

UNIVERSITY OF PORTSMOUTH

FACULTY OF TECHNOLOGY

Department of Electronic and Computer Engineering

M528 – Electronics Manufacturing

U09167B

Date: May 2009

Time: 90 minutes

INSTRUCTIONS

Write your student ID number clearly on page 2.

Write your answers to all 5 questions in this examination paper.

For each question, indicate your answer to **part A** by placing an “X” in the box next to the appropriate choices on the answer sheet. For each question, write your answer to **part B** by writing in the appropriate space in this examination paper.

Handwritten notes are permitted with this examination.

Calculators permitted are:

Casio FX 85 series

Casio FX 83 series

Examiner:

Professor Ron Pethig, Mr Chi Nguyen

Student ID Number

QUESTION 1

a) Place an "X" in the box next to the **3 most important dependencies** for factories that manufacture electronic products. **[6 Marks]**

<input type="checkbox"/>	access to transportation	<input type="checkbox"/>	coordination of suppliers
<input type="checkbox"/>	access to energy	<input type="checkbox"/>	coordination of resources
<input type="checkbox"/>	access to information	<input type="checkbox"/>	coordination of prices
<input type="checkbox"/>	access to markets	<input type="checkbox"/>	coordination of buyers
<input type="checkbox"/>	access to designs	<input type="checkbox"/>	coordination of designers

b) **Provide one specific example of each dependency selected in part (a).** **[9 Marks]**
Explain which dependency was **most important during the Industrial Revolution** and which dependency is **most important today**. **[5 Marks]**

QUESTION 2

a) Place an "X" in the box next to **3 semiconductor fabrication processes**.

[6 Marks]

<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>

fusion
mixing
lithography
plating
doping

<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>

heating
etching
spray
drilling
exposure

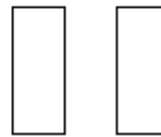
b) Use the fabrication processes selected in part (a) to explain the steps for developing the feature displayed below.

[14 Marks]

Side view



Top view



QUESTION 3

a) Place an "X" in the box next to **3 strategic goals** that are supported by supply chain design at electronics businesses. **[6 Marks]**

<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>

inventory
size
finance
buffers
quality

<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>

flexibility
quantity
risks
costs
resources

b) For each goal selected in part (a), provide a supply chain principle and a specific example of a company using the principle to achieve that goal. **[14 Marks]**

QUESTION 4

a) Place an "X" in the box next to **3 terms** that are most directly related to the classic inventory model, **Economic order quantity (EOQ)**. **[6 Marks]**

<input type="checkbox"/>	average order frequency	<input type="checkbox"/>	unit holding cost
<input type="checkbox"/>	average order time	<input type="checkbox"/>	unit storage time
<input type="checkbox"/>	average sale price	<input type="checkbox"/>	unit sale price
<input type="checkbox"/>	maximum unit holding cost	<input type="checkbox"/>	total annual cost of inventory
<input type="checkbox"/>	maximum unit sale price	<input type="checkbox"/>	total annual profit margin

b) **Calculate the optimal number of orders per year** using the values provided below.

Indicate the values for each term selected in part (a). **[14 Marks]**

Annual demand is 3,400

Unit product cost is £80

Cost of each order is £15

Annual cost of storage is 20% of product cost

QUESTION 5

a) Place an "X" in the box next to **3 design principles that affect product quality**. [6 Marks]

<input type="checkbox"/>	fitness for requirements	<input type="checkbox"/>	fitness for market
<input type="checkbox"/>	fitness for environment	<input type="checkbox"/>	fitness for purpose
<input type="checkbox"/>	fitness for standards	<input type="checkbox"/>	minimum resources
<input type="checkbox"/>	minimum re-use	<input type="checkbox"/>	minimum prototyping
<input type="checkbox"/>	minimum tolerance	<input type="checkbox"/>	minimum components

b) For each term selected in part (a), provide a **product example with high quality** and a **product example with low quality** when using that design principle to compare product quality. [14 Marks]