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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.

- 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. (4 Marks)
- (c) Differentiate up-milling and down milling. (4 Marks)
- 7. (a) Explain with an example, the specification of a grinding wheel. (8 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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- 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 Merchant's 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 operation, the following data was obtained:

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

- Determine the following:
  - i) Chip thickness ratio. (10 Marks)
  - ii) Shear angle. (8 Marks)
  - iii) Shear stress. (8 Marks)
- 3. (a) With a neat sketch explain the turret indexing mechanism. (8 Marks)

- (b) List out the differences between capstan and turret lathe. (8 Marks)

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

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

(b) A C70 steel flat surface of  $100 \times 250\text{mm}$  is to be produced on a horizontal axis milling machine. A HSS slab mill of  $100\text{mm}$  diameter and  $150\text{mm}$  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  $2\text{mm}$ . Take cutting speed as  $20\text{m/min}$  & feed  $0.13\text{mm/tooth}$ . (8 Marks)

(c) Show the calculations for indexing 111 divisions in a milling machine. The following index plates are available. (8 Marks)

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

7. (a) Differentiate between:

- i) Plunge cut and traverse grinding.
- ii) Infeed and through feed grinding.

(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. (8 Marks)

(b) Explain with neat sketches:

- i) Water jet machining.
- ii) Electron beam machining.

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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, (8 Marks)
- ii) Multiple spindle drilling operation. (8 Marks)

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

(c) A hole of  $40\text{mm}$  diameter and  $50\text{mm}$  depth is to be drilled in a mild steel component, the cutting speed can be taken as  $65\text{m/min}$  and the feed rate as  $0.25\text{mm/rev}$ . Calculate the machining time and the material removal rate. Take  $\alpha$  as  $59^\circ$ . (8 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 mechanical shaper. (8 Marks)

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

Cutting speed=	$9\text{m/min}$
Feed=	$3\text{mm/stroke}$
Depth of cut=	$1.5\text{mm}$
Length of approach and over travel=	each $3\text{cms}$
Side clearance on each side=	$5\text{mm}$
	$\pm$
	$\frac{\text{mm}}{\text{min}} / \frac{\text{min}}{\text{cutting time}}$

**NEW SCHEME**

Reg. No. 

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Fifth Semester B.E. Degree Examination, January/February 2004

ME/IM/IP/MA/AU

Manufacturing Process-II

(Max.Marks : 100

Time: 3 hrs.]

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. (8 Marks)

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

(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)

(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 0.8mm per stroke and a depth of cut 3mm, calculate the total time of machining that component. The forward stroke is completed in 230° of crank rotation. Also determine the percentage of time when the tool is not contacting the workpiece. (6 Marks)

Assume a approach clearance of 2mm.



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6. (a) Differentiate between :

- i) Up and down milling (9 Marks)
  - ii) Peripheral and face milling (3 Marks)
  - iii) Simple and differential indexing (3 Marks)
- (c) Write a brief notes on end milling cutters. (3 Marks)
- (e) With a neat sketch explain the principle of operation of dividing head attachment used on milling machine. (3 Marks)

7. (a) Explain in detail how you specify grinding wheels.

- (b) Explain the following terms briefly. (6 Marks)
    - i) Wheel balancing
    - ii) Wheel dressing and truing
  - (c) With a neat sketch describe the centreless grinding process. Also list the advantages and limitations of the same. (6 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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Fifth Semester B.E. Degree Examination, July/August 2005

ME/EM/IP/MA/AU

### Manufacturing Process-II

(Max.Marks : 100

Time: 3 hrs.]

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

1. (a) Explain the following with a neat sketch (9 Marks)
- i) Side relief angle
  - ii) Rake angle
  - iii) End and side cutting edge angles
  - iv) Clearance angle
- (b) In an experiment on orthogonal cutting a chip length of 05 mm was obtained from an uncut chip length of 225 mm while cutting with a tool of 20° 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. (4 Marks)
- (b) Explain the factors affecting the machinability of materials. (8 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  $e$  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. (10 Marks)
- i) T bolts and clamps
  - ii) V.blocks.

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