

Menoufia University
Faculty of Engineering, Shebin El-kom
Production Engineering and
Mechanical Design Department
First Semester-Final Exam
Date of Exam: 17 / 1 / 2019



Subject: *Machining Processes*
Code: PRE112
Year : 2018-2019
Time Allowed: 3Hours
Total Marks : 90Marks

Allowed tables and charts (None).

Answer the following questions

Question One

(15Marks)

- 1- List some of general safety rules for workshop equipment and tools. c15-1(2Marks)
- 2- Sketch a single point tool and label its angles. a1-1 (3Marks)
- 3- What are the functions of cutting fluid? a1-1 (2Marks)
- 4- How can you specify a lathe? a13-1(2Marks)
- 5- List the different characteristics of cutting tool materials a3-1 (2Marks)
- 6- Name different methods of taper turning? Describe these methods using neat sketches. a13-1(4Marks)

Question Two

(30Marks)

- 1- Explain various types of operations performed on a drilling machine by neat sketches. a1-1(4Marks)
- 2- How can you specify a drilling machine? a1-1(2Marks)
- 3- What are the different types of hand tools? Illustrate the different types of files by neat sketches. a13-1(4Marks)
- 4- Estimate the time required for machining a cast iron surface 250 mm long and 150 mm wide on a shaper with cutting-to-return ratio of 3/2. Use a cutting speed of 21 m/min, a feed of 2 mm/stroke and a depth of cut of 4mm. The available ram strokes on the shaper are: 28, 40, 60 and 90 strokes/min. b13-1(5Marks)
- 5- A mild steel shaft 80mm in diameter and 200mm long. **Prepare** the process sheet with sketches and **Calculate** the total machining time for the part shown in the Fig. **Assumed:** cutting speeds, feeds and maximum depth of cut of turning

Suppose you switched to a coated-carbide tool, so you increase the cutting speed to 121 m/min. Now **recalculate** the machining time. b13-1(15Marks)

Question Three

(15Marks)

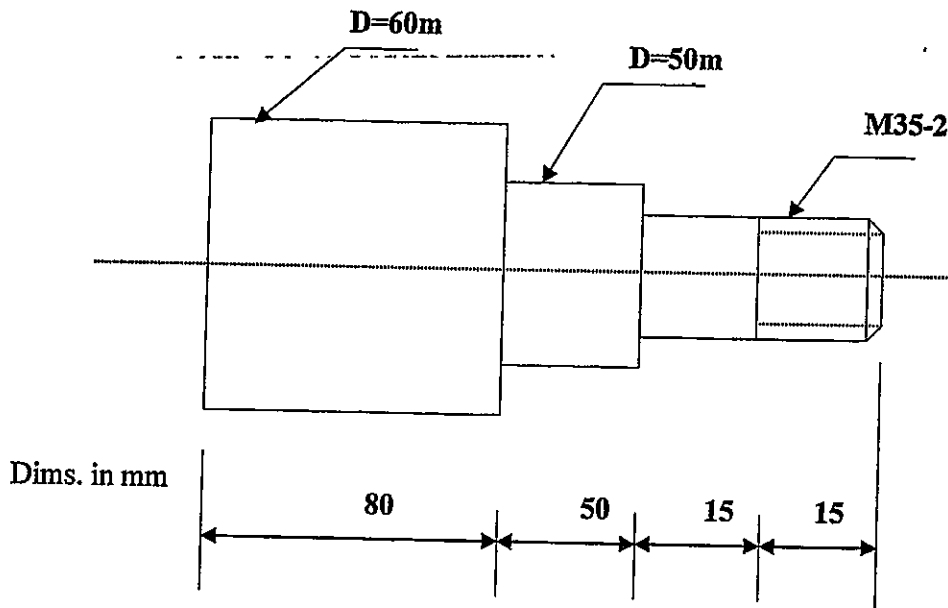
- 1- Explain the symbols in the following grinding notation:
32A54L5V12 a13-1(4Marls)
- 2- What are the advantages and disadvantages of centerless grinding? a13-1(4Marls)
- 3- What are the advantages and limitations of broaching processes? a13-1(4Marls)
- 4- Sketch and name the parts of a broaching tool. a13-1(3Marls)

With our best wishes

This exam measures the following ILOs:							
Question Number	Q1-2,3,Q2-1,2	Q1-5	Q1-4,6 Q2-3 Q3-1 Q4	Q2-1,5 Q3-4	Q3-2 Q3-3	Q1-1	Q2-5
Skills	a1-1	a3-1	a13-1	b13-1	b18-1	c15-1	c19-1
	Knowledge & Understanding Skills			Intellectual Skills		Professional Skills	

process for high speed steel tools are 60 m/min, 0.12mm/ rev and 0.5 mm, respectively. Cutting speed and feed for facing are 15m/min and 0.3mm/rev, cutting speed and feed for cut-off are 10m/min and 0.1mm/rev. Cutting speed return speed for threading are 15m/min and 20m/min. Also, **Calculate** the motor power if unit power is 0.2kw/cm³/min. Mechanical efficiency factor is 80%.

b13-1, c19-1 (15Marks)



Question Three

(30Marks)

- 1- With the help of a net sketch, differentiate between up milling and down milling. a13-1(6Marks)
- 2- Sketch and describe the indexing head used for gear cutting. b18-1(4Marks)
- 3- **Find** the movement of the index head and the gears needed to index 47 divisions.

Plate I 15, 16, 17, 18, 19, and 20 holes

Plate II 21, 23, 27, 29, 31, and 33 holes

Plate III 37, 39, 41, 43, 47, 49, and 49 holes

The change gears are 24, 24, 28, 32, 40, 44, 48, 56, 64, 72, 86, and 100 teeth.

b18-1(5Marks)

- 4- For a slab milling operation using a 125-mm diameter, 11-tooth cutter, the feed per tooth is 0.13 mm/tooth with a cutting speed of 30 m/min (HSS steel).

Calculate the rpm of the cutter and the feed rate of the table, then **Calculate** the time to machine a 150-mm long block of metal and the depth of cut is 6 mm.

