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City & Guilds

0171-515 MARCH 2018
Level 3 Advanced Technical Extended Diploma in Land-Based Engineering (1080)

Level 3 Land-Based Engineering – Theory exam (1)

If provided, stick your candidate barcode label here.

Friday 9 March 2018
09:30 – 11:30

Candidate name (first, last)

First

Last

Candidate enrolment number

Date of birth (DDMMYYYY)

Gender (M/F)

Assessment date (DDMMYYYY)

Centre number

Candidate signature and declaration*

- If any additional answer sheets are used, enter the additional number of pages in this box. ➡ 0 0
- Please ensure that you **staple** additional answer sheets to the **back** of this answer booklet, clearly labelling them with your full name, enrolment number, centre number and qualification number in BLOCK CAPITALS.
- All candidates need to use a **black/blue pen. Do not** use a pencil or gel pen.
- If provided with source documents, these documents **will not** be returned to City & Guilds, and will be shredded. **Do not** write on the source documents.

***I declare that I had no prior knowledge of the questions in this assessment and that I will not divulge to any person any information about the questions.**

You should have the following for this examination
- a pen with blue or black ink
- a non-programmable calculator

General instructions
- Use black or blue ball-point pen.
- The marks for questions are shown in brackets.
- This examination contains 10 questions. Answer **all** questions.
- Answer the questions in the spaces provided. Answers written in margins or on blank pages will **not** be marked.
- Cross through any work you do not want to be marked.

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1 Calculate the force (pull) required on a 400 mm long socket bar when tightening a cylinder head bolt to 62.5 Nm. Show all your working. (4 marks)

2 For **each** of the following measuring devices
- PTO dynamometer
- Vernier gauge
- Induction ammeter

a) give an example of how it can be used (3 marks)

b) state **one** unit that can be measured. (3 marks)

3 During a check of antifreeze strength of the coolant in four vehicles, it is found that the following quantities of antifreeze are required to bring the coolant up to the required strength for protection against frost damage.

Vehicle	**Amount of antifreeze**
Vehicle 1	0.33
Vehicle 2	0.5
Vehicle 3	0.625
Vehicle 4	0.25

a) Determine the total amount of antifreeze required. (1 mark)

b) For your answer in a), convert to 1s.f. (1 mark)

See next page

4 You have just carried out an MOT on a 30 m sprayer and are required to test it.
Figure 1 shows the dimensions of the area inside the field to be sprayed with water.

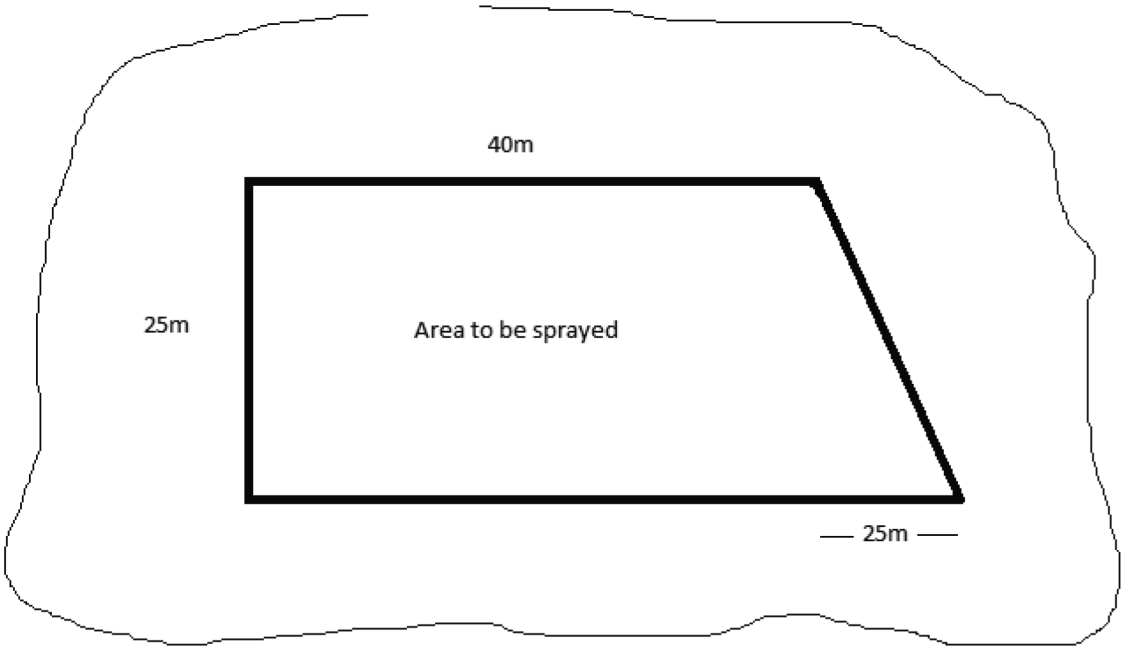

Figure 1

a) Using Figure 1, calculate the
i) area of the rectangle (3 marks)

ii) area of the triangle (3 marks)

iii) total area indicated inside the field. (1 mark)

b) Calculate the number of passes required to cover the area to be sprayed in Figure 1. (2 marks)

c) For your answer in 4b), round it off to the nearest whole number. (1 mark)

5 Explain Archimedes' Principle in relation to a fuel tank sender unit. (2 marks)

6 a) Name the parts labelled A, B and C in Figure 2. (3 marks)

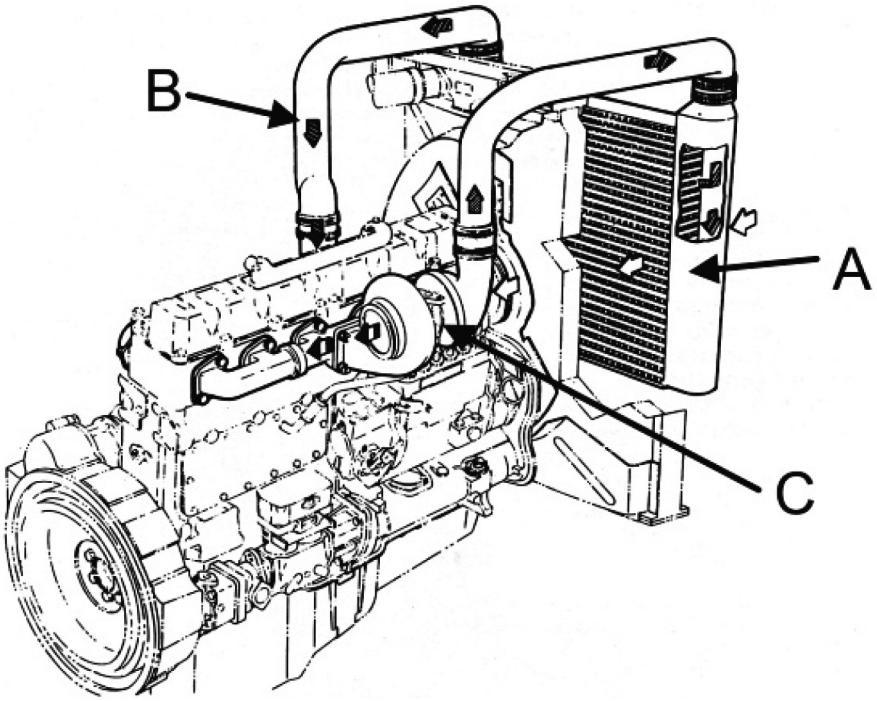

Figure 2

b) Explain the purpose of the part labelled A in Figure 2. (3 marks)

7 In engine lubrication systems, explain **each** of the following terms.

a) Force-feed. (3 marks)

b) Splash-feed. (3 marks)

8 a) Name the parts of the small engine components labelled B, C and D in Figure 3. (3 marks)

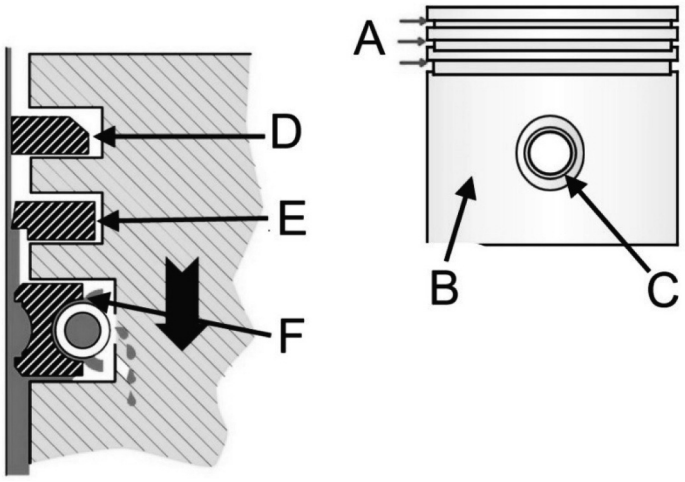

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Figure 3

b) Explain the purpose of the part labelled D. (3 marks)

9 Describe the function of **each** of the parts labelled A to C in Figure 4. (6 marks)

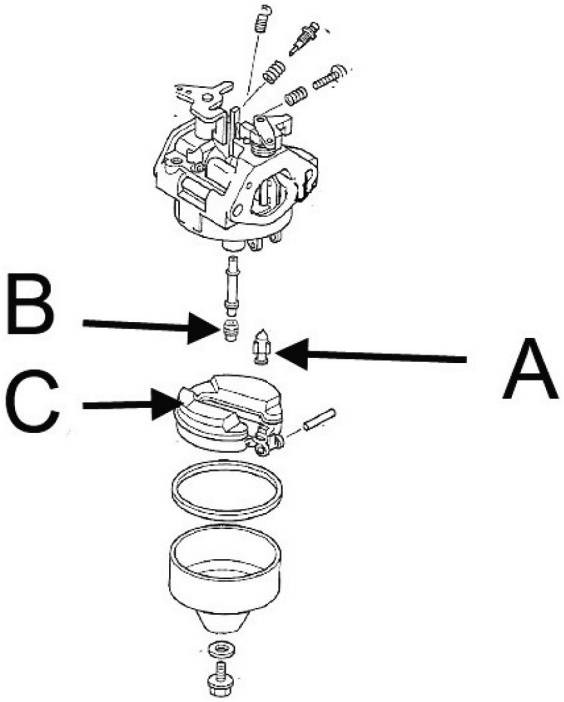

Figure 4

10 A six cylinder 7.5 litre mechanical fuel injection diesel engine is brought into the workshop with a miss fire.

Discuss how to diagnose the faults, including possible solutions and any typical pressure readings to be taken. (12 marks)

End of examination