

Write your name here

Surname

Other names

**Edexcel  
Principal Learning**

Centre Number

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# Engineering

Level 3

**Unit 1: Investigating Engineering Business and  
the Environment**

Wednesday 11 January 2012 – Morning

**Time: 1 hour 30 minutes**

Paper Reference

**EG301/01**

**You must have:**

Calculator

Total Marks

## Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided  
– *there may be more space than you need.*

## Information

- The total mark for this paper is 60.
- The marks for **each** question are shown in brackets  
– *use this as a guide as to how much time to spend on each question.*

## Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►

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PEARSON

Answer ALL questions.

SECTION A

In Section A questions must be answered with a cross in a box ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

1 Which scale of production would normally be associated with the manufacture of blow moulded detergent bottles?

|   |            |                          |
|---|------------|--------------------------|
| A | Batch      | <input type="checkbox"/> |
| B | Continuous | <input type="checkbox"/> |
| C | Mass       | <input type="checkbox"/> |
| D | Job        | <input type="checkbox"/> |

(Total for Question 1 = 1 mark)

2 The engineering sector which develops satellites for GPS systems is:

|   |            |                          |
|---|------------|--------------------------|
| A | transport  | <input type="checkbox"/> |
| B | aerospace  | <input type="checkbox"/> |
| C | civil      | <input type="checkbox"/> |
| D | automotive | <input type="checkbox"/> |

(Total for Question 2 = 1 mark)

3 An engineer from the agriculture sector would be involved with:

|   |  |                          |
|---|--|--------------------------|
| A | developing products from cereal crops    | <input type="checkbox"/> |
| B | producing genetically modified livestock | <input type="checkbox"/> |
| C | installing soil irrigation systems       | <input type="checkbox"/> |
| D | enhancing the properties of trees        | <input type="checkbox"/> |

(Total for Question 3 = 1 mark)



4 When communicating with a group of people, a speaker should **not**:

|   |  |                          |
|---|--|--------------------------|
| A | maintain eye contact with the audience | <input type="checkbox"/> |
| B | use a variety of vocal tones           | <input type="checkbox"/> |
| C | stand still with their arms folded     | <input type="checkbox"/> |
| D | maintain a steady pace of speaking     | <input type="checkbox"/> |

(Total for Question 4 = 1 mark)

5 According to the Factories Act 1961, a workroom floor should be cleaned by washing at least every:

|   |       |                          |
|---|-------|--------------------------|
| A | day   | <input type="checkbox"/> |
| B | week  | <input type="checkbox"/> |
| C | month | <input type="checkbox"/> |
| D | year  | <input type="checkbox"/> |

(Total for Question 5 = 1 mark)

6 Which **one** of the following is a quality assurance technique used when manufacturing high-volume products?

|   |                     |                          |
|---|---------------------|--------------------------|
| A | Prototype testing   | <input type="checkbox"/> |
| B | Statistical control | <input type="checkbox"/> |
| C | 100% inspection     | <input type="checkbox"/> |
| D | Predictive analysis | <input type="checkbox"/> |

(Total for Question 6 = 1 mark)

7 What type of business is controlled by a board of governors?

|   |                 |                          |
|---|-----------------|--------------------------|
| A | Charitable      | <input type="checkbox"/> |
| B | Partnership     | <input type="checkbox"/> |
| C | Public limited  | <input type="checkbox"/> |
| D | Private limited | <input type="checkbox"/> |

(Total for Question 7 = 1 mark)



8 Software can be used for project planning.

One benefit of using software over other methods is:

|   |                                    |                          |
|---|------------------------------------|--------------------------|
| A | projects can be tracked throughout | <input type="checkbox"/> |
| B | plans are modified more easily     | <input type="checkbox"/> |
| C | project lag can be identified      | <input type="checkbox"/> |
| D | time savings can be identified     | <input type="checkbox"/> |

(Total for Question 8 = 1 mark)

9 In the UK, a medium-sized enterprise would usually have fewer than how many employees?

|   |      |                          |
|---|------|--------------------------|
| A | 100  | <input type="checkbox"/> |
| B | 250  | <input type="checkbox"/> |
| C | 500  | <input type="checkbox"/> |
| D | 1000 | <input type="checkbox"/> |

(Total for Question 9 = 1 mark)

10 A feature of using job costing is that:

|   |   |                          |
|---|---|--------------------------|
| A | only direct costs are considered                | <input type="checkbox"/> |
| B | only indirect costs are considered              | <input type="checkbox"/> |
| C | both direct and indirect costs are considered   | <input type="checkbox"/> |
| D | neither direct or indirect costs are considered | <input type="checkbox"/> |

(Total for Question 10 = 1 mark)



11 A company decides it is worth spending money on a new product or equipment for the long-term benefit of the business.

This process is known as:

|   |                          |                          |
|---|--------------------------|--------------------------|
| A | asset assessment         | <input type="checkbox"/> |
| B | investment appraisal     | <input type="checkbox"/> |
| C | expenditure evaluation   | <input type="checkbox"/> |
| D | contribution measurement | <input type="checkbox"/> |

(Total for Question 11 = 1 mark)

12 Production planning and control is the engineering function which is responsible for:

|   |   |                          |
|---|---|--------------------------|
| A | sourcing raw materials for manufacturing              | <input type="checkbox"/> |
| B | identifying areas of products which could be improved | <input type="checkbox"/> |
| C | making sure that products are completed on time       | <input type="checkbox"/> |
| D | making sure that all equipment works correctly        | <input type="checkbox"/> |

(Total for Question 12 = 1 mark)

13 The following figures relate to the depreciation of a piece of computer-based machinery.

The purchase cost is £100 000

The machinery depreciates by 20% per year

Which **one** of the following figures is the value of the equipment after 3 years?

|   |         |                          |
|---|---------|--------------------------|
| A | £99 940 | <input type="checkbox"/> |
| B | £64 000 | <input type="checkbox"/> |
| C | £51 200 | <input type="checkbox"/> |
| D | £40 000 | <input type="checkbox"/> |

(Total for Question 13 = 1 mark)



14 Soldering is an activity performed in the electronic engineering sector.

Which **one** of the following is **not** a risk associated with soldering?

|   |                  |                          |
|---|------------------|--------------------------|
| A | Burning skin     | <input type="checkbox"/> |
| B | Inhaling fumes   | <input type="checkbox"/> |
| C | Eye irritation   | <input type="checkbox"/> |
| D | Impaired hearing | <input type="checkbox"/> |

(Total for Question 14 = 1 mark)

15

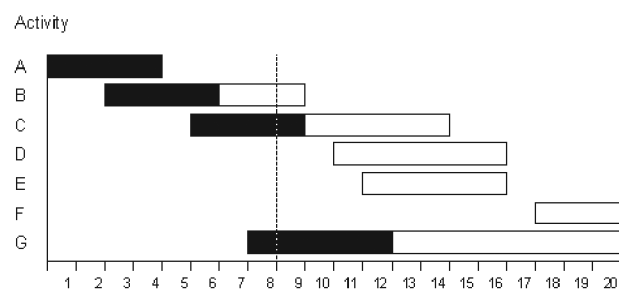


Figure 1

Figure 1 shows an extract from a project planning chart.

This type of chart is called a:

|   |                  |                          |
|---|------------------|--------------------------|
| A | sequence diagram | <input type="checkbox"/> |
| B | Gantt chart      | <input type="checkbox"/> |
| C | flow chart       | <input type="checkbox"/> |
| D | network diagram  | <input type="checkbox"/> |

(Total for Question 15 = 1 mark)

16 The accounting system which traces and accumulates direct costs, and allocates the indirect costs of manufacturing is called:

|   |                      |                          |
|---|----------------------|--------------------------|
| A | investment appraisal | <input type="checkbox"/> |
| B | absorption costing   | <input type="checkbox"/> |
| C | inventory appraisal  | <input type="checkbox"/> |
| D | process costing      | <input type="checkbox"/> |

(Total for Question 16 = 1 mark)



17 The HSE guidance for producing risk assessments states there are five different stages.

These stages (not in order) are:

- A. Review your assessment and update if necessary
- B. Record your findings and implement them
- C. Decide who might be harmed and how
- D. Evaluate the risks and decide on precautions
- E. Identify the hazards

Which order should these stages be completed in?

|          |               |                          |
|----------|---------------|--------------------------|
| <b>A</b> | E, D, B, A, C | <input type="checkbox"/> |
| <b>B</b> | A, C, D, E, B | <input type="checkbox"/> |
| <b>C</b> | E, C, D, B, A | <input type="checkbox"/> |
| <b>D</b> | D, B, E, A, C | <input type="checkbox"/> |

(Total for Question 17 = 1 mark)

18 The Fire Precautions Act 1971 sets out a structure for fines if regulations are broken.

Currently, the maximum fine is:

|          |         |                          |
|----------|---------|--------------------------|
| <b>A</b> | £1 000  | <input type="checkbox"/> |
| <b>B</b> | £5 000  | <input type="checkbox"/> |
| <b>C</b> | £10 000 | <input type="checkbox"/> |
| <b>D</b> | £50 000 | <input type="checkbox"/> |

(Total for Question 18 = 1 mark)

19 What is the **main** purpose of budget monitoring?

|          |  |                          |
|----------|--|--------------------------|
| <b>A</b> | To make sure funds are spent where they are intended to be spent | <input type="checkbox"/> |
| <b>B</b> | To ensure the business does not overspend                        | <input type="checkbox"/> |
| <b>C</b> | To make sure that the company is aware of its finances           | <input type="checkbox"/> |
| <b>D</b> | To allow the accountants to check that all money is being spent  | <input type="checkbox"/> |

(Total for Question 19 = 1 mark)



20 Figure 2 shows a flow chart for an engineering process.

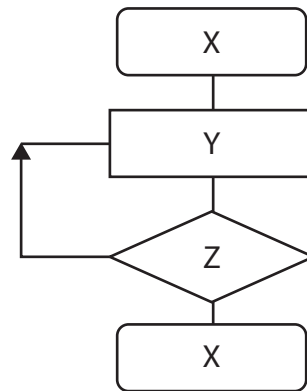


Figure 2

The symbol labelled 'Z' indicates a:

|          |             |                          |
|----------|-------------|--------------------------|
| <b>A</b> | process     | <input type="checkbox"/> |
| <b>B</b> | preparation | <input type="checkbox"/> |
| <b>C</b> | merge       | <input type="checkbox"/> |
| <b>D</b> | decision    | <input type="checkbox"/> |

(Total for Question 20 = 1 mark)

**TOTAL FOR SECTION A = 20 MARKS**





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**SECTION B**

**21** An engineering business trains its own employees.

Identify **one** advantage and **one** disadvantage for the business.

Advantage

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.....

Disadvantage

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**(Total for Question 21 = 2 marks)**

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**22** Explain the term 'product and technology experience'.

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**(Total for Question 22 = 3 marks)**

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**23** With reference to batch production, describe the characteristics of one fixed cost and one variable cost.

Fixed cost

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Variable cost

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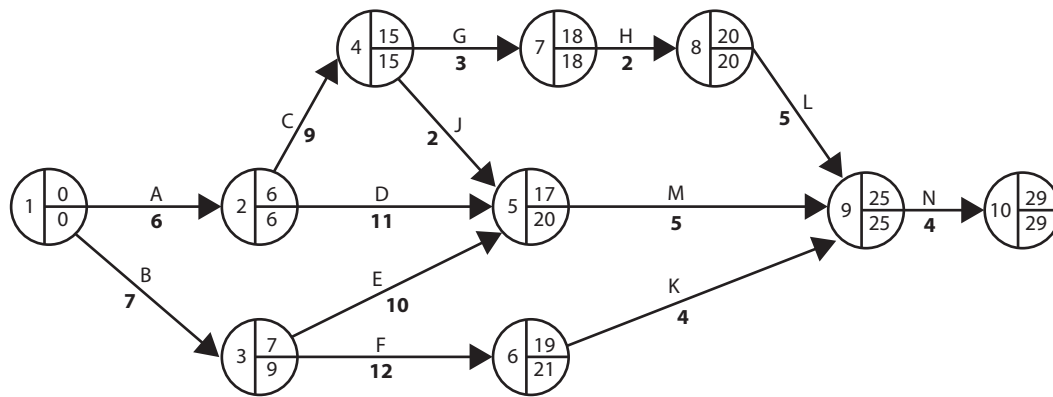
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**(Total for Question 23 = 4 marks)**



24



**Figure 3**

Figure 3 shows a network diagram for an engineering project. The numbers in bold identify the number of days required for each activity.

(a) What is the earliest day of the project on which activity F can begin? (1)

(b) What is the latest day of the project on which activity G can begin? (1)

(c) Identify the activities on the critical path for this project. (1)

**(Total for Question 24 = 3 marks)**



**25** Engineering businesses could be private (Ltd) companies or public companies (plc).

(a) Outline the differences between private (Ltd) and public (plc) companies.

(4)

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(b) Evaluate the benefits of being a private (Ltd) company to the shareholders.

(4)

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**(Total for Question 25 = 8 marks)**

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**TOTAL FOR SECTION B = 20 MARKS**



**SECTION C**

**26** An automotive engineering company wants to expand its market by introducing a small city car.

(a) Describe how the production capacity of the company could influence the decision of the business.

(4)

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(b) The city car is to be powered by an electric motor.

Evaluate the use of electricity as a source of power for cars.

(4)

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(c) The car is to be constructed using recyclable materials.

Discuss the environmental benefit of using these materials.

(4)

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**(Total for Question 26 = 12 marks)**



