Kafrelsheikh University
Faculty of Engineering
Department of Mech. Eng.
1st year Mechanical Eng.
Dr. Ibrahem Maher

30 - 12 - 2018
Time allowed: 3 hours.
Full Mark: 75
Final exam
MDP1105

Production Engineering (1)

This exam measures the following ILOs: a3, a8, b5, c6

Question 1 (18 Marks)

a) State the major differences between machining and forming processes.
b) Explain the need for unconventional machining processes compared to conventional ones.
c) Show the general classification of the machining processes.
d) Using sketches, show the different modes of metal-cutting processes.
e) Using diagrams, show the main types of erosion machining processes.
f) What are the main variables of a machining process?

Question 2 (18 Marks)

a) Draw the following tool angel signature –8 14 5 6 20 15 1 in ASA system.
b) A cutting tool has a setting angle of 60°, back rake angle 12°, and side rake angle of 18°; find the normal rake angle on the assumption that the cutting is orthogonal. If this tool is set at 2.5 mm above center during turning of a bar 100 diameter, what change will be caused to the normal rake angle?
c) Using diagrams, classify the cutting tool materials.
d) State the main requirements for tool materials.
e) Explain what is meant by hot–hardness. Draw the hot–hardness diagram for the different tool materials.
f) Show the ISO classification of carbide tools. Mention their applications.

Question 3 (20 Marks)

a) A lathe, equipped with six-speed gearbox (35, 70, 140, 280, 560, and 1120 rpm), is used to machine a shaft made of extruded brass of 60 mm diameter and a length of 500 mm. Its diameter is to be reduced to 55 mm in two cuts using the following conditions:

	Roughing	Finishing
Depth of cut, mm	2	0.5
Feed, mm/rev	0.4	0.1
Cutting speed, m/min	100	180

Select the suitable spindle speeds for roughing and finishing cuts and calculate the total machining time.
b) Show by neat sketch the constructional features of a twist drill.
c) Explain the procedure of choosing a reamer diameter.
d) Calculate the shaping time for a workpiece length 600 mm and width 150 mm using a feed rate of 0.5 mm/stroke. The height of the part was 60 mm, which was reduced to 50 mm at a maximum depth of cut 2 mm, the cutting speed was 30 m/min, and $r_s = 2$.

Question 4 (20 Marks)

a) Using sketches, what are the various grinding machining operations?
b) Explain each item of the following standard bonded abrasive wheel marking: C 46 M 4 V.
c) Classify the metal forming operations, then explain each forming operation using sketch.
d) Indicate three advantages of cold working relative to warm and hot working.

انتهت الأسئلة - بالتوفيق و النجاح