

MET3  
MANUFACTURING ENGINEERING TRIPOS PART IIB

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Thursday 21 April 2016

9 to 12

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**PAPER 2**

*Answer not more than **four** questions.*

*Answer each question in a separate booklet.*

*All questions carry the same number of marks.*

*The **approximate** percentage of marks allocated to each part of a question is indicated in the right margin.*

*Write your candidate number **not** your name on the cover sheet.*

**STATIONERY REQUIREMENTS**

8 page answer booklet x 4

Rough work pad

**SPECIAL REQUIREMENTS TO BE SUPPLIED FOR THIS EXAM**

CUED approved calculator allowed

Engineering Data Book

10 minutes reading time is allowed for this paper.

**You may not start to read the questions printed on the subsequent pages of this question paper until instructed to do so.**

1 (a) List four *megatrends* and explain how they are currently affecting global manufacturing. [25%]

(b) “*Engineering’s greatest challenge is keeping our manufacturing systems capable of competing in the global marketplace*” (Dr. Charles M. Vest). Discuss some of the different ways in which national governments are attempting to respond to this challenge. [75%]

2 (a) Describe the differences between leadership and management [10%]

(b) Discuss issues of leadership and management you would expect to observe within each of the following contexts:

(i) a specialist technology consultancy firm with 10 employees, founded by two friends, with ownership shared amongst all employees, that is facing a sudden increase in demand for its services;

(ii) a multinational corporation with 100,000 employees that is seeking to dramatically reduce its carbon footprint while increasing shareholder value;

(iii) a software start-up with 3 employees (all co-founders) that is trying to raise investment to expand its team in order to develop and ship its first product.

[90%]

3 (a) The technology management process framework (ISAEP) combines five key processes. Provide one example for each of the five processes that explains the importance of patents or patent data for the related technology management decisions. [30%]

(b) Tesla Motors is a US-based automotive company founded in 2003 that develops and sells electric vehicles, as well as charging infrastructure. In 2014, the company had grown to revenues of approximately \$3.2 billion.

The following statement reflects Tesla's original patent strategy:

*"At Tesla, ... we felt compelled to create patents out of concern that the big car companies would copy our technology and then use their massive manufacturing, sales and marketing power to overwhelm Tesla."*

In June 2014, Tesla announced a change to its strategic approach to patents. The following statement reflects the company's new approach:

*"There was a wall of Tesla patents in the lobby of our Palo Alto headquarters. They have been removed, in the spirit of the open source movement, for the advancement of electric vehicle technology... Tesla will not initiate patent lawsuits against anyone who, in good faith, wants to use our technology."*

(i) What does the new strategy say about Tesla's future approach to patents? [40%]

(ii) Discuss possible motives for Tesla's patent strategy change and what the company would want to achieve. [30%]

4      Furnitura, a small-sized maker of long-lasting furniture, has been increasingly concerned with how to reduce the environmental impacts arising from company operations. These operations include all the manufacturing processes, logistics, the use of furniture by their customers and eventually its disposal. The company is also considering avenues for growing and re-orienting the business from primarily business-to-consumer towards more business-to-business. Furnitura is keen to explore technical and business model innovations to implement return and collection systems, either in partnership or fully owned and controlled, that take into account repair, reuse, exchange, leasing and remanufacture of furniture.

In this context:

- (a)    Explain the concept of the *Value Mapping Tool*. [30%]
  
- (b)    Use the Value Mapping Tool to identify failed exchanges and suggest new value opportunities for Furnitura. [40%]
  
- (c)    Propose a sustainable business model for the company which puts the emphasis on creating, delivering and capturing sustainable value. [30%]

5 In the context of a manufacturing business:

(a) (i) Explain what is meant by *product management*.

(ii) Describe the main links between the activities of product management and the marketing function of the business.

[40%]

(b) Compare and contrast the role of a Product Manager in *two* of the following sectors:

(i) Fast moving consumer goods;

(ii) Domestic appliances; and

(iii) Scientific instruments.

[30%]

(c) Discuss, giving examples, how servitisation affects the product life cycle of complex engineered products.

[30%]

Version AN/3

6 A large UK-based Fast Moving Consumer Goods (FMCG) manufacturing firm is planning the launch of a new product range in Europe that it believes will be disruptive to the market. This product requires the firm to utilise novel manufacturing techniques and social media marketing capabilities that it has not used before. To reduce the risks of this product launch, the firm is seeking to collaborate with: (i) a small social media consultancy based in London and (ii) a medium-sized specialist contract manufacturing firm based in Eastern Europe.

Discuss the people management issues that could potentially arise throughout the process of launching this new product. [100%]

**END OF PAPER**