



**UNIVERSITI KUALA LUMPUR
MALAYSIAN INSTITUTE OF INDUSTRIAL TECHNOLOGY**

**FINAL EXAMINATION
JANUARY 2016 SEMESTER**

COURSE CODE : JFB 40303
COURSE TITLE : NON-DESTRUCTIVE TESTING (NDT) FOR WELDING
PROGRAMME LEVEL : BACHELOR
DATE : 18 MAY 2016
TIME : 2.30 PM – 5.30 PM
DURATION : 3 HOURS

INSTRUCTIONS TO CANDIDATES

1. Please read the instructions given in the question paper **CAREFULLY**.
 2. This question paper is printed on both sides of the paper.
 3. This question paper consists of **ONE (1)** section.
 4. Choose **FOUR (4)** questions only.
 5. Please write your answers on the answer booklet provided.
 6. Please answer all questions in English only.
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THERE ARE 4 PAGES OF QUESTIONS EXCLUDING THIS PAGE.

(Total: 100 marks)

INSTRUCTION: Answer only FOUR (4) questions.

Please use the answer booklet provided

Question 1

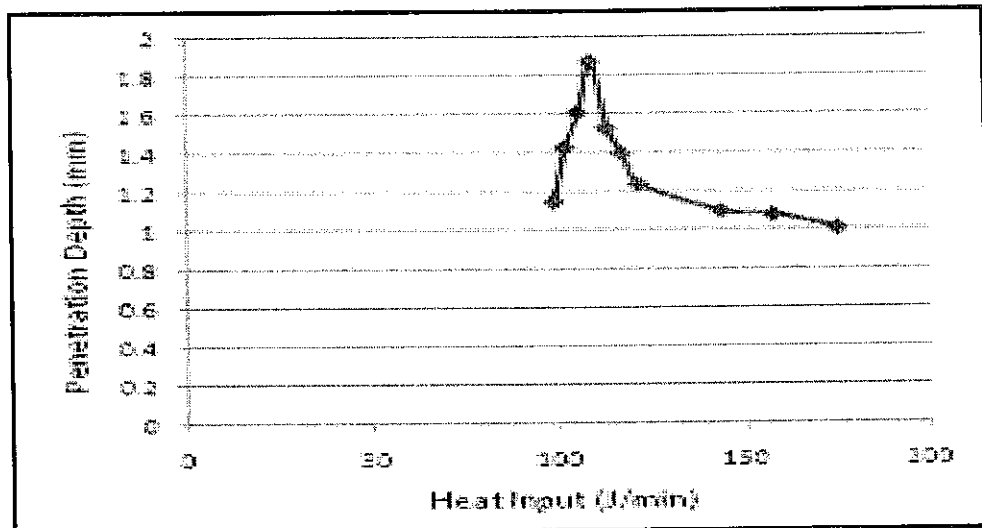


Figure 1: Effect of heat input on penetration

- (a) Describe the results based on Figure 1 and identify the minimum value of penetration. (7 marks)
- (b) Identify the minimum developer dwell time and list **FOUR (4)** defects that can be inspect using magnetic particle inspection. (8 marks)
- (c) Construct the working principle of surface cleaning and white contrast application in the magnetic particle inspection process. (6 marks)
- (d) List **FOUR (4)** types of non-destructive testing methods that can inspect center line crack and base metal crack. (4 marks)

Question 2

- (a) List out **SIX (6)** defects can be inspecting by dye penetration testing method. (6 marks)
- (b) Identify the apparatus and material used in ultrasonic testing and eddy current testing. (6 marks)
- (c) Distinguish the differences between magnetic particle inspection and visual inspection. (5 marks)
- (d) Construct the following welding defects on dissimilar weldment of AA6351 and AA6082.
- i. Crater crack and cluster porosity on bevel groove joint. (4 marks)
 - ii. Face undercut and root concavity on J groove butt joint. (4 marks)

Question 3

- (a) Describe the procedure of visual inspection for inspect overlap defect on single U butt joint of AA6351. (10 marks)
- (b) Identify **SEVEN (7)** defects that can be inspecting using radiography testing. (7 marks)
- (c) Construct **THREE (3)** instrument used in dye penetration process. (3 marks)
- (d) Construct excess penetration and over penetration on single V butt joint of AA6351 and AA5083. (5 marks)

Question 4

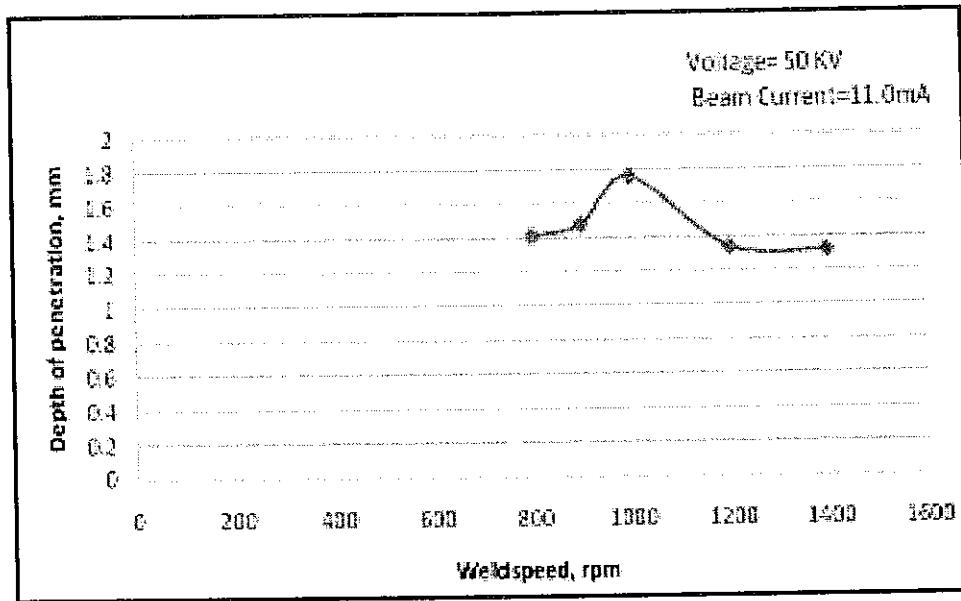


Figure 2: Effect of weld speed on depth of penetration

- (a) Analyze the result based on Figure 2. (9 marks)
- (b) Compare the differences post cleaning and developer dwell time in dye penetration process. (9 marks)
- (c) Describe the groove weld and fillet weld. (3 marks)
- (d) Sketch the following welding defects on double bevel butt joint of AA6351 with dimension 100mm x 50mm x 10mm.
 - i. Spatter (1 marks)
 - ii. Burn-through (1 marks)
 - iii. Slag inclusion (1 marks)
 - iv. Lack of root fusion (1 marks)

Question 5

- (a) Sketch the groove preparation for producing double U groove butt joint, double Vee groove butt joint, double J groove butt joint, bevel groove butt joint and U groove butt joint. (5 marks)
- (b) Explain the effect of increased welding current on welding responses. (6 marks)
- (c) Decide which type of non-destructive testing that can be used to obtain the information required below:
- i. Inspect concave cap defect on AA6061 joint (2 marks)
 - ii. Inspect uneven leg length defect on AA 6061 joint (2 marks)
 - iii. Measure width of workpiece AA6061 (2 marks)
 - iv. Inspect overlap on welded joint of AA6061 (2 marks)
- (d) Construct excess cap and fusion line crack on single U joint of AA5082 and AA6351. (6 marks)

END OF EXAMINATION PAPER

