



UNIVERSITY COLLEGE TATI (UC TATI)

FINAL EXAMINATION QUESTION BOOKLET

COURSE CODE	: DTD 2013
COURSE	: PRESS TOOL DESIGN
SEMESTER/SESSION	: 1-2022/2023
DURATION	: 3 HOURS

Instructions:

1. This booklet contains 5 questions. Answer **ALL** questions.
2. All answers should be written in answer booklet.
3. Write legibly and draw sketches wherever required.
4. If in doubt, raise your hands and ask the invigilator.

**DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO**

**THIS BOOKLET CONTAINS 5 PRINTED PAGES INCLUDING COVER PAGE**

PRESS TOOL DESIGN (DTD 2013)

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**QUESTION 1**

- a) **Classify** between cut-off and parting-off process. (3 marks)
- b) **Sketch** the guide plate tool and name all the plates. (3 marks)
- c) **Distinguish** between piercing and blanking process for a particular press tool. (3 marks)

**QUESTION 2**

- a) **Explain** the term "Theory of Shearing" in stamping process. (3 marks)
- b) **Identify** the critical stages of shearing for cutting the sheet of and show the graph of these critical stages. (3 marks)
- c) **Explain** one method can be used to reduce cutting force. **Sketch** the diagram to support your answer. (3 marks)

**QUESTION 3**

- a) **State** the formula how to calculate the value of cutting clearance and sketch a simple diagram to show the location of cutting clearance. (4 marks)
- b) **Explain** what the land and clearance angle are. **Sketch** the diagram to support your answer. (8 marks)
- c) **Illustrate** how to remove the blank in case of straight wall without angular clearance is used? Sketch the diagram to support your answer. (8 marks)
- d) **Explain** what is the difference between wide run and narrow run. Sketch the diagram to support your answer. (8 marks)

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**QUESTION 4**

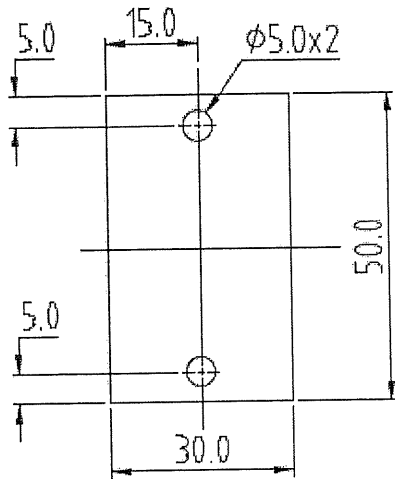
- a) **Classify** the punches used in the press tool. Sketch these punches and what are the operation can be done through these punches. (8 marks)
- b) **Explain** fixed stripper. Sketch the diagram to show this type of stripper. Give two advantages using this stripper (8 marks)
- c) **Outline** FIVE (5) factors which are influenced the design of a die block. (5 marks)
- d) **Explain** the differences between solid die and split die. Sketch the diagram to support your answer. (6 marks)

**QUESTION 5**

Refer to figure PT1 to answer this question.

- a) **Explain** the information should be shown on the strip layout for a certain tooling. (6 marks)
- b) **Sketch** the strip layout for the component and **state** clearly the process. Use direct piloting according to part design. (6 marks)
- c) **Calculate** the following for designing the tool as shown in Figure PT1.
- i. Economic factor (use scrap bridge 2.0 mm) (3 marks)
  - ii. Total cutting force to shear the component (9 marks)
  - iii. Machine tonnage (3 marks)

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Specifications:-

1. Material : Steel 0.6%
2. Thickness: 1 mm
3. Tmax: 40 kg/mm<sup>2</sup>

Figure PT1 Bracket

-----End of question-----

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Criteria	Marks
All question answered will be marked according to the answer schema	/100

## PRESS TOOL DESIGN (DTD 2013)

**APPENDIX 1****Side Scrap and Scrap bridge**

Sheet Thickness (mm)	Strip Width (mm)			
	Up to 10	10 - 50	50 - 100	100 - 150
0.5	1.5	2.0	3.0	3.5
1.0	1.0	1.75	2.0	2.5
1.5	1.5	2.0	2.5	3.0
2.0	2.0	2.5	3.0	3.5
3.0	2.0	3.5	4.0	4.5

**Economic Factor**

$$E.F = \frac{\text{Area of component} \times \text{No. of Row} \times 100}{\text{Width of Strip} \times \text{pitch}}$$

**Cutting/Shearing Force, F**

$$\text{Cutting/Shearing Force, } F = l \times s \times \tau_{\max}$$

where,

- $l$  = length of periphery to be cut in mm
- $s$  = stock thickness in mm
- $\tau_{\max}$  = shear strength in  $\text{N/mm}^2$

**Cutting Clearance for sheet thickness up to 3 mm**

$$\text{Clearance (for one side)} = C \times s \times \sqrt{\left(\frac{\tau_{\max}}{10}\right)}$$

**Cutting Clearance for sheet thickness above 3 mm**

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$$\text{Clearance (for one side)} = (1.5 \times C \times s - 0.015) \times \sqrt{\left(\frac{\tau_{\max}}{10}\right)}$$

where,  $C$  = a constant = 0.01  
 $s$  = stock thickness in mm  
 $\tau_{\max}$  = shear strength in N/mm<sup>2</sup>