Write your name here

Surname	Other names

Edexcel
Principal Learning

Centre Number	Candidate Number

Engineering

Level 3

Unit 1: Investigating Engineering Business and the Environment

Thursday 14 January 2010 – 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.

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H 3 5 9 8 9 A 0 1 1 6

Turn over ▶

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SECTION A

Answer ALL questions.

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 of the following engineering sectors is considered a primary industry?

A	Marine	☒
B	Oil	☒
C	Chemical	☒
D	Structural	☒

(Total for Question 1 = 1 mark)

2 A micro-business would have **fewer** than how many employees?

A	10	☒
B	25	☒
C	50	☒
D	100	☒

(Total for Question 2 = 1 mark)

3 Demographic trends concern which aspect of a person's life?

A	Interests	☒
B	Religious beliefs	☒
C	Family size	☒
D	Attitude	☒

(Total for Question 3 = 1 mark)

4 An engineering company employs a sub-contractor to fit a boiler in a new warehouse.

Who has responsibility for ensuring health and safety requirements are met?

A	The company	☒
B	The sub-contractor	☒
C	Both	☒
D	Neither	☒

(Total for Question 4 = 1 mark)

5 Which form of communication would be the **most** suitable to explain to a user how to assemble a bicycle?

A	Email instructions	☒
B	Audio tape	☒
C	Written report	☒
D	Annotated diagrams	☒

(Total for Question 5 = 1 mark)

6 A commissioning engineer would be responsible for:

A	collecting and analysing near-surface deposits	☒
B	making calculations about loads and stresses	☒
C	ensuring that equipment works to its specification	☒
D	planning and undertaking scheduled maintenance	☒

(Total for Question 6 = 1 mark)

7 In which direction does project management responsibility flow in a business matrix structure?

A	Vertically	☒
B	Downwards	☒
C	Diagonally	☒
D	Horizontally	☒

(Total for Question 7 = 1 mark)

8 Before purchasing components from a supplier, an engineering company will carry out an appraisal. This decision is known as:

A	profit and loss	☒
B	invest or purchase	☒
C	make or buy	☒
D	sale and return	☒

(Total for Question 8 = 1 mark)

9 According to the Working Time Regulations 1998 guidance, workers cannot be required to do more than how many hours, on average, each week?

A	38	☒
B	44	☒
C	48	☒
D	54	☒

(Total for Question 9 = 1 mark)

10 Process costing is a technique where:

A	average production costs are applied to products in batches	☒
B	production costs are applied to individual units	☒
C	all costs of development are taken into account	☒
D	costs for each project are assigned individually	☒

(Total for Question 10 = 1 mark)

11 A marine engineer would be responsible for:

A	measuring water and gas levels	☒
B	controlling the raising and lowering of off-shore drills	☒
C	calculating the displacement of a ship's hull	☒
D	installing and repairing fresh water supplies	☒

(Total for Question 11 = 1 mark)

12 Engineering companies often use external services such as accounting. This is known as:

A	outsourcing	☒
B	resourcing	☒
C	downsizing	☒
D	franchising	☒

(Total for Question 12 = 1 mark)

13 Which of the following would **not** be within the remit of a structural engineer?

A	Simulating how a building would behave in an earthquake	☒
B	Carrying out environmental impact assessments	☒
C	Investigating the properties of materials	☒
D	Calculating stresses on beams, bridges and walls	☒

(Total for Question 13 = 1 mark)

14 Which of the following engineering premises are **not** covered by the Factories Act 1961?

A	Premises where components or articles are made	☒
B	A dry dock where ships are broken up	☒
C	Any premises used for the storage of gas in a large gasholder	☒
D	Premises used for the purpose of housing railway locomotives	☒

(Total for Question 14 = 1 mark)

15 A UK engineering company purchases components from France. The company pays for the components in Euros (€) but needs to account for the purchases in British Pounds (£).

1000 components costs €750, and the exchange rate is €1 = £0.80.

How much do the components cost?

A	£600	☒
B	£625.50	☒
C	£900	☒
D	£937.50	☒

(Total for Question 15 = 1 mark)

16 Manual lifting is a common process in an engineering workshop.

Which of the following manual lifts would result in the highest level of risk?

A		☒
B		☒
C		☒
D		☒

(Total for Question 16 = 1 mark)

17 Which **one** of the following is associated with quality assurance?

A	CNC	☒
B	GDP	☒
C	MRP	☒
D	TQM	☒

(Total for Question 17 = 1 mark)

18 Renewable sources of energy are increasingly being used for the commercial generation of electricity. Which of the following is an advantage of **wind** energy?

A	The energy is non-polluting	☒
B	Initial financial outlay is high	☒
C	Turbines can be located close to power stations	☒
D	There is a constant supply	☒

(Total for Question 18 = 1 mark)

19 Which of the following does **not** describe an aspect of marginal costing?

A	It is a system which calculates the cost of producing an additional product	☒
B	No attempt is made to share the costs of overheads between items produced	☒
C	Decisions are based on the analysis of both fixed and variable costs	☒
D	Variable costs are not used in product costing activities nor stock valuations	☒

(Total for Question 19 = 1 mark)

20 The Control of Substances Hazardous to Health Regulations (COSHH) 2002 state a number of methods to control exposure to harmful substances.

Which of the following is **not** one of those **control methods**?

A	The use of processes which minimise the amount of material used or produced, or equipment which totally encloses the process	☒
B	The controlled exposure of substances at source which reduces the level and amount of risk	☒
C	The use of alternative forms of substances which are equally hazardous, using PPE as a primary control method	☒
D	The provision of PPE, but only as a last resort and never as a replacement for other controls which are required	☒

(Total for Question 20 = 1 mark)

TOTAL FOR SECTION A = 20 MARKS

SECTION B

21 Identify **one** advantage and **one** disadvantage for an engineering consultant of becoming a sole trader.

Advantage

.....

.....

Disadvantage

.....

.....

(Total for Question 21 = 2 marks)

22 Financial planning is an important activity within an engineering company.

Outline the process of producing a financial plan.

.....

.....

.....

.....

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.....

.....

(Total for Question 22 = 4 marks)

23 Explain the following terms:

Gross National Product (GNP)

Variable Cost

(Total for Question 23 = 4 marks)

24 A company decides to launch a new product. Figure 1 is an extract from its accounts for the first financial year.

Sales		**£250 000**
Cost of sales		**£132 000**
Expenses		
Wages/salaries	**£58 000**	
Light and heat	**£6 500**	
Insurance	**£2 250**	
Advertising	**£17 000**	
Other expenses	**£9 375**	

Figure 1

(a) What is the gross profit made by the company?

(1)

(b) What is the total value of the expenses of the company?

(1)

(c) State whether the company has made a profit or a loss, and also the value of the profit or loss.

(1)

(Total for Question 24 = 3 marks)

25 An engineering company is replacing the traffic control signals in a major city.

The Gantt chart in Figure 2 shows the progress of the project.

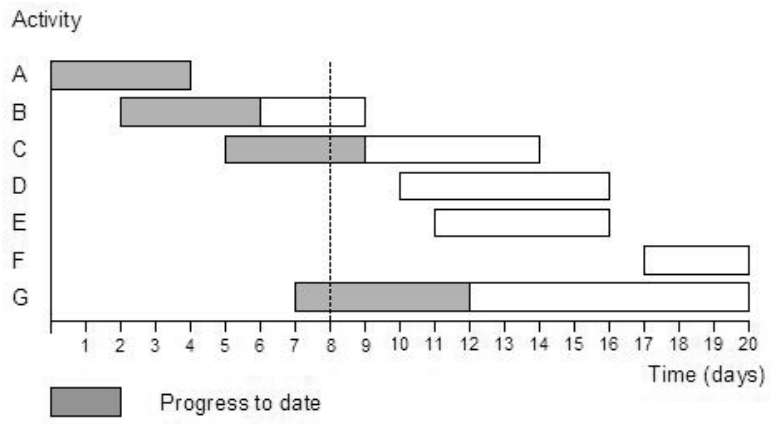

Figure 2

(a) Which activities are planned to run concurrently on day 15?

(1)

.....

(b) Activities B and E are to be carried out by the same team of staff.

What is the float for activity E?

(1)

.....

(c) Table 1 states the number of staff needed for each activity.

Activity	Staff Required
A	12
B	6
C	7
D	4
E	6
F	10
G	5

Table 1

What is the total number of staff days required to complete activity G?

(1)

.....

(d) Evaluate the use of a Gantt chart as a planning method for engineering projects.

(4)

(Total for Question 25 = 7 marks)

TOTAL SECTION B = 20 MARKS

SECTION C

26 An electronics engineering company wishes to add a new MP3 audio player to its existing product range.

(a) Describe activities that the engineering company would perform in the making and assembly of the MP3 player.

(4)

(b) The MP3 player is to be mass produced.

Discuss the benefits of continuous flow production for this product.

(4)

(c) Continuous manufacture of the MP3 player could generate pollutants which affect the local environment.

Discuss the issues associated with the following types of pollution.

(6)

Noise and light pollution

Chemical waste

(Total for Question 26 = 14 marks)

27 Discuss the roles and responsibilities of employees under the Health and Safety at Work Act 1974.

(6)

(Total for Question 27 = 6 marks)

TOTAL FOR SECTION C = 20 MARKS

TOTAL FOR PAPER = 60 MARKS