



Machines of Metal Cutting and Forming

ماكينات تشغيل و تشكيل

This exam measures the following ILOs: a.13, a.19, b.12, b.18, c.13, and c.18.

Question 1

(25 Marks)

- 1) Sketch and describe the basic principle involved in Water Jet machining. (5 Marks)
- 2) What are the advantages of water jet machining (WJM)? (5 Marks)
- 3) What are types of the carrier gas and abrasive particles material usually used with Abrasive Jet Machining? (5 Marks)
- 4) Sketch and describe the factors affect the machining process of Abrasive Jet Machining. (5 Marks)
- 5) What is the difference between the injection and suspension jet in Abrasive Water Jet Machining? (5 Marks)

Question 2

(30 Marks)

- 6) Explain the operating principle of Piezoelectric and Magnetostrictive transducers. (6 Marks)
- 7) What are the disadvantages of Ultrasonic Machining? (6 Marks)
- 8) Define and describe the characteristics of the Ultrasonic waves used in USM. (6 Marks)
- 9) What are the advantages of using RUM over USM and diamond grinding? (6 Marks)
- 10) What are the suitable dielectric fluids used in EDM? and what are their characteristics? (6 Marks)

Question 3

(35 Marks)

- 11) What are the basic characteristics of electrode materials used in EDM? (7 Marks)
- 12) Sketch and describe the basic principle involved in WEDM. (7 Marks)
- 13) What are the limitations in WEDM process? (7 Marks)
- 14) Why the wire electrode in WEDM is breakage and how to avoid it? (7 Marks)
- 15) List six applications of WEDM. (7 Marks)

Question 4

(35 Marks)

- 16) What is the characteristic of the electron beam in EBM? (7 Marks)
- 17) What are the EBM process capabilities? (7 Marks)
- 18) What are the limitations in EBM process? (7 Marks)
- 19) What are the key elements in LASER? (7 Marks)
- 20) Discuss in details the differences between spontaneous and stimulated emission in LASER process. (7 Marks)

The End