



Prifysgol Cymru
Y Drindod Dewi Sant
University of Wales
Trinity Saint David

LOCATION: SWANSEA

LLEOLIAD: ABERTAWE

LEVEL 5

LEFEL 5

**EXAMINATION PERIOD
MAY 2018**

**CYFNOD ARHOLIADAU
2018**

**MODULE CODE:
M5X01176**

MANAGEMENT, INNOVATION & SUSTAINABILITY

TIME: 2 HOURS

ALL CANDIDATES TO ANSWER QUESTION 1 IN SECTION A

**ALL BENG MECHANICAL, MECHANICAL & MANUFACTURING
AND ENERGY AND ENVIRONMENTAL ENGINEERING
CANDIDATES TO ANSWER ANY TWO QUESTIONS FROM SECTION
B (ANDREW THORN)**

**ALL BENG MOTORSPORT, MOTORCYCLE, AND AUTOMOTIVE
ENGINEERING CANDIDATES TO ANSWER ANY TWO QUESTIONS
FROM SECTION C (MARK SANDFORD)**

*Equipment or materials required – Calculators may be used
Adnoddau neu ddefnyddiau sydd eu hangen - Dim*

Section A
Question 1

Mr Whitewall a sole trader is deciding whether or not to start a new business offering a mobile tyre fitting service. Mr Whitewall is preparing a business plan that he will eventually present to a national bank in order to apply for a business loan. Mr Whitewall has identified some capital expenditure that he will need to make to establish the business. Mr Whitewall is envisaging that the equipment will be used for three years after which he will be able to sell it for 25% of the original purchase price.

High top long wheelbase transit van	£22,000
Portable petrol compressor	£ 2,000
Portable electrical generator	£ 1,000
Tyre fitting machine	£ 3,500
Trolley jacks, rackng etc	£ 500
Vehicle fitment	£ 1,000
Total	£30,000

Calculate the depreciation using:

- a) Straight line method (4 marks)
- b) Reducing balance method (6 marks)
- c) Discuss the advantages and disadvantages of using the straight line and reducing balance methods. Which method of calculating the depreciation is likely to be most appropriate for use in Mr Whitewall's business case preparation, and why.
(5 marks)

Mr Whitewall has incurred fixed costs of £30,000. Whilst running his business he incurs: direct costs, variable cost and variable overheads (eg carcass disposal) taken together produce an average cost of £57 per tyre. Mr Whitewall is expecting to change 238 tyres per month. A finished tyre sells on average for £75.

- d) Calculate the break-even point (4marks)
- e) Draw and label a break-even chart (6marks)

SECTION B

ANSWER any Two QUESTIONS

Question 2

There are many reasons as to why organisations have to change. However, the reasons for change are often not understood by the workforce or poorly communicated.

- a) Explain how the six requirements of change can be utilised to make the process of change management easier.

(15 marks)

- b) Discuss why change management programmes often fail.

(10 marks)

Question 3

Devenwall Engineering Ltd has just received an enquiry to manufacture seventy-five high precision measuring gauges. Each gauge requires 8 hours of direct labour and £105 of materials.

The business has calculated that it will incur the following costs during the month of production

Indirect labour costs	£2,500
Depreciation of machinery	£4,000
Rent and rates	£6,000
Direct labour costs	£70,000
Heating and lighting	£4,000
Indirect materials	£17,000

Direct labour time is 6000 hours

- a) Calculate the full cost of manufacturing seventy-five gauges.

(12 marks)

- b) Using the answer calculated in part a) determine the final price quoted for the job assuming the company wishes to make a 25% profit on the order.

(4 marks)

- c) Devenwall have provided the quotation to the potential customer and been informed that the job is theirs providing they can reduce the cost of the job by 10%. Evaluate three steps that Devenwall can take to reduce the cost of the job.

(9 marks)

Question 4

Logistics operations are key part of running a manufacturing company.

- a) Frankie Chemicals produces and packages a range of cleaning chemicals. They are looking to build a new distribution centre/warehouse and are unsure where it should be located. They have obtained the following data on supplier and customer locations along with the predicted demand shown in Table 1.

Determine using the centre of gravity technique the coordinates where they should start looking for a suitable site and comment on your findings.

Table 1 Location of suppliers and customers and demand

Location	X –Y coordinates	Demand (units)
Supplier 1	87, 18	86
Supplier 2	74, 33	74
Supplier 3	12, 75	92
Supplier 4	94, 18	22
Customer 1	52, 31	87
Customer 2	36, 87	96
Customer 3	24, 63	64
Customer 4	16, 71	53
Customer 5	38, 52	79

(15 marks)

- b) Discuss some of the pressures that logistics organisations are currently facing.

(10 marks)

SECTION C

ANSWER any Two QUESTIONS

Question 5

The price set for a product or service is often related to supply of, and demand for, that product.

- a) Explain the relationship between supply and demand and pricing. **(4 marks)**
- b) Analyse the relationship between price and demand for.
- (i) Branded Ford Transit style delivery van tyres.
 - (ii) Vehicle diesel fuel
- (6 marks)**
- c) A company have developed an innovative crash helmet for road and track use. The helmet uses new materials and novel construct, causing it to exceed current international sporting safety regulations, whilst offering best in class light weight. The helmet is about to be released to the market and the company need to set a price for the product. Naturally the company wish to set a high price. What factors should the company consider in deciding on the price to the potential consumer for the helmet?
- (i) What factors should the company consider in deciding on the price to the potential consumer for the helmet? **(9 marks)**
- (ii) What pricing strategies could the company consider when entering this mature and competitive market? **(6 marks)**

Question 6

The governing body of the World Rally Cross Championship are considering some significant rule changes to the technical regulations in order to attract more entrants, TV/media coverage and increase the relevance to potential sponsors amidst the current economic and environmental climate.. Possible changes being considered is to allow/encourage the adoption of technologies to reduce the environmental impact of race vehicles. Technologies such as Hybridisation, Full Electric Vehicles etc should be considered.

- a) Briefly discuss possible reasons for the governing body to consider these changes.

(4 marks)

- b) Analyze the driving forces affecting the governing body to incorporate environmental changes to the technical regulations by using the PEST/STEP analysis framework.

(16 marks)

- c) Following the results of your analysis; what advice would you offer the governing body and the teams on the potential adoption of environmental changes to the technical regulations?

(5 marks)

Question 7

Engineers have a duty of care to provide goods and services that are 'fit for purpose'. There are often pressures to bring products or services to market rapidly, or introduce innovative technologies to motorsport vehicles.

- a) Describe such a possible scenario and outline the pressures and ethical issues affecting an engineer. Suggest possible courses of action.

(8 marks)

Sometimes people do not feel comfortable taking an ethical stand against a decision that they do not feel is ethically correct. Later they may come to regret that decision.

- b) Suggest a number of reasons (or excuses) that people use in order to not make an ethical stand.

(8 marks)

- c) Generate a series of questions that someone could ask them self when faced with an ethical dilemma. The list should help them evaluate possible courses of action.

(9 marks)