

SUMMER EXAMINATIONS, 1999

PRODUCTION SYSTEMS 1 (IE210)

Second year Industrial Engineering and Information Systems
Second year Mechanical Engineering
Second year Electronic Engineering

Dr. E.J. Wright
Prof. M.E.J. O'Kelly
Mr. Pat Donnellan

Time allowed: 3 hours

Cambridge Elementary Statistical tables and Graph paper available. [Control chart formulae are not required]

Attempt: Question 6, which is Compulsory, and Any other 3 questions.

- Q1** a) Describe the concept of Economic Order Quantity (EOQ) and derive the basic EOQ formula. (6 Marks)
- c) Distinguish between dependent demand and independent demand. (4 Marks)
- d) Sunshine motors is a large car dealership. Its most popular car is a 4-wheel drive, sports utility vehicle. The new year models are available and the dealer must determine how many of these vehicles to order from the car manufacturer. Demand is estimated at 160 vehicles per year. The annual carrying cost is £650 per car and the ordering cost is £700 per order.
- i) Determine the optimal order size, (4 Marks)
 - ii) The total annual inventory cost (3 Marks)
 - iii) The order cycle time (time between orders) (3 Marks)
- Q2** a) What are the main elements of ISO14001, the Environmental Management Standard. (10 Marks)
- b) According to the Safety, Health and Welfare at Work Act, 1989, what are the main responsibilities of an **Employee** in ensuring their own safety health and welfare at work? (6 Marks)
- c) What is a Prohibition Notice, issued by the HSA? (4 marks)
- Q3** a) Describe the general objectives and the approach you would take in laying out a manufacturing facility. (6 marks)
- b) Describe a product and a process type of layout and explain when each would be used in manufacturing. (Sketch each layout type) (8 marks)
- c) Describe and sketch a Flexible Manufacturing System (FMS). (6 marks)
- Q4** a) What are the main elements of the Liability for Defective Products Act, 1992? (8 marks)
- b) What are the main elements of a product liability prevention programme? (6 marks)
- b) What are the main benefits of the ISO9001 quality system? (6 marks)
- Q5** a) Explain each of the following terms in the context of acceptance sampling:
- AOQ (Average Outgoing Quality)
 - LTPD (Lot Tolerance Percentage Defective)
 - AQL (Acceptable Quality Level)
 - Consumer's Risk (β)
 - Producer's Risk (α)
 - Type 1 Error
 - Type 11 Error
 - AOQL (Average Outgoing Quality Limit)
 - Operating Characteristic Curve (OC Curve)
 - Random Sampling
- (10 marks)
- b) Determine 4 points on the B operating characteristic curve of the following single sampling plan
(n, c) = (10, 1) with lots of size 1000 = N
- [Hint: Use Binomial Distribution] (10 marks)