

MANSOURA UNIVERSITY
FACULTY OF ENGINEERING

Department of Mechanical Design and Production Engineering
Second Year. Time allowed: 3 Hs.
Second Term, Final Exam. May 2013.

Methods of Metal Machining (Processes and Equipments)

Answer the following Questions:

- 1- a- Make a general comparison between modern CNC machining center and the lathes that are controlled by individual computers.
b- Discuss the major advantages of five-axis machining center over conventional milling machines.
- 2- a- In details discuss the main objectives of manufacturing systems.
b- Sketch and in details discuss the transfer line layout of a manufacturing machining plan (processing and assembly).
c- Discuss different suggested material transfers' layout in a jobbing shop environment.
- 3- Discuss the influences of the following:
 - a. machine tool technology,
 - b. manufacturing systems management and
 - c. materials technology on the cost of machining operations.
- 4- a- Derive analytical equations that can be used to estimate different type of machining removal rates (turning, milling, drilling and grinding).
b- Discusses the relationship between analytical and graphical solution in determining the machining removal rates.
c- Sketch the metal removal rate chart and discuss the basic relation between volume of metal removed per minute, depth of cutting in mm. feed mm/rev and cutting speed mt/min.
- 5- Discuss the processes of the following machining operations:
 - a. Broaching,
 - b. Boring and
 - c. Reaming.

Prof. Dr. A.A.Fattah

Reminder:

- Carefully read the given questions and take your time in thinking then write proper answers according to the engineering formatting system.
- Give an individual answer for each Question in an individual page.
- Don't leave the examination hall before answering all the above questions.

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Methods of Metal Forming (Processes and Equipments)

Answer the following Questions:

- 1- Casting process is one of the metal forming processes that capable of producing complicated shapes.
 - With a schematic sketch, make a complete comparison between the process of automatic Horizontal sand flask molding and Vertical flask-less molding which could be described as modern sand casting processes.
- 2- In metal working rolling and extrusion manufacturing processes, Sketch and in details discusses the following:
 - a) The Six types of rolling surface defects.
 - b) The four types extrusion defects.
- 3- With the aid of illustrative sketch, briefly discuss:
 - a) Deferent Processes of drawing metalworking, and
 - b) Deferent extrusion Processes.
- 4- In details discuss the following energy beam welding processes that could relatively defined as new processes in high production application:
 - a) Laser beam and electron beam welding processes and
 - b) Focusing on the weld testing and stress analysis, describe in details the quality control systems.
- 5- Inbrife discusses and describe the following:
 - a) Hot metal gas forming process,
 - b) Cyclonic separator which used for removing particulates from an air, gas or liquid stream, in powder metallurgy production technique, and
 - c) The six main processes that could characteristics to Water jet cutting operation technique.

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