

**SULIT**



**UNIVERSITI TUN HUSSEIN ONN MALAYSIA**

**PEPERIKSAAN AKHIR  
SEMESTER II  
SESI 2010/2011**

NAMA KURSUS : MODERN MACHINING PROCESS

KOD KURSUS : BDD 4073

PROGRAM : SARJANA MUDA KEJURUTERAAN  
MEKANIKAL DENGAN KEPUJIAN

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JANGKA MASA : 2 JAM 30 MINIT

ARAHAN : JAWAB SEMUA SOALAN

KERTAS SOALAN INI MENGANDUNGI TIGA (3) MUKA SURAT

**SULIT**

- S1** (a) With the help of sketches, explain the principle of four (4) types of flushing. (8 marks)
- (b) Identify at least five (5) significant advantages of EDM. (5 marks)
- (c) A metal removal rate of  $2.15 \text{ mm}^3/\text{s}$  is achieved in an EDM operation on a non-ferrous Magnesium alloy. What metal removal rate would be achieved on Brass alloy material in this operation, if the same discharge current were used? Melting point temperatures for Magnesium and Brass are  $650 \text{ }^\circ\text{C}$  and  $930 \text{ }^\circ\text{C}$  respectively. (7 marks)
- S2** (a) Describe the first definition of High Speed Machining (HSM). (2 marks)
- (b) High Speed machining (HSM) has been widely used in mould and die industry which requires dealing with finishing of hard materials. List and briefly explain four (4) categories of parts/components which normally been machined by HSM. (8 marks)
- (c) A cylindrical workpiece of copper with a 125 mm diameter and 1100 mm length is to be machined with high speed machining in turning operation. A 1000 mm portion of the length is to be turned to a diameter of 124 mm at a cutting speed 1200 m/min and feed 0.3 mm/rev.  
Determine:
- i) The required depth of cut
  - ii) Machining time
  - iii) Material removal rate
- (10 marks)
- S3** (a) Describe the function of Transducer in Ultrasonic Machining (USM) and list two (2) principles operation of Transducer. (4 marks)
- (b) List four (4) criterias for selection of an abrasive in USM. (4 marks)
- (c) List five (5) main factors which are normally effects the 'Chipping Rate' in USM. (5 marks)
- (d) List two (2) disadvantages of USM. (2 marks)

- (e) Determine the amount of metal removed in the operation of USM. Use metric units and express the answer in  $\text{mm}^3$ .  
(Given:  $F = 50 \text{ KHz}$ ,  $S = 100 \text{ N/mm}^2$ ,  $H_o = 150 \text{ BHN}$ ,  $R = 0.05 \text{ mm}$ ,  $Y = 0.5 \text{ mm}$ )  
(5 marks)
- S4** (a) A rectangular plate of Inconel is to be cut with Water Jet Machining (WJM). The water pressure supplied is 500 MPa from an orifice diameter 0.4 mm. Determine mass flow rate of the water jet.  
(7 marks)
- (b) List five (5) main factors which normally effects the good cutting quality in WJM.  
(5 marks)
- (c) List three (3) advantages of WJM.  
(3 marks)
- (d) With the help of a sketch, describe the principle of Jet Nozzle in Water Jet Machining (WJM).  
(5 marks)
- S5** (a) What is Chemical Machining? List three (3) types of Chemical Machining.  
(7 marks)
- (b) Describe the function of Etching and list three (3) factors in selection of etchant material.  
(7 marks)
- (c) Which of the advanced machining processes causes thermal damage? What is the consequence of such damage to workpiece?  
(6 marks)