

SET B

UNIVERSITI KUALA LUMPUR
MALAYSIA FRANCE INSTITUTE

FINAL EXAMINATION
JANUARY 2011 SESSION

SUBJECT CODE : FFD 13202
SUBJECT TITLE : OPTIMIZATION OF MATERIAL
LEVEL : DIPLOMA
DURATION : 12.30pm – 2.30pm
(2 HOURS)
DATE / TIME : 05 MAY 2011

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. 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 **TWO (2)** question only.
6. Answer all questions in English.

THERE ARE 6 PRINTED PAGES OF QUESTIONS, EXCLUDING THIS PAGE.

SECTION A (Total: 50 marks)

INSTRUCTION: Answer ALL questions. Please use the answer booklet provided.

1. Production planning is an important matter to address. Give TWO (2) important reasons. (3 marks)

2. State ONE (1) reason why the factory engineer is concerned about availability of spare parts and components in a plant? (3 marks)

3. There are FOUR (4) symbols used in the production flow process.
 - 3.1 Name ONE (1) important reason.
 - 3.2 Draw and name the four symbols. (6 marks)

4. What is "swinging" in terms of metal movement? (4 marks)

5. What is plastic deformation in bending? (4 marks)

6. Draw and explain to show inner bend radius. (4 marks)

7. In figure 1 below shows the neutral axis of a bend metal at 90°.
 - 7.1 What is the objective of the neutral axis?
 - 7.2 The general distance of a – b is?

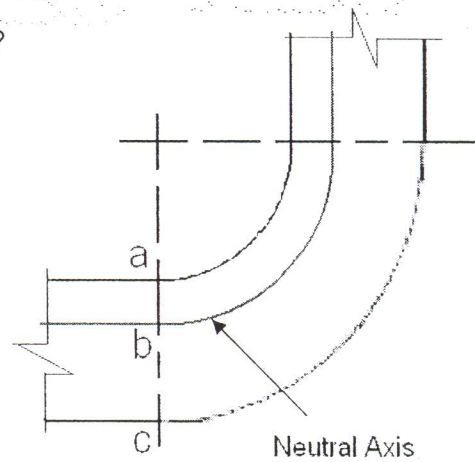


Figure 1 Neutral axis with 90° bend

(6 marks)

8. In figure 2 below, showing an isometric view box. Indicate the corresponding numbers of bending sequence.

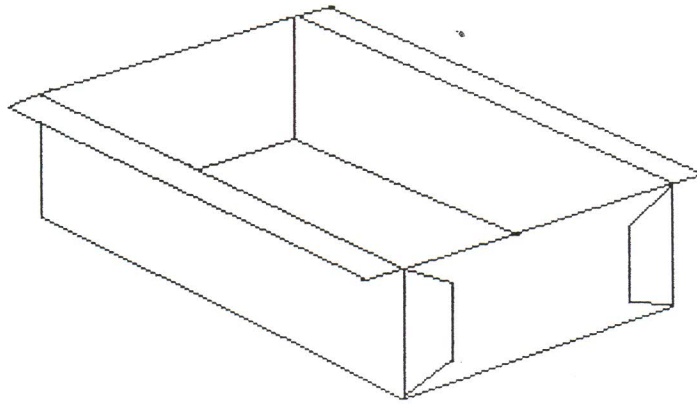


Figure 2 An isometric metal box.

- (4 marks)
9. Why must bending made parallel to the microstructure grain flow having a larger inner bending radius?
- (4 marks)
10. Under the manufacturing steps before the production begins, a trial run is necessary. In your opinion, give TWO (2) reasons why the trial run is necessary.
- (4 marks)
11. What are the factors that influence the route of fabrication?
- (4 marks)
12. Spring back will occur after the bending is released. Greater precaution is necessary when bending thin and hard materials. Draw a schematic of plate spring back.

(4 marks)

SECTION B (Total: 50 marks)

INSTRUCTION: Answer TWO (2) questions 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 3. Approximate values for the neutral line are given in Table 2. The thickness of the metal, $T = 3.8\text{mm}$. Inside radius $r = 6.5\text{mm}$.

Metal thickness T (mm)	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

Table 2 Neutral line value

Take Circumference = $2\pi R$ or πD

No.	Parts	Length (mm)
1	AB	48.0
2	CD	52.0
3	EF	120.5
4	GH	132.5
5	IJ	178.5

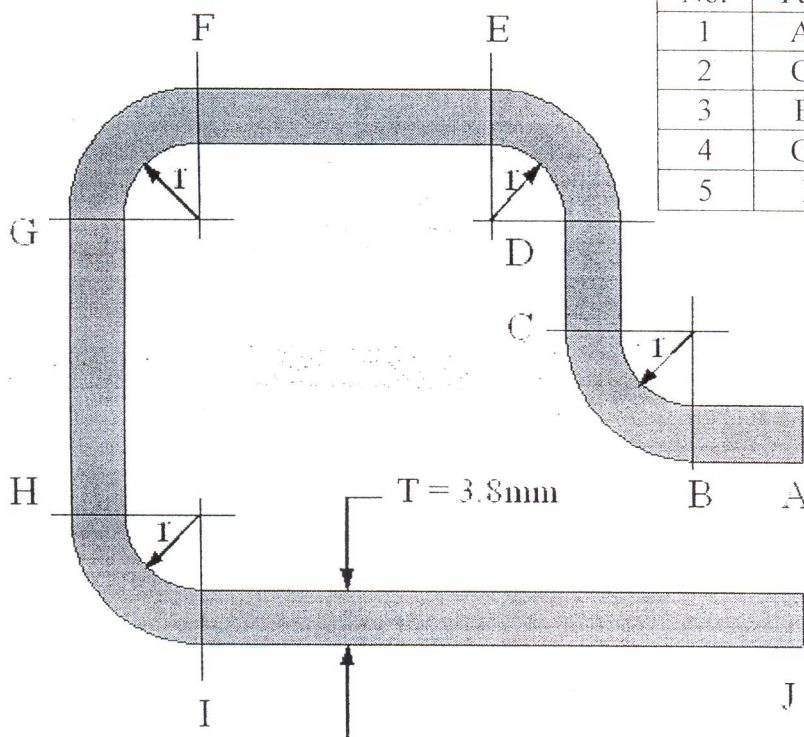


Figure 3 A Four-bend Channel

(15 marks)

- b) Assuming that the overall dimension of the four-bend channel section is 322mm x 3.8 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 450 pieces of pipe holder (see Figure 4). This project requires 12 pieces of plate format 1829mm x 4.0mm x 6096mm. The nesting process shows that the plate format wastage each is 8.5%. What is the total cost of the wastage?

Recently the price of metal had increased and for the plate format above is RM580.45 per piece, what would the plate cost that the company must pay?

The complete fabrication cost was mark-up by 35% of the plate cost.

(20 marks)

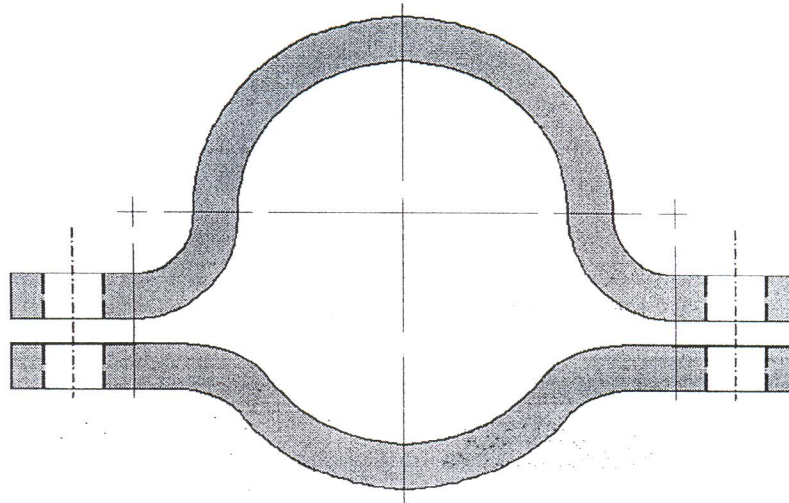


Figure 4 Pipe holder

- b) Bolts and nuts with washers will be used to fasten the pieces together and the price is RM145.00 (approximate). If one box contains 30 pieces bolt and nut. Calculate the total number boxes required for this project?

(5 marks)

Question 3

Base on the steps in manufacturing in Figure 5 below, answer the following question;

3.1 In step 2, why does the management approves the new product?

(5 marks)

3.2 Under the R&D; Product Design Division, how many job tasks that this division must do basically?

(4 marks)

3.3 Which department finalized the design?

(4 marks)

3.4 What does the marketing do on step 11 and step 27?

(4 marks)

3.5 When will the design approved for production?

(3 marks)

3.6 Identify the steps in which all four departments are working together at the same time?

(3 marks)

3.7 What is meant by consumer?

(2 marks)



* Product engineers and production engineers are both manufacturing engineers. The responsibilities are different. In some cases the same person or persons may assume all responsibilities.

Figure 5

Production planning begins before R & D is completed. Production must make certain that the product can be produced. The number of products produced and the amount of time needed to produce them is important to Marketing.