

**9210-101**

**Level 6 Graduate Diploma in Engineering  
Management for engineers**

**Sample Paper**

**You should have the  
following for this examination**

- one answer book
- drawing instruments
- non-programmable calculator

**A reference booklet is  
attached**

- Standard Normal Distribution  
Table

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**General instructions**

- This examination paper is of **three hours** duration.
- This examination paper contains **eight** questions.
- Answer **any five** questions.
- All questions carry equal marks. The maximum marks for each section within a question are given against that section.
- An electronic non-programmable calculator may be used, but you **must** show clearly the steps prior to obtaining final numerical values.
- Drawings should be clear, in good proportion and in pencil. Do not use red ink.

- 1 Group Dynamics concern how groups are formed, what their structure is, which processes are followed in their functioning, development and survival, and interactions and forces operating between groups.
- What are the main differences between formal and informal groups? (4 marks)
  - Why are informal groups formed?  
Explain psychological needs and aspirations that are intended to be satisfied by being in informal groups. (6 marks)
  - Explain the general characteristics of informal groups. (4 marks)
  - Discuss possible strengths and weaknesses of informal groups in organisations. (6 marks)
- 2 'It is often necessary to take decisions quickly and these decisions can often fail because the best alternatives are not clear at the outset, or key factors are not considered as part of the process. To avoid overlooking of factors that are very important in the decisions, a logical and ordered process is practiced by organizations.'
- State and briefly describe the steps in a systematic decision making process. (6 marks)
  - Explain briefly one of the following techniques used to choose the best cause of action or decision.  
Pareto Analysis  
Decision Tree Analysis (8 marks)
  - Briefly explain the break-even analysis used to support financial decision-making. (6 marks)
- 3 A certain project consists of activities as given in the table below. Time durations of each activity and the proceeding activities are also give in the table.

Activity	Duration (weeks)	Proceeding Activities
A	5	–
B	8	–
C	4	B
D	7	A, C
E	7	B
F	6	D, E
G	10	D, E
H	8	D, E
I	4	H
J	5	F
K	8	G, I, J

- Draw the network diagram and state all earliest and latest event times. (6 marks)
  - Find the total slack in respect of each activity, hence find the critical activities. (4 marks)
- It has become necessary to carry out another task of 20 weeks duration (Activity B2) after the completion of the activity B, and Activity B2 is to be completed before the commencement of Activity I.
  - Re-draw the network diagram and find the duration of the project.
  - Determine the critical activities with this change. (6 marks)
- If the activity G in the original list of activities is expected to take 14 weeks, determine the project duration. (4 marks)

- 4 a) What are the assumptions made in developing an Economic Quantity Model used to determine the optimum inventory of products? (4 marks)
- b) An automobile service company uses a certain type of cleansing liquid. The annual demand for the cleansing liquid is 1,800 units. The ordering cost and the stock holding cost are £12 per batch per year and £4 per unit per year respectively. The price schedule offered by the supplier is given below

Order Quantity	Unit Price (£)
<100	20
100 – 159	18
160 – 200	17
>200	16

- i) Determine the order quantity using **Economic Order Quantity model**. (4 marks)
- ii) What is the order quantity that minimizes the total cost? (6 marks)
- c) The above company intends to maintain a safety stock to counter for variation of use of cleansing liquid during lead-time. It has been estimated that average use of cleansing liquid during a fixed lead-time is 90 units with standard deviation of 4. Assuming normal distribution for the usage of cleansing liquid during lead-time, calculate the re-order level for 95% service level. Use the standard normal distribution table provided with this question paper. (6 marks)

**Use the following formula in answering Question 4**

$$EOQ = \sqrt{\frac{2AD}{h}}$$

A = Order processing cost  
D = Annual Demand  
h = Annual stock holding cost per unit per year

- 5 a) i) Identify and describe the main components of the Human Resource Management process. (5 marks)
- ii) Why is it important to retain high quality human resources? (5 marks)
- b) i) What is meant by the term 'Job analysis'? (5 marks)
- ii) Why is job analysis considered as a pre-requisite for the entire spectrum of human resource management? (5 marks)
- 6 a) i) Explain the importance of Productivity in an organisation. (6 marks)
- ii) List the four levels of measuring productivity. (4 marks)
- b) Select **two** government legislative devices and discuss how these might affect productivity at national level. (4 marks)
- c) Describe a productivity improvement programme instituted at your organisation and comment on the programme's effectiveness. (6 marks)

- 7 a) Explain the following terms with particular reference to costing.
- i) Contribution. (2 marks)
  - ii) Break-even point. (2 marks)
  - iii) Variable cost. (2 marks)
  - iv) Margin of safety in terms of units. (2 marks)
- b) The following information is extracted by a financial analyst from the books of a manufacturing company.

	£	£
Sales		100,000
<b>Variable costs</b>		
Direct materials	30,000	
Direct labour	30,000	
Factory overhead	8,000	
Marketing expenses	7,000	
Administrative expenses	5,000	80,000
Contribution		20,000
<b>Fixed costs</b>		
Factory over heads	5,000	
Marketing expenses	3,000	
Administrative expenses	2,000	10,000
Net profit		10,000

Compute the following using the above information.

- i) The Profit-Volume (P/V) ratio. (2 marks)
  - ii) The break-even point. (2 marks)
- c) The company is also considering an alternative proposal in modifying its existing plant. This will involve additional fixed costs of £2,500, with the expectation of reducing the same amount in each of the direct materials and direct labour costs. If this proposal is undertaken, compute the following.
- i) The Profit-Volume (P/V) ratio. (4 marks)
  - ii) The break-even point. (2 marks)
  - iii) The profit of the company. (2 marks)

- 8 a) Distinguish Trial Balance from Balance sheet in accounting systems. (6 marks)  
 b) XYZ company commenced a business on 1 January 2014, with a capital of £ 40,000. At the end of the year, the following balances were obtained from the books of accounts.

Particulars	Debit (in £)	Credit (in £)
Plant and machinery	12,500	
Purchases	48,500	
Wages	7,050	
Returns outwards		500
Sales		60,000
Furniture and fixtures	2,500	
Freight	1,000	
Carriage outwards	250	
Rent and taxes	2,300	
Printing and stationary	400	
Debtors	10,300	
Creditors		5,000
Postage and telegrams	400	
Discounts		600
Rent received		600
Insurance	350	
Salaries	3,600	
Cash in hand	3,050	
Cash at bank	13,300	
Returns inwards	1,000	
Trade expenses	200	

The stock at 31 December 2014 was worth £ 7,300. Make the following adjustments.  
 Write off bad debts £ 300 and provide reserve for doubtful debts at 5% on debtors.  
 Create a reserve for discount on debtors and creditors at 2%.  
 Plant and Machinery are to be depreciated at 10%, Furniture at 5%.  
 Insurance was prepaid to the extent of £ 50.  
 Prepare the following statements.

- i) Trading and profit and loss account for the year ended 31 December 2014. (7 marks)  
 ii) Balance sheet as at that date. (7 marks)