Menoufia University **Faculty of Engineering, Shebin El-Kom** **Prod. Engg & Mech. Design Dept.** **First Semester Examination, 2015-2016** **Date of Exam: 18 / 01 / 2016**		**Subject: Machining Processes** **Code: PRE 112** **Year : First** **Time Allowed: 3 hours** **Total Marks: 90 Marks**

Answer all the following questions (with the help of net sketches), (Assume any missing data):

Question 1: (22 Marks)

a) What are the requirements must be regarded in cutting tool material? (5 Marks)

b) What are the different types of chips? List the conditions of occurrence of each of them. (5 Marks)

c) It is required to shape a surface 100 mm width and 200 mm length. The cutting conditions are as follows: the crank rotates with 30 cycles per minute, the quick return ratio is 3/2, the depth to be cut is 8 mm, the feed per stroke is 0.5 mm and the depth of cut is 0.4 mm. Calculate the following: cutting speed, average speed and machining time. (12 Marks)

Question 2: (23 Marks)

a) With the aid of neat sketches draw the different operations which can be machined on milling machines? (5 Marks)

b) Calculate the number of turns of the indexing crank to cut the following:
i- hexagonal nut ii- a gear of 61 teeth. (6 Marks)

c) Calculate the machining time in a plain milling operation of a surface 80 mm width and 300 mm length for a depth of cut of 5 mm. The cutting conditions are:
Feed per tooth is 0.05 mm, depth of cut is 1 mm, width of the cutter is 100 mm, cutting speed is 30 m/min, the cutter is 8 teeth and 60 mm diameter. (12 Marks)

Question 3: (25 Marks)

a) Explain with the aid of sketches the grinding operations. (8 Marks)

b) Evaluate the machining time for the following cylindrical grinding operation:
Diameter of work = 40 mm & Length of the part = 200 mm & Total stock to be removed = 0.25 mm & G.W. face width =50 mm & wheel diameter = 250 mm & Radial in-feed = 0.025 mm/min & Work speed = 15 m/min & Wheel speed = 2000 m/min &Traverse speed = 25 mm/rev and Spark-out time = ١.5 min. (5 Marks)

c) Explain the broaching process. (2 Marks)

d) Calculate the number of teeth in an internal keyway broach for finishing a keyway to 10 mm wide and 5 mm deep in a boss of 30 mm length. Also, find out the power consumed in broaching this keyway. If broaching is performed at 3mm/min and feeds for finish broaching is 0.08 mm/tooth, determine the size of the broach. (5 Marks)

e) List the different methods of thread cutting and grinding. (3 Marks)

f) Calculate suitable gear trains for the following cases: (7 Marks)
i- 2.5 mm pitch on a 6 mm lead screw
ii-11 tpi on a 4 tpi lead
iii- 7 threads in 10 mm on 6 mm lead screw
iv- 7/22 in. pitch, 3 start on a lathe with 2 tpi
v- 2.5 mm pitch on a 4 tpi lead screw
vi- 12 tpi on a lathe having 6 mm pitch lead screw

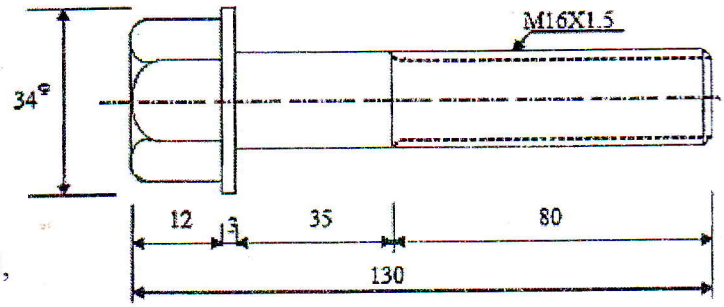
Question 4: (15 Marks)

a) Calculate the machining time of practical exercise as shown in the following figure:

- Initial bar size is 40 mm.

For turning: Cutting speed = 40 m / min, feed rate = 0.3 mm / rev, depth of cut = 1.5 mm.
For threading: cutting speed = 10 m / min.
For drilling: Cutting speed = 20 m / min, feed rate = 0.25 mm / rev.
For milling: Cutting speed = 20 m / min, feed per tooth = 0.25 mm, No. of cutter teeth = 8, cutter diameter = 100 mm.

- Assume any missed data.



(Dim. In mm.)

(7 Marks)

b) What is the difference between a turret lathe and a capstan lathe? (4 Marks)

c) What are spring collets available for bar automatics? What type do you recommend for?

a. Single-spindle semiautomatic
b. Multispindle semiautomatic

(4 Marks)

With our best wishes

Dr / Adel Abdelazez
Dr./Ali El-Masry

This exam measures the following ILOs						
Question No.	Q1-(a-b), Q4-(b-c)	Q1-c, Q3-e	Q2-a, Q3-(a-c)		Q2-b, Q3-b,Q4-a	Q2-c, Q3-(d-f)
Skills	a3-1	a8-1	a19-1	b14-1	c5-1	C8-1
	Knowledge & Understanding Skills			Intellectual skills	Professional Skills	