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Family Name					
Given Name/s					
Student Number					
Teaching Period	Semester 1, 2019				

ENG235 – Manufacturing End Semester Exam S119	DURATION	
	Reading Time:	10 minutes
	Writing Time:	180 minutes
INSTRUCTIONS TO CANDIDATES		
<p>This exam is in two parts. Candidates need to answer ALL questions in both parts.</p>		
EXAM CONDITIONS		
<p><u>You may begin writing from the commencement of the examination session.</u> The reading time indicated above is provided as a guide only.</p>		
This is a CLOSED BOOK examination		
No calculators are permitted		
No handwritten notes are permitted		
No dictionaries are permitted		
ADDITIONAL AUTHORISED MATERIALS	EXAMINATION MATERIALS TO BE SUPPLIED	
No additional printed material is permitted	2 x 20 Page Book 1 x Scrap Paper	

**THIS EXAMINATION IS PRINTED
DOUBLE-SIDED.**

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LEFT BLANK.**

Section 1– Short Answer (84%)

Answer all 12 of the following 12 questions. Each question is worth 7 marks.

Question 1

Briefly explain how bonding is achieved in solid state welding and discuss the advantages over other joining processes. Use specific process examples in your answer.

Question 2

List three reasons why the non-traditional material removal processes are important giving some examples where they might be used?

Question 3

Explain how the ultrasonic machining process works?

Question 4

List the 5 points of the safety hierarchy and discuss and provide an example for each point.

Question 5

Explain how rapid prototyped parts can be used in conjunction with other manufacturing processes to manufacture low volume parts, for example for design verification.

Question 6

Surface roughness is a measurable aspect of surface texture. What does surface roughness mean? What are two common ways of calculating surface roughness? Provide a list of 4 manufacturing processes with an achievable surface finish for each, in Ra (μm).

Question 7

Should products be designed and built for a certain expected life? Explain your answer with examples.

Question 8

Discuss the advantages of case hardening and describe two methods of case hardening.

Question 9

How would you determine whether a particular component had been forged or cast . Explain in your answer factors which influence the choice between these two manufacturing processes.

Question 10

Explain the difference between rolling and roll forming. Give examples of each to illustrate your understanding.

Question 11

Give five (5) examples of manufacturing processes involving material removal and give an example of each; you may give your answer in list form.

Question 12

Describe your understanding of the term GMAW . Include in your examples of where this process is applied and also describe its limitations.

Section 2 – Design and analysis (16%)

Answer both questions.

Question 13

Discuss possible manufacturing techniques for the part shown in figure 1 for the following production volumes.

- (a) 5 parts for design verification testing
- (b) 50 parts for an initial sample production build
- (c) 200,000 parts per annum ongoing production

You should also suggest minor design modifications to improve the manufacturability for each process selected. **All dimensions shown in centimetres (cm).** Preferred material is Aluminium.

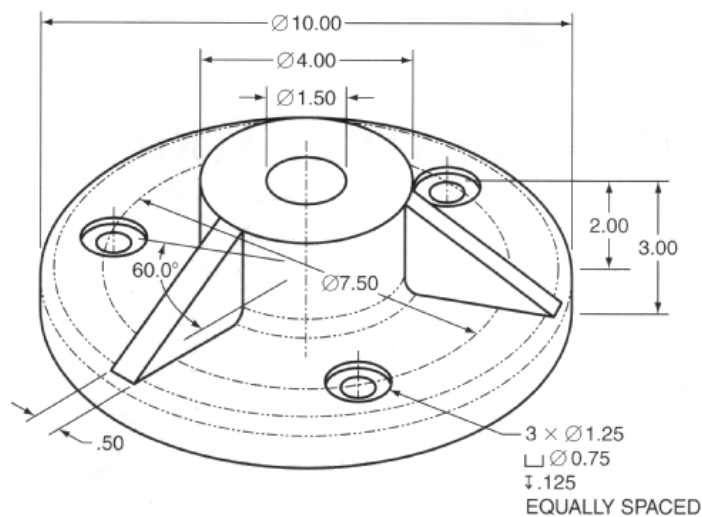


Figure 1.

Question 14

- (a) Several methods can be used to manufacture the steel part shown in figure 2. List three methods and describe the advantages of each process. You should consider the equipment needed, the amount of scrap produced and the strength of the complete part. All dimensions shown in millimetres (mm).
- (b) What process would be suitable for an annual production quantity of 125,000 parts and why?

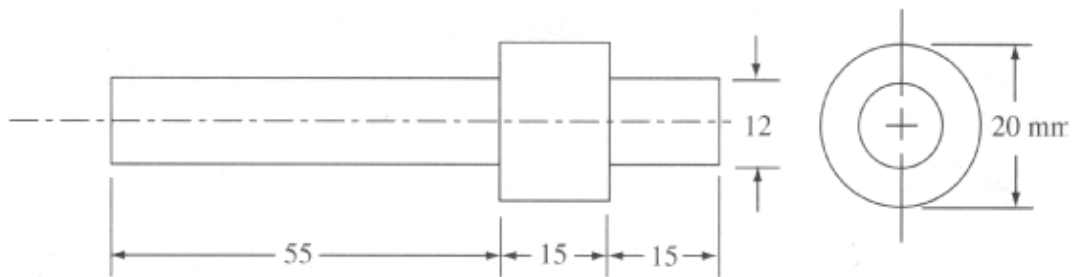


Figure 2