

國立清華大學命題紙

98 學年度工業工程與工程管理學系 工程碩士在職專班 組碩士班入學考試

科目 工業工程與管理實務 科目代碼 0302 共 5 頁第 1 頁 *請在【答案卷卡】內作答

注意：所有題目為簡答題，並以中文作答。

(1)

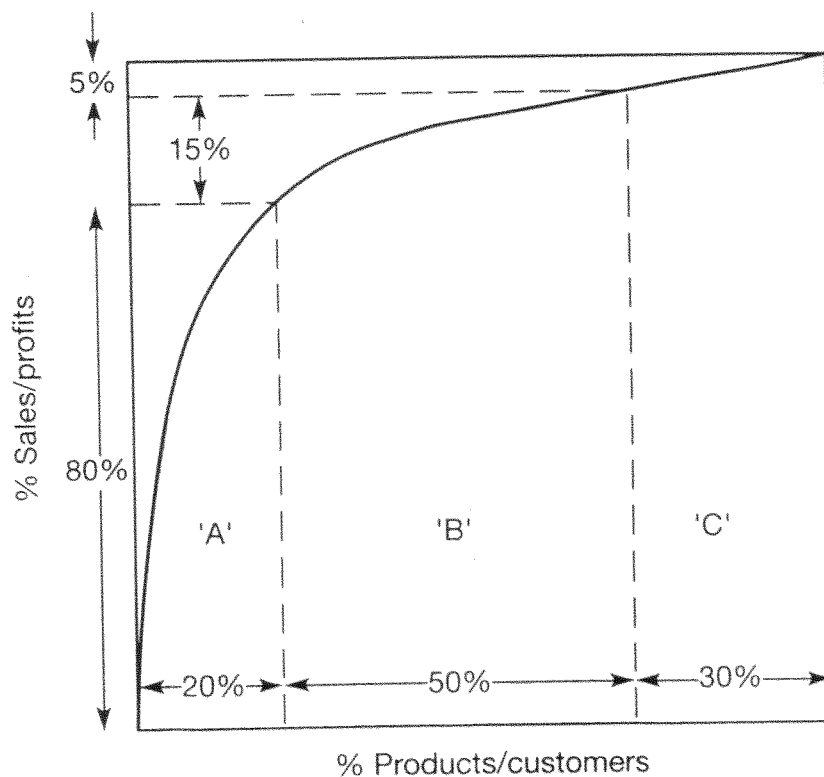
(1A). (10%) 試簡述工業工程中的各種方法與工廠管理的關係。

(1B). (15%) 再將(1A) 的作答內容以一張圖來表示。

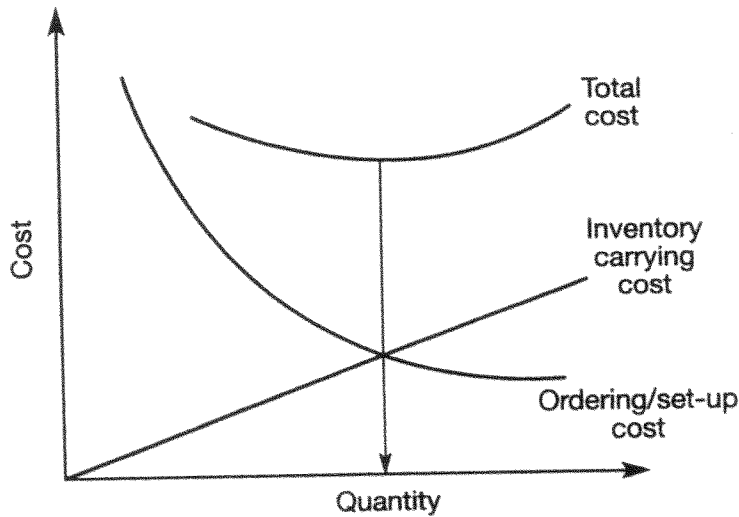
(2) (25%) 試列出目前台灣製造業所面臨的三個主要問題，並提出你的建議對策。

(3) (10%) What is return on investment (ROI)? What is its formula?

(4) (10%) Please explain the following figure.



(5) (10%) Please explain the following figure.



(6) (20%)

ZARA

Zara is one of world's most successful and dynamic apparel businesses. It is the flagship of Inditex, a vertically integrated retail and manufacturing group based in Galicia in north-west Spain. The first Zara store opened in the city of La Coruña in 1975, the brain child of Amancio Ortega, owner of a small clothing factory. Ortega was looking for a better way to run his business, one which would avoid the inefficiency of making clothes that might not sell. In the intervening decades more

than 600 Zara stores – most owned directly by the company – have opened throughout Spain and 43 other countries worldwide.

Zara produces and sells highly fashionable apparel for men, women and children, but its core customers are fashion conscious 18–35-year-old women. It offers them the very latest design trends at affordable mass-market prices. Physical product quality is good enough to see out the season, but not necessarily longer. By then the same customers will have moved onto the next ‘hot’ look. The customers are loyal, frequent shoppers who visit a Zara store on average 17 times per year.¹ To retain their interest, stock is constantly varied and updated. New deliveries arrive on a twice weekly basis. Few products are available in store for more than a month, adding a sense of exclusivity and urgency to buy. The stores themselves are sited in fashionable prestige locations, their interiors are smart, fresh, modern and regularly refurbished to retain their contemporary appeal.

Zara is a design-sensitive, but not designer-led operation. The company does not seek to set new trends itself, just to be a very fast and flexible follower. It employs a large cadre of design staff who interpret the latest in international fashion trends, often identified by ‘cool hunters’ who glean inspiration through visits to fashion shows, competitors’ stores, university campuses, pubs, cafes and clubs, plus any other venues or events deemed to be relevant to the lifestyles of the target customers. The team’s understanding of directional fashion trends is further guided by regular inflows of sales data and other information from all of the company’s stores and sites around the world.

Zara’s positioning puts it in direct competition with some of the best known operators in the apparel industry, including US-based The Limited and Gap, as well as the highly successful vertically integrated European retailers, Mango, Mexx and the Italian giant Benetton. All are exponents of quick response logistics. However, Zara’s rapid growth and ongoing success in such a fiercely competitive environment is testament to its ability to implement an operating strategy – based on the dual objectives of minimizing stock and responding quickly to market needs² – even more effectively than its internationally acclaimed rivals.

The process of supplying goods to the stores begins with the cross-functional teams – comprising fashion, commercial and retail specialists –

working within Zara's Design Department at the company's headquarters in La Coruña. Fashion specialists within the Design Department are responsible for the initial designs, fabric selection and choice of prints and colours. It is then up to the team's commercial management specialists to ascertain the likely commercial viability of the items proposed. If the design is accepted – two-thirds are not – the commercial specialists proceed to negotiate with suppliers, agree purchase prices, analyze costs and margins, and fix a standard cross-currency price position for the garment. Store prices reflect the price position agreed for goods sold in Spain, plus the cost of distribution. Hence a shopper in the UK will pay 50 per cent more for the same item as a shopper in Spain. For customers in the US and Japan the price is more than double.

The size of the production run – i.e. the number of garments required – and launch dates (the latter vary between countries in accordance with custom and climate) are also determined at this point.

Approximately 20 per cent of merchandise – items with the broadest and least transient appeal – is imported as finished goods from low-cost manufacturing centres, mostly in Asia. The rest is produced by quick response. Around 50 per cent of all Zara's merchandise is manufactured in-house using the company's own highly automated factories and a network of smaller contractors clustered around La Coruña. The remainder is produced elsewhere in Spain or in other European countries.

Raw materials are procured through the company's buying offices in Europe and Asia, with material coming in from Mauritius, New Zealand, Australia, Morocco, China, Korea, India, Turkey, Italy and Germany. The global sourcing policy, using a broad supplier base, provides the widest possible selection of fashion fabrics, while reducing the risk of dependence on any source or supplier. Approximately half of the material is purchased in 'gray', to be dyed or printed and finished by one of Inditex's other Galician subsidiaries. The turnaround time for this process is only one week, illustrating how high production costs in Europe are offset by the benefits of proximity and control.

Zara's manufacturing systems are similar in many ways to those developed and employed so successfully by Benetton in northern Italy, but refined using ideas developed in conjunction with Toyota. Only those operations which enhance cost-efficiency through economies of

scale are conducted in-house (such as dyeing, cutting, labelling and packaging). All other manufacturing activities, including the labour-intensive finishing stages, are completed by networks of hundreds of small subcontractors, each specializing in one particular part of the production process or garment type. These subcontractors work exclusively for Zara's parent, Inditex SA. In return they receive the necessary technological, financial and logistical support required to achieve stringent time and quality targets. Inventory costs are kept to a minimum because Zara pays only for the completed garments.

Finished goods are forwarded to the company's two distribution centres in La Coruña and Zaragoza where they are labelled, price-tagged (all items carry international price tags showing the price in relevant currencies) and packed. From there they are carried by third-party contractors by road and/or air to their penultimate destinations. Road is used for journeys of 24 hours or less, while airfreight is used for longer distances. All deliveries are completed within 48 hours.

In an industry where lead times of many months are common, Zara has reduced its lead time for more than half of the garments it sells to a level unmatched by any of its European or North American competitors. The whole design, production and delivery cycle takes only four to five weeks. Design modifications and restocking of existing products, if required, is completed within 14 days. The system is flexible enough to cope with sudden changes in demand and shop-by-shop stock allocations are calculated centrally, rather than in-store, because production is always kept at a level slightly below expected sales to keep stock moving. True to its original objectives, the company has consciously opted for undersupply, viewing it as a lesser evil than holding slow-moving or obsolete stock.

- (6A) (5%) What are the objectives of Zara's operating strategy that makes it successful in fiercely competitive environment?
- (6B) (5%) How does Zara determine the trade-off between the turnaround time and production cost in sourcing material?
- (6C) (10%) Describe a few key management strategies that make Zara a very successful apparel company.