Marks : 100

Note: *Answer any FIVE full questions.*
2. Sketch should be neatly drawn in pencil.

1. (a) Explain the following with a neat sketch
   i) Side relief angle ii) Rake angle
   iii) End and side cutting edge angles iv) Clearance angle
   (8 Marks)

   (b) In an experiment on orthogonal cutting a chip length of 95 mm was obtained from an uncut chip length of 225 mm while cutting with a tool of 20^0 rake angle using a depth of cut of 0.5 mm. Determine the shearplane angle, friction angle and chip thickness, if the horizontal and vertical component of cutting force are 1200 N and 360N respectively.
   (12 Marks)

2. (a) Briefly explain the mechanism of tool wear. **(6 Marks)**

   (b) Explain the factors affecting the machinability of materials. **(6 Marks)**

   (c) A cast iron bar stock was turned at 50m/min for which the tool life was 3 hours. For the same material, at 40m/min, the tool life was 5 hours. Find the value of constant c and n in the Taylor's tool life equation. Also state the type of tool material based on the value of n. **(8 Marks)**

3. (a) Differentiate between an engine lathe and capstan/turret lathe. **(5 Marks)**

   (b) Explain any two types of chucks used in lathe. **(10 Marks)**

   (c) Write a note on tool holding devices. **(5 Marks)**

4. (a) Sketch and explain the nomenclature of a twist drill. **(10 Marks)**

   (b) Explain any five operations carried in drilling machine using simple sketch. **(10 Marks)**

5. (a) Explain with a sketch, the principle of working of Whit worth quick return motion mechanism in shaper. **(10 Marks)**

   (b) Explain with sketches, the following work holding devices used in a planer.
   i) T. bolts and clamps ii) V.blocks. **(10 Marks)**

Contd.... 2

6. (a) Differentiate between :
   i) Up and down milling
   ii) Peripheral and face milling **(9 Marks)**
   iii) Simple and differential indexing **(3 Marks)**

   (b) Write a brief notes on end milling cutters. **(8 Marks)**

   (c) With a neat sketch explain the principle of operation of dividing head attachment used on milling machine. **(8 Marks)**

7. (a) Explain in detail how you specify grounding wheels. **(6 Marks)**

   (b) Explain the following terms briefly.
   i) Wheel balancing
   ii) Wheel dressing and truing **(6 Marks)**

   (c) With a neat sketch describe the centreless grinding process. Also list the advantages and limitations of the same. **(8 Marks)**

8. (a) Explain the principle of electro chemical machining (ECM) process also briefly explain the working of an ECM machine with a schematic sketch. **(8 Marks)**

   (b) With schematic diagram explain briefly ultrasonic machining operation. **(6 Marks)**

   (c) Briefly explain with a sketch, the principle of operation of abrasive jet machining. **(6 Marks)**

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IP54

USN | | | | | | | | | | |

NEW SCHEME

Fourth.

~~Fifth~~ Semester B.E. Degree Examination, Dec.06/Jan. 07

ME / IP / AU / IM

Manufacturing Process – II

Time: 3 hrs.] [Max. Marks:100

Note: *1. Answer any FIVE questions.*
2. Assume missing data suitably, if any.

1 a. Show the different cutting angles of a single point cutting tool, with a neat sketch. **(05 Marks)**

b. Explain the relationship between cutting velocity and chip flow velocity and cutting velocity and shear velocity and prove the same. **(05 Marks)**

c. During the machining of C-20 steel with a triple carbide cutting tool 0–8–6–7–10–70–1mm ORS shape. The following data was obtained
Feed – 0.18 mm/revolution. Depth of cut – 2mm. Cutting speed – 120 m/min. Chip thickness – 0.4 mm. Determine i) Chip reduction coefficient ii) Shear angle. **(10 Marks)**

2 a. What is tool life. Explain different tool failures. **(05 Marks)**

b. A tool life of 80 minutes is obtained at a speed of 30 mpm and 8 minutes at 60 mpm. Determine the following i) Tool life. ii) Cutting speed for 4 minutes tool life. **(10 Marks)**

c. Explain the effect of alloying elements on HSS tool. **(05 Marks)**

3 a. Differentiate between capstan lathe and Turret lathe. **(05 Marks)**

b. Explain with fig. the work feeding mechanism for capstan lathe. **(07 Marks)**

c. Show the tool layout for the product shown in fig.3(c) for capstan lathe. **(08 Marks)**

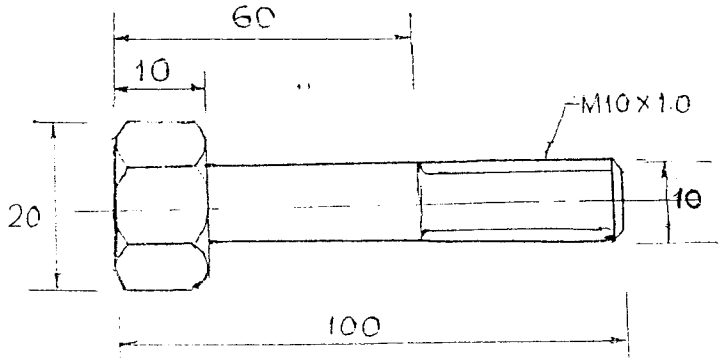

Fig. 3(c)

4 a. Explain with neat sketch, the geometry of twist drill. **(06 Marks)**

b. What is the purpose of socket and sleeve in drilling operation explain with figure. **(06 Marks)**

Contd...2

c. Show the tool layout of turret drilling machine for the product shown in fig. 4(c). **(08 Marks)**

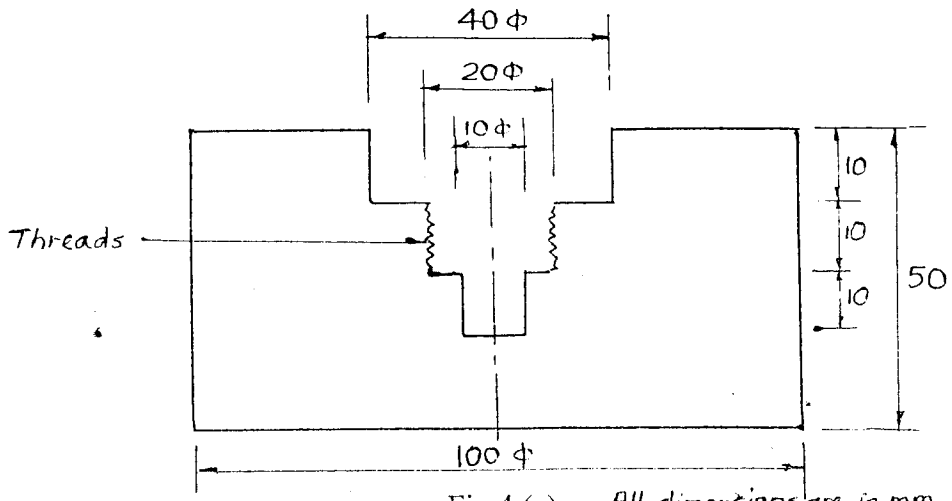

Fig.4.(c) All dimensions are in mm

5 a. Differentiate between shaper and planer. **(05 Marks)**

b. Explain with figure the table feeding mechanism of shaper. **(05 Marks)**

c. Estimate the time required to machine a cast iron surface 250mm long and 150mm wide on a shaper with a cutting to return ratio of 3:2. Use a cutting speed of 21 m/min, a feed of 2mm / stroke and a clearance of 25 mm the available ram strokes on the shaper are 28, 40, 60 and 90 strokes / min. Also determine MRR assuming depth of cut as 4 mm. **(10 Marks)**

6 a. Differentiate between up milling and down milling. Show the chip cross – section with figure for both the operations. **(05 Marks)**

b. Determine the time required to mill a slot of 300 × 25 mm in a work piece of 300 mm length with a side and face milling cutter of 100 mm diameter, 25 mm wide and having 18 teeth. The depth of cut is 5mm, the feed per tooth is 0.1mm and cutting speed is 30 m/min. Assume approach and over travel distance 50 mm. **(10 Marks)**

c. Name different types of indexing and explain indexing mechanism of a dividing head with sketch. **(05 Marks)**

7 a. Why soft wheel is used to grind hard material and hard grinding wheel for soft material. **(06 Marks)**

b. Explain the characteristics of a grinding wheel. **(06 Marks)**

c. What are fine finishing operations, explain machine lapping process using a vertical lapping machine. **(08 Marks)**

8 Write short notes on any four :

a. EDM

b. ECM

c. LBM

d. AJM

e. EBM

f. Chemical Machining. **(20 Marks)**

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06ME45

Fourth Semester B.E. Degree Examination, June/July 08
Manufacturing Process II

Time: 3 hrs. Max. Marks:100

Note : *Answer any FIVE full questions, choosing at least two full questions from each part.*

Part - A

1 a. Derive an expression for shear angle in terms of chip thickness co – efficient and rake angle for orthogonal cutting. (10 Marks)

b. The following data refer to an orthogonal cutting process. Chip thickness 0.62 mm, feed 0.2 mm, rake angle 15^0. Calculate chip reduction co – efficient and shear angle. (05 Marks)

c. Define tool life list out the factors that affect tool life. (05 Marks)

2 a. Clearly explain the different factors that are to be considered during the selection of a cutting tool materials. (12 Marks)

b. With a neat sketch explain different heat affected zones during orthogonal cutting. (08 Marks)

3 a. Differentiate between a turret lathe and a capsten lathe. (06 Marks)

b. Explain with a sketch keyway cutting on a shaping machine. (06 Marks)

c. With a neat sketch explain hydraulic driving mechanism of a shaper. (08 Marks)

4 a. Sketch a radial drilling machine and lable all parts. (08 Marks)

b. Explain the following operations on a drilling machine
   i) Boring
   ii) Counter sinking (10 Marks)

c. List out drill bit materials. (02 Marks)

Part - B

5 a. Clearly explain up milling and down milling. (10 Marks)

b. Show the calculations for setting dividing head to mill 69 divisions on a spur wheel blank by compound indexing. (10 Marks)

6 a. Clearly explain the designation process of manufacture and properties of following grinding wheels with
   i) Vitrified bond
   ii) Rubber bond. (12 Marks)

b. With a neat sketch explain the principle of working of a center type cylindrical grinding machine. (08 Marks)

7 a. Sketch and explain the process of lapping on a lapping machine. (10 Marks)

b. What is honing? Explain vertical honing process. (07 Marks)

c. List out advantages and applications of honing. (03 Marks)

8 a. With neat sketch explain electro chemical machine. (10 Marks)

b. List out limitations and applications of
   i) Laser beam machining
   ii) Plasma Arc machining (10 Marks)

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06ME45

Fourth Semester B.E. Degree Examination, June-July 2009
Manufacturing Process - II

Time: 3 hrs. Max. Marks:100

Note : ***Answer any FIVE full questions, selecting atleast TWO questions form each Part – A and Part - B.***

PART - A

1 a. With neat sketches, give nomenclature of a single point cutting tool. (07 Marks)

b. Derive the conditions $2\phi + \beta - \gamma = \frac{\pi}{2}$. Explain its significance with usual notations. (07 Marks)

c. List various factors influencing tool – life. Explain any one of them. (06 Marks)

2 a. List various cutting tool materials in the increasing order of their hardness. (06 Marks)

b. Explain with the help of neat sketches, heat distribution at tool and workpiece. (06 Marks)

c. What are the methods of measurement of temperature of cutting tool tip? Explain any one of them. (08 Marks)

3 a. Differentiate between capstan and turret lathes. (05 Marks)

b. With a neat sketch, explain any one of the driving mechanisms used in a shaping machine. (08 Marks)

c. Sketch a planning machine indicating major parts. Name any one of the mechanism for quick return movement in a planer. (07 Marks)

4 a. List various drilling machines. (05 Marks)

b. Draw neat sketch of a radial drilling machine indicating parts. (06 Marks)

c. Sketch and mention the application of the drilling machine operations – counter boring reaming and trepanning. (09 Marks)

PART - B

5 a. With sketches, differentiate between up milling and down milling operations. (06 Marks)

b. Draw a neat sketch to show major parts of a horizontal milling machine. (08 Marks)

c. What is Indexing? Explain compound indexing. (06 Marks)

6 a. List various grinding wheel abrasives and bonding processes. (07 Marks)

b. Sketch a centre type – cylindrical grinding machine indicating parts. (08 Marks)

c. Differentiate between horizontal and vertical grinding machines. (05 Marks)

7 a. Sketch and explain vertical lapping machine. (08 Marks)

b. Name the parts along with a neat sketch of a tool head for honing of holes. (07 Marks)

c. List the uses of lapping process. (05 Marks)

8 a. Mention any five non – traditional machining processes. (05 Marks)

b. Explain AJM with a neat sketch. (10 Marks)

c. What are the applications of non traditional machining methods? (05 Marks)

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06ME45

Fourth Semester B.E. Degree Examination, May/June 2010
Manufacturing Processes – II

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. With a neat sketch, explain the various parameters which make up the tool signature of a single point cutting tool. **(08 Marks)**

b. Derive an expression for the shear angle in orthogonal cutting, in terms of rake angle and chip thickness ratio. **(08 Marks)**

c. Explain the functions of cutting fluids. **(04 Marks)**

2 a. Explain the factors which affect the machinbility of a material. **(08 Marks)**

b. A cast iron bar stock was turned at 50 m/min, for which, the tool life was 3 hours. For the same material, at 40 m/min, the tool life was 5 hours. Find the value of constant c and n in the Taylor's tool life equation. Also, state the type of tool material based on the value of n. **(08 Marks)**

c. With neat sketches, explain flank and crater wear **(04 Marks)**

3 a. With the help of a neat sketch, explain the turret indexing mechanism. **(08 Marks)**

b. Explain the working of a hydraulic shaper mechanism, with a neat sketch. **(08 Marks)**

c. Compare shaper and planer in terms of their operation, type of workpiece and applications. **(04 Marks)**

4 a. Draw a neat diagram of a radial drilling machine. Name all the parts and explain the principle of operation. **(08 Marks)**

b. Explain the following operations, with simple sketches :
i) Reaming ; ii) Boring ; iii) Counterboring ; iv) Trepanning. **(08 Marks)**

c. Sketch and explain the nomenclature of a twist drill. **(04 Marks)**

PART – B

5 a. Differentiate between :
i) Up – milling and down milling
ii) Simple indexing and compound indexing. **(08 Marks)**

b. 69 teeth of a spur hear are to be cut around the periphery of a cylindrical blank. Recommend a suitable indexing mechanism. **(06 Marks)**

c. With a neat sketch, explain the working of an universal dividing head. **(06 Marks)**

6 a. Explain the centreless grinding process with a neat sketch. Also discuss the advantages and limitations of the same. **(08 Marks)**

b. Write a note on : i) Dressing and truing of grinding wheels ; ii) Wheel balancing. **(08 Marks)**

c. With an example, explain the specifications of a grinding wheel. **(04 Marks)**

7 a. Explain the following, with neat sketches : i) Honing ; ii) Lapping. **(10 Marks)**

b. List the factors which affect the lapping process. Discuss the influence of these parameters on lapping. **(10 Marks)**

8 a. Explain the principle of Laser Beam Machining [LBM], with a neat sketch. **(08 Marks)**

b. With a schematic diagram, explain the ultrasonic machining process [USM]. **(08 Marks)**

c. Discuss the applications and limitations of non – conventional machining processes over conventional machining processes. **(04 Marks)**

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