



SET A

**UNIVERSITI KUALA LUMPUR
MALAYSIA FRANCE INSTITUTE**

**FINAL EXAMINATION
JANUARY 2010 SESSION**

SUBJECT CODE : FFD 13202
SUBJECT TITLE : OPTIMIZATION OF MATERIAL
LEVEL : DIPLOMA
TIME / DURATION : 9.00am – 11.00am
2.0 HOURS
DATE : 04 MAY 2010

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
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THERE ARE 11 PRINTED PAGES OF QUESTIONS, EXCLUDING THIS PAGE.

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

1. Production planning is important because?
 - A. To ensure materials are in the right place at the right time
 - B. To ensure materials are in the right time of the planning.
 - C. To ensure materials are in the right work area.
 - D. To ensure materials are in the right order in the store.

(3 marks)

2. The symbols are used in the flow pattern are such;
 - A. DELAY, ON-HOLD, OPERATION, AND STORE.
 - B. OPERATION, INSPECTION, DELAY AND TEMPORARY STORAGE.
 - C. OPERATION, TREATMENT, DELAY AND STORING.
 - D. DELAY, STORE, OPERATION AND ON-HOLD.

(3 marks)

3. From the figure 1 indicate the compression stress and tensional stress of the bend plate.
 - A. M is Compression stress and N is Tensional stress.
 - B. M is Tensional stress and N is Compression stress.

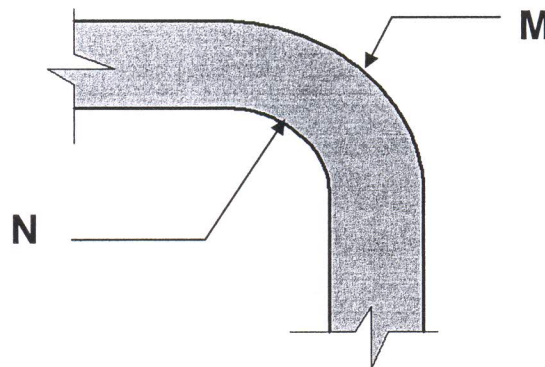


Figure 1 Schematic of a bend plate

(3 marks)

4. Engineers are most interested in parts that must be made in the plant. But the final deciding factor will always be...
- A. the Managing Director's approval.
 - B. the market share improvement.
 - C. the least cost of the required parts.
 - D. the least the company can produce.

(3 marks)

5. "Swinging" in terms of metal movement is
- A. metal is forced to move up by the punch steel at a new position.
 - B. metal is forced and the movement stops.
 - C. metal is forced down or up through space and occupies new position.
 - D. metal is forced down and then up.

(3 marks)

6. What is "bending process"?
- A. It is a process which metal can change the plastic shape.
 - B. It is a process which metal can be transformed into plastic.
 - C. It is a process which metal can be plastically deformed and changing its shape.
 - D. It is a process which metal and plastic can change together.

(3 marks)

7. In terms of design considerations the minimum inner radius for most material is
- A. 10 material thicknesses.
 - B. 1 material thickness.
 - C. 0.01 material thicknesses.
 - D. the minimum inner radius is not considered.

(3 marks)

8. With the given Route Sheet Form below explain what is "Set-up Time"?

Route Sheet for Bracket				
Sequence	Machine	Operation	Setup Time	Operation Time/Unit
1	Shear # 3	Shear to length	5	.030
2	Shear # 3	Shear 45° corners	8	.050
3	Drill press	Drill both holes	15	3.000
4	Brake press	Bend 90°	10	.025

Figure 2 Route Sheet Form

- E. "Set-up time" is the required time to run the job operation.
- F. From beginning of the job until the job is completed.
- G. Setting up the requirement so that no time is lost.
- H. "Set-up time" is the time required to make ready and preparing the machine.

(3 marks)

9. Production planning type must be determined before it starts. The types will be.

- A. Custom, Jobbing-Type or Line production.
- B. Custom, Job-lot, or Line production.
- C. Customary, On-Job Hold, or Line production.
- D. Accustom Job-Hired or Linesman.

(3 marks)

10. From the diagram given below fill in the blanks with the correct definitions.

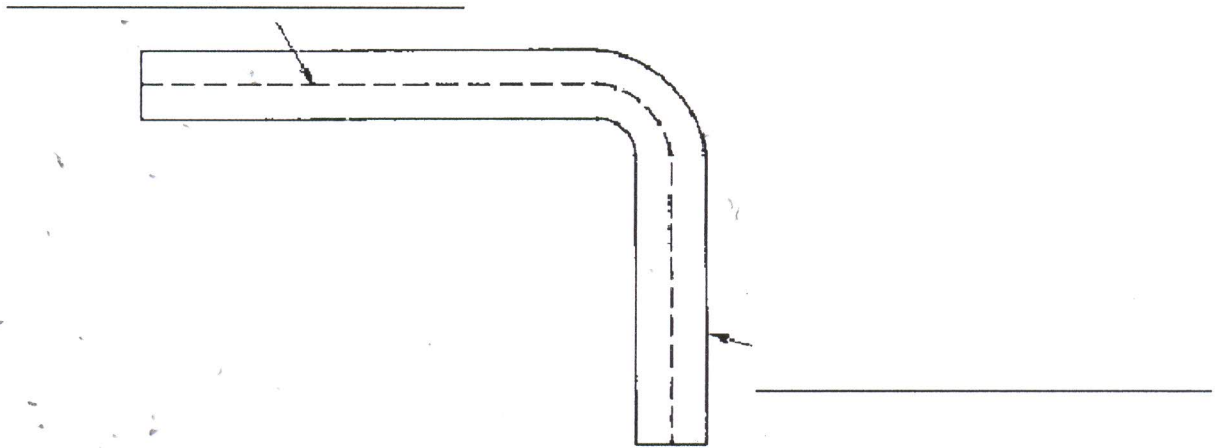


Figure 3 Bending stresses

(4 marks)

11. The precise position of the neutral line inside the bend depends upon a number of factors which include:

- A. The arrangement of the microstructure of the material.
- B. Mechanical properties of the material.
- C. Properties of the material and inside the material.
- D. Properties, thickness of material and inside radius of the bend.

(4 marks)

12. Material nesting generally refers to as the geometrically arrangement on materials before they are cut. Some of the main benefits of material nesting are such:

- E. Saves material, saves scrap and saves the day.
- F. Saves the workers and the manager's job.
- G. Saves material, reduces scrap and maximizing productivity.
- H. Saves only material.

(4 marks)

13. Bending is a process by which metal can be deformed by plastically deforming the material and changing its shape. From the given diagram how would the microstructure be when bend at 90° .

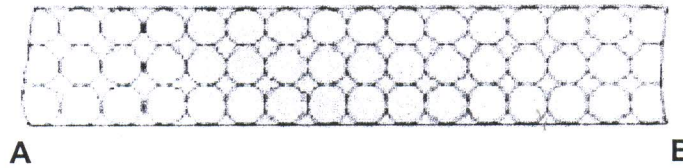


Figure 4 Microstructure of metal plate before bend

(6 marks)

14. Planning is necessary function within any organisation that produces something. For example, in the manufacturing environment planning is often complex. State THREE (3) points of the complexity.

(6 marks)

15. The plate format of size 2.5mm x 1219mm x 2438mm was used for a project. If a piece of the plate format cost was RM34.70, what will the new cost after it was raised by 23%?

(6 marks)

16. In metal fabrication there are three basic processes which are

(3 marks)

SECTION B (Total: 40 marks)

INSTRUCTION: Answer TWO (2) questions only.

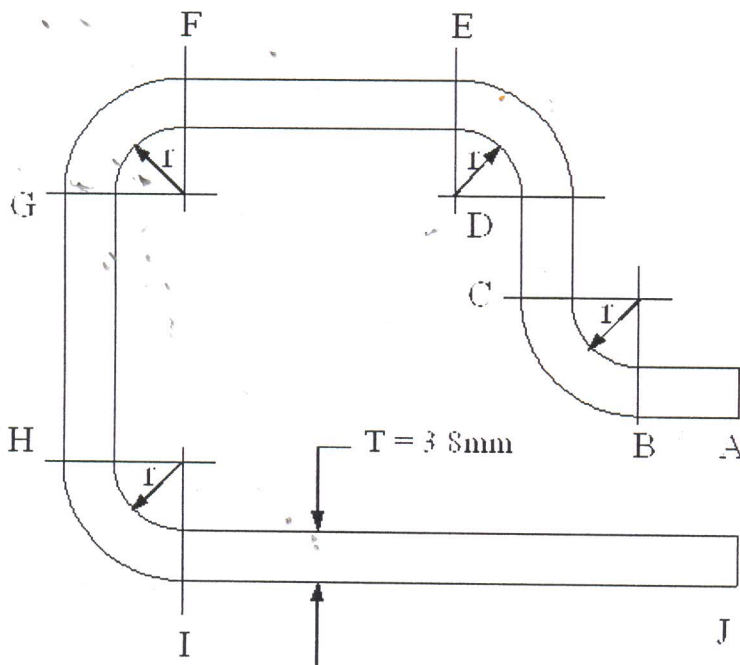
Please use the answer booklet provided.

Question 1

Calculate the total length of the blank A – J, 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 $r = 6.5\text{mm}$.

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 1 Metal thickness with neutral line values



Take
Circumference = $2\pi R$ or πD

No.	Parts	Length (mm)
1	AB	30.5
2	CD	34.0
3	EF	65.0
4	GH	46.5
5	IJ	70.5

Figure 4 Four-bend Channel

(20 marks)

Question 2

If the overall dimension of the four-bend channel section is, length 322mm, breadth 215mm and thickness 3.8mm. You are to use the plate format size 1219mm x 2438mm. The total numbers of channel sections needed are 25 pieces. Calculate the following:

b.1) choose one best layout for optimizing the plate format?

(10 marks)

b.2) determine the total percentage usage.

(10 marks)

Question 3

Calculate the length of the blank required to roll the cylinder as shown in the figure 5 below. The position of the neutral line is 0.5T.

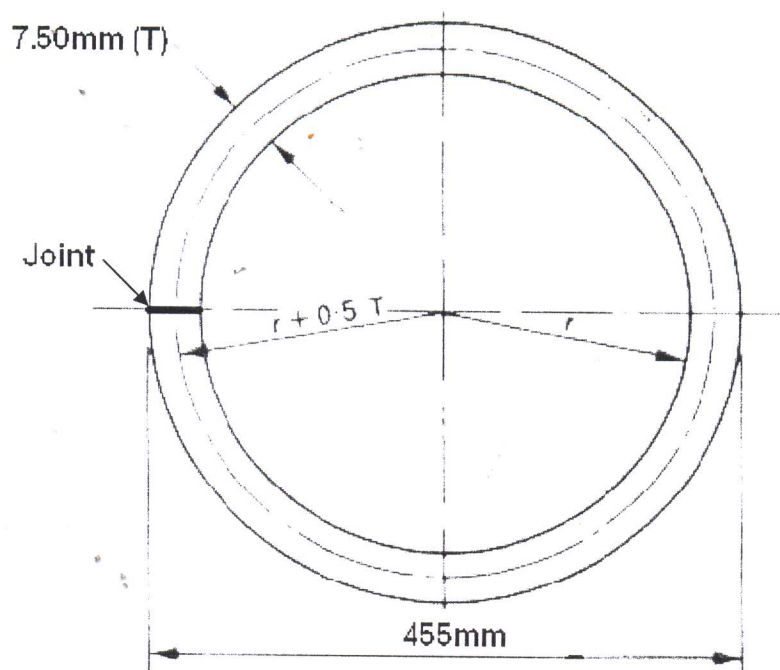


Figure 5 Schematic of a roll cylinder.

(20 marks)

Question 4

Referring to the **Steps in Manufacturing** in Figure 6, determine the followings:

(a) Which department finalized the design?

(3 marks)

(b) What does the marketing do on step 11?

(4 marks)

(c) When will the design approved for production?

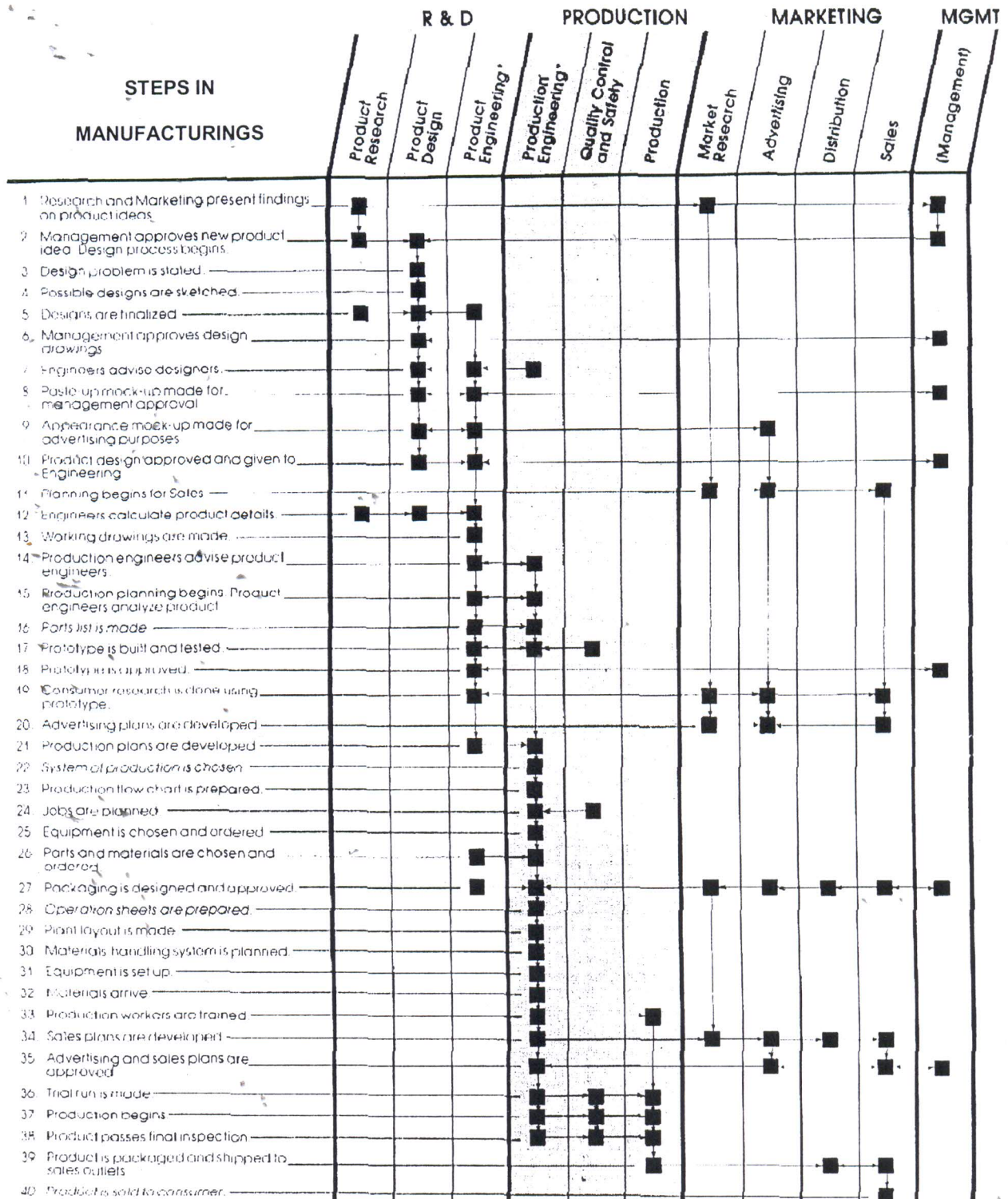
(4 marks)

(d) Step 36, indicated that a trial run was taken into consideration by the production department. In your opinion why it was considered. Give a reason.

(5 marks)

(d) Identify the steps in which all four departments are working together at the same time?

(4 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.

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.

Figure 6 Steps in manufacturing

END OF QUESTION