

Mark Scheme (Results)

January 2012

Principal Learning

Engineering
EG301 Paper 01

Investigating Engineering Business
and the Environment

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General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

SECTION A

Question Number	Answer	Mark
1	B	(1)

Question Number	Answer	Mark
2	B	(1)

Question Number	Answer	Mark
3	C	(1)

Question Number	Answer	Mark
4	C	(1)

Question Number	Answer	Mark
5	B	(1)

Question Number	Answer	Mark
6	B	(1)

Question Number	Answer	Mark
7	A	(1)

Question Number	Answer	Mark
8	B	(1)

Question Number	Answer	Mark
9	B	(1)

Question Number	Answer	Mark
10	C	(1)

Question Number	Answer	Mark
11	B	(1)

Question Number	Answer	Mark
12	C	(1)

Question Number	Answer	Mark
13	C	(1)

Question Number	Answer	Mark
14	D	(1)

Question Number	Answer	Mark
15	B	(1)

Question Number	Answer	Mark
16	D	(1)

Question Number	Answer	Mark
17	C	(1)

Question Number	Answer	Mark
18	B	(1)

Question Number	Answer	Mark
19	B	(1)

Question Number	Answer	Mark
20	D	(1)

SECTION B

Question Number	Answer	Mark
21	<p>ADVANTAGES</p> <p>Accept any one of the following:</p> <ul style="list-style-type: none"> • Training can be tailored to the needs of the company (1) • Training can be undertaken when most convenient (1) • Costs are reduced (1) • No need for employees to travel (1) • Specific needs can be addressed (1) • More motivated staff (1) <p style="text-align: right;">(1 x 1)</p> <p>DISADVANTAGES</p> <p>Accept any one of the following:</p> <ul style="list-style-type: none"> • Existing inefficiencies may be continued (1) • Trainees may resent in-house supervisors providing inappropriate training (1) • Trainers may not be taken seriously (1) • Suitable facilities may not be available (1) • Suitable trainers may not be available (1) • Employees may not be entirely truthful about their needs (1) • Cost of training (1) • Down time/loss of production (1) • Cost of covering trainees/trainers (1) • After training the employee may leave the business (1) <p style="text-align: right;">(1 x 1)</p>	(2)

Question Number	Answer	Mark
22	<p>1 mark for identification, up to 2 marks for expansion</p> <p>Examples:</p> <ul style="list-style-type: none"> • Manufacturers and consumers (1) using the product will gain experience about the product (1), which could lead to finding improvements (1) • Successful products tend to be developed and improved (1) following customer feedback (1) rather than entirely new products being manufactured (1) • Aspects of existing products can be used within new products in the range (1), concepts and ideas can be transferred (1) from one type of product to another (1) • Improved understanding can make products better (1) which will give the company a competitive edge (1) and increase market share (1) <p style="text-align: right;">(3 x 1)</p>	(3)

Question Number	Answer	Mark
23	<p>For full marks both fixed and variable costs must be considered; 2 marks each.</p> <p>Fixed cost</p> <ul style="list-style-type: none"> • A fixed cost does not vary depending on production levels (1) regardless of batch size (1) • Fixed costs include rent, property tax, insurance, or interest expense (1) <p>Variable cost</p> <ul style="list-style-type: none"> • A variable cost changes according to the level of production (1) and will increase as batch size increases (1) • Variable costs include materials/labour/machining costs (1) • Reference to economy of scale (1) <p style="text-align: right;">(2 x 2)</p>	(4)

Question Number	Answer	Mark
24(a)	Accept any one of the following: Day 7 7 Seven Day seven	(1)

Question Number	Answer	Mark
24(b)	Accept any one of the following: Day 15 15 Fifteen Day fifteen	(1)

Question Number	Answer	Mark
24(c)	<ul style="list-style-type: none"> • Activities A-C-G-H-L-N • 1-2-4-7-8-9-10 • Top pathway/route/loop accept identification by annotation of diagram	(1)

Question Number	Answer	Mark
25(a)	<p>For full marks both Ltd and Plc must be considered. 3 marks maximum if only one is covered.</p> <ul style="list-style-type: none"> • A private limited company cannot offer shares for sale on the stock market (1), whereas a Public Limited Company can (1) • For a private limited company the only shareholders are usually family and friends (1), plc is public limited company and anyone can be shareholders (1) • Share prices of plc's can vary daily (1) as they are traded on the stock market (1) whereas Ltd companies can be sold privately (1) to reflect their market value (1) • A plc must have £50 000 worth of shares issued (1) whereas a Ltd company can have just 1 share issued (1) • A public company has shares which are sold on the stock exchange (1) <p>Accept any reasonable response.</p> <p>NB Do not accept any statements that are common to both Ltd and Plc, such as 'a share holder would own a small percentage'.</p>	(4)

Question Number	Answer	Mark
25(b)	<p data-bbox="363 309 874 342">Award 1 mark for each valid point</p> <ul data-bbox="392 376 1203 1081" style="list-style-type: none"> <li data-bbox="392 376 1203 443">• Trading as a limited company limits the liability (1) of the company's officers and shareholders (1) <li data-bbox="392 450 1203 551">• Personal assets are not at risk (1) in the event of a failure of the business (1) / in the event of a winding up or receivership (1) <li data-bbox="392 557 1203 658">• Being registered as a limited company (1) often gives suppliers and customers a sense of confidence in a business (1) <li data-bbox="392 665 1203 732">• Larger companies will deal with limited businesses (1) leading to increase shareholder dividends (1) <li data-bbox="392 739 1203 840">• If a limited company becomes insolvent and is wound up only the assets of the company (1) are used to try to clear its debts (1) <li data-bbox="392 846 1203 913">• Additional shares can be sold (1) to raise funds for the company (1) <li data-bbox="392 920 1203 987">• Can influence the effectiveness/profitability of the company (1) by exercising voting rights(1) <li data-bbox="392 994 1203 1081">• If the company is secure (1) it is less likely to be influenced by stock market fluctuations (1) 	(4)

SECTION C

Question Number	Answer	Mark
26(a)	<p>Award 1 mark for each valid point</p> <ul style="list-style-type: none"> • If the plant is running at full capacity (1) there would need to be expansion to make the new car (1) • An existing model may need to be replaced (1) to free capacity for the new car (1) • Spare capacity could be used to build a new model (1) but could need extra staffing (1) • Improved efficiency (1) could make production viable (1) • Option to create another production plant - at home or abroad (1) which may attract grants or reduced costs (1) • Flexibility to manufacture different models (1) in limited space (1) 	(4)

Question Number	Answer	Mark
26(b)	<p>Award only 3 marks if only advantages/disadvantages stated</p> <p>Some issues may be negative or positive depending on the situation - award marks if the argument is logical</p> <p>Advantages:</p> <ul style="list-style-type: none"> • They are very quiet (1) • They typically have good starting torque (1) • They have no significant polluting emissions/fewer greenhouse gasses (1) • Does not rely on fossil fuels (1) • Does not waste energy or fuel when stuck in traffic (1) • Travel in congestion/green zones is free (1) • Efficient power source (1) <p>Disadvantages:</p> <ul style="list-style-type: none"> • Current batteries have relatively short trip capacity/long trips will need many recharging stops (1) • Recharge time can take hours (1), so you don't just stop at the station for a couple of minutes as you do with petrol (1) • Batteries only survive so many recharges before they require replacement (1) • Batteries are expensive to replace/cars (batteries) expensive to buy(1) • Charging points are not very frequent (1) • Batteries currently contain unfriendly chemicals that must be handled properly (1) • Pollution displaced to power stations (1) • Repairs may be limited to specialist garages (1) 	(4)

Question Number	Answer	Mark
26(c)	<p data-bbox="373 271 884 300">Award 1 mark for each valid point</p> <ul data-bbox="421 342 1254 981" style="list-style-type: none"> <li data-bbox="421 342 1254 409">• EU directives state a percentage of the vehicle which must be recycled (1) <li data-bbox="421 416 1254 483">• Recycling steel saves energy and natural resources (1) <li data-bbox="421 490 1254 591">• Steel is one of the few materials that can be recycled repeatedly (1) without loss of quality or strength (1) <li data-bbox="421 598 1254 698">• Recycled steel reduces the need for new iron ore to be mined (1), protecting the environment from the side effects of mining (1) <li data-bbox="421 705 1254 772">• Fewer materials will go for scrap (1) with the majority being reused in other cars (1) <li data-bbox="421 779 1254 846">• Less requirement for landfill sites as materials are recycled (1) <li data-bbox="421 853 1254 920">• Materials are returned to the supply chain (1) reducing waste in landfill (1) <li data-bbox="421 927 1254 981">• Fewer emissions from extraction of materials (1) reducing carbon footprint (1) 	(4)

Question Number	Indicative Content	
27	<p>Typical responses include:</p> <ul style="list-style-type: none"> • RIDDOR applies to all sizes/types of business (1) • Reporting accidents and ill health at work is a legal requirement (1) • Information is used by the HSE to identify how/why risks occur (1) • The HSE can advise how to improve safety as a result (1) • Certain incidents/accidents must be reported (1) • Appropriate example of reportable incident (1) • Records must be kept of accidents (1) • There may be cost implications (1) • Accidents have to be reported to comply with the law (1) • Information from accidents/incidents elsewhere can be used to inform safety procedures (1) • Failure to report incidents can result in fines (1) • Can improve working procedures for future activities (1) • Records of incidents/accidents should be detailed (1) • Previous advice will be considered if there is another incident (1) • Training requirement for staff (1) • Links to young person's at work act (1) • The influence of RIDDOR on the company will vary with the nature of work undertaken (1) • Allows the HSE to monitor patterns in injuries/illnesses (1) • Allows 'dangerous' companies to be identified (1) <p>Example: It is a legal requirement for companies to report accidents and ill health to the HSE (1) who use the information to see if there are patterns to incidents (1) which allows them to offer advice on how to improve standards (1). Employees need to be trained (1) to prevent further injuries, because if there are further accidents, the HSE will check that their advice has been listened to (1). It can cost a lot of money (1) to train staff. Also, if a company does not report incidents they can be fined (1) as they must do so by law (1).</p>	
Level	Mark	Descriptor
	0	No reward-able material
1	1-3	Basic understanding of RIDDOR with some of the key features identified, such as reportable injuries, the role of the HSE and prosecution.
2	4-6	Some description of how RIDDOR is used by the HSE for monitoring incidents, and offering guidance for improvement. Some consideration of training, cost implications and record keeping.
3	7-8	A detailed description of how RIDDOR applies to a business, with some consideration of reporting, record keeping, training, legislation and prosecution included. An understanding of the need to follow guidance in order to reduce further incidents.

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