



**UNIVERSITI KUALA LUMPUR  
MALAYSIA FRANCE INSTITUTE**

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**FINAL EXAMINATION  
JANUARY 2014 SESSION**

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**SUBJECT CODE : FFD 13403**

**SUBJECT TITLE : PRODUCTION ORGANIZATION AND OPTIMIZATION OF MATERIAL**

**LEVEL : DIPLOMA**

**TIME/DURATION : (2 HOURS)**

**DATE :**

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**INSTRUCTIONS TO CANDIDATES**

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1. Please read the instructions given in the question paper **CAREFULLY**.
  2. This question paper is printed on both sides of the paper.
  3. Please write your answers on the answer booklet provided.
  4. Answer should be written in blue or black ink except for sketching, graphic and illustration.
  5. This question paper consists of **TWO (2)** sections. Section A and B. Answer all questions in Section A. For Section B, answer **ONE (1)** question only.
  6. Answer all questions in English.
  7. No graph paper is appended.
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**THERE ARE 6 PRINTED PAGES OF QUESTIONS, AND NO PAGE OF GRAPH PAPER EXCLUDING THIS PAGE.**

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**SECTION A (Total: 60 marks)****INSTRUCTION: Answer ALL questions. Please use the answer booklet provided.**

- 1 For the design considerations, what is the minimum inner bend radius for most material?  

(4 marks)
- 2 Symbols are used in the manufacturing flow process because it allows reading and telling what is taking place. Sketch and label/name the **FOUR (4)** common symbols used.  

(4 marks)
- 3 Describe why production planning is important? Explain **TWO (2)** reasons of its importance.  

(4 marks)
- 4 One of the tasks of the factory engineers are most interested in, are the parts that must be made in the plant. Explain and give **ONE (1)** reason for it.  

(4 marks)
- 5 Explain the following matter:
  - 1.1 What is an organization? Give an example.
  - 1.2 What is an organization chart?

(6 marks)
- 6 Describe the term orange peel, and the necessary steps to be taken to avoid it.  

(5 marks)
- 7 In terms of the metal fabrication process, define with a sketch “bending process”.  

(5 marks)

8 Explain the significant function of the neutral axis. In general, what is the percentage of the neutral axis from the inside bend radius of the plate?

(5 marks)

9 “Swinging” in terms of metal movement is metal forced down or up through space and occupies new position. From the given diagrams below explain the status of each stage.

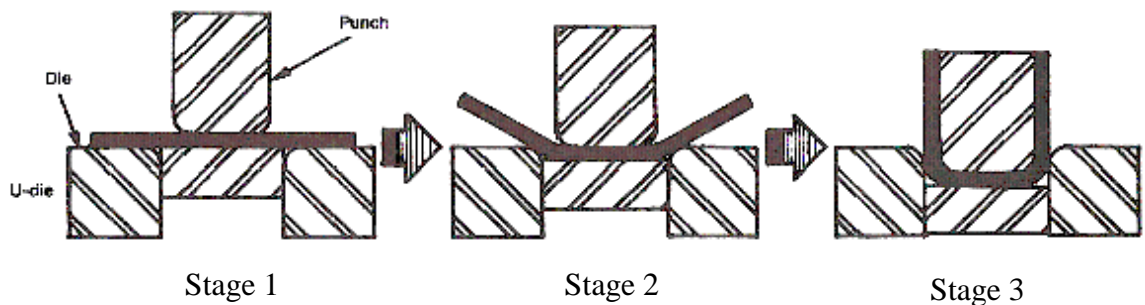


Figure 1 Metal movement during bending

(5 marks)

10 From the figure 2 below observe and examine the photo carefully. What is the basic and necessary “set-up” for this drilling process? Distinguish **TWO (2)** matters concerning safety.



Figure 2 A drilling process

(6 marks)

- 11 Bending will cause stresses both on the inside and on the outside. Explain compressional and tensional stress of the bend plate. Show the locations stresses with arrows.

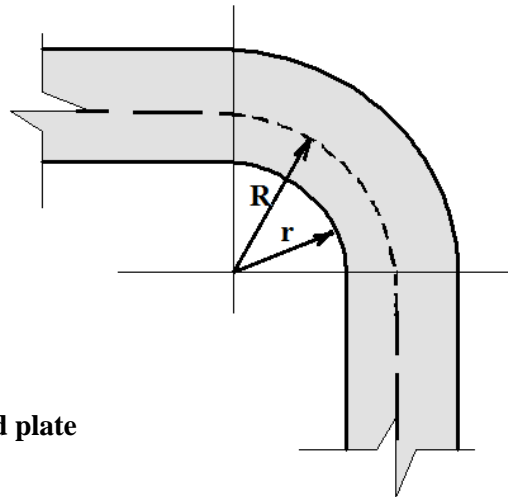


Figure 3 A section of a 90° bend plate

(6 marks)

- 12 The following items were cut from the plate format size 1200mm x 3.0mm x 1500mm. One piece of the plate format would cost RM350.00 to cut. Calculate the total cutting cost for 5 pieces of plate format using an automatic multiple plasma cutting machine. What would the cost be if 10% was marked up to the cost calculated?

Table 1 Bill of Material

No.	Piece Mark	Quantity	Type Description	Grade
1	PPG1	120	381mm x 3mm x 457 mm	ASTM A 36
2	PH1	115	43.1mm x 3mm x 381mm	ASTM A 36
3	PD3	100	33.0mm x 3mm x 33.5mm	ASTM A 36
4	PG2	100	177mm x 3mm x 60.9mm	ASTM A 36
5	P2	120	152mm x 3mm x 43.1mm	ASTM A 36

(6 marks)

**SECTION B (Total: 40 marks)**

**INSTRUCTION: Answer ONE (1) question only.**

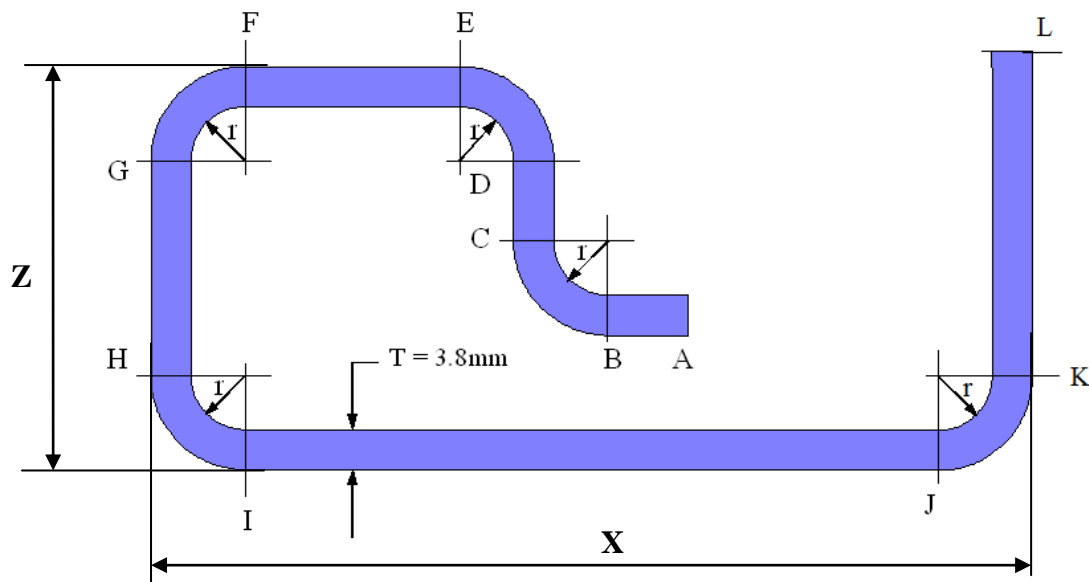
**Please use the answer booklet provided.**

**Question 1**

- a) Calculate the length of the blank required to form the four-bend channel section as shown in Figure 4. Approximate values for the neutral line are given in Table 2. The thickness of the metal,  $T = 3.8\text{mm}$ . Inside radius  $r = 6.5\text{mm}$ . Take Circumference =  $2\pi R$  or  $\pi D$

**Table 2 Neutral line value**

Metal thickness $T$ (mm)	Neutral axis factor for approximate value of neutral line
0.315 to 1.016	1/3 plate thickness plus inside radius
1.219 to 2.346	2/5 plate thickness plus inside radius
3.251 to 7.620	1/2 plate thickness plus inside radius



**Figure 4 A Five-bend Channel**

No.	Parts	Length (mm)
1	AB	48.0
2	CD	52.0
3	EF	120.5
4	GH	132.5
5	IJ	210.5
6	KL	104.0

(18 marks)

b) Find the distance **Z** and **X** respectively.

(12 marks)

c) Assuming that the overall dimension of the four-bend channel section is 322mm x 3.8mm x 215mm. You are to use the plate size 1219mm x 3.8 x 2438mm with the total number of channel sections needed are 15 pieces. Calculate what is the best layout for optimizing the plate?

(10 marks)

### Question 2

a) A company was awarded to fabricate 800 pieces of pipe holder in January 2012 (see figure 5). After analyzing the project, the company requires 20 pieces of plate format 1829mm x 4.5mm x 6096mm.

- I. If the cost in January 2012 was RM680.45 per piece, what would the cost be in June 2012 since there was an increase of 6.5% per piece in price?
- II. What would be the total cost of metal plates the company must bear?

(20 marks)

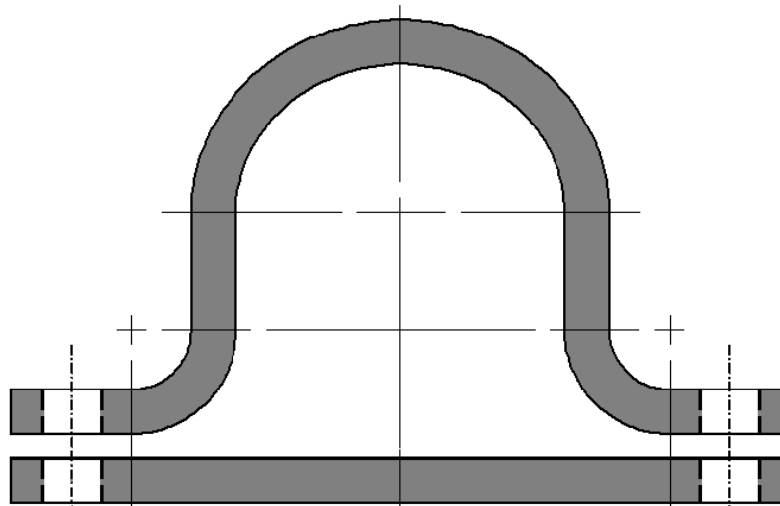


Figure 5 Pipe holder

- b) Bolts and nuts with washers will be used to fasten the pieces together. The company needed to purchase the bolts and nuts with washers. Assuming that one box contains 40 pieces bolt and nut, and one box contains 60 pieces of washers.
- I. How many boxes of bolt and nut are required for the pipe holder installation?
  - II. How many boxes of washer are required?

(20 marks)

**END OF QUESTION**