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0171-515 JUNE 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.

Tuesday 19 June 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.

• 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 11 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.



1 a) Define Hooke's law. (1 mark)

b) State the formula for Hooke's law. (1 mark)

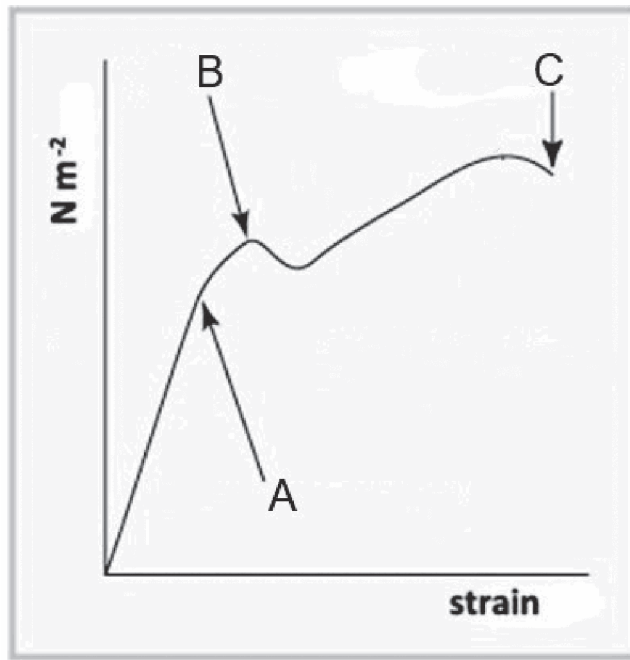


Figure 1

- c) Using the graph in Figure 1, explain the points labelled A, B and C, giving an example related to vehicle repairs, for **each**.

(6 marks)

d) Explain the term stress.

(1 mark)

2 State a typical modern engine oil pressure reading for a diesel engine, when tested at normal operating temperature.

(1 mark)

3 Figure 2 shows the results of a modern diesel engine dynamometer test.

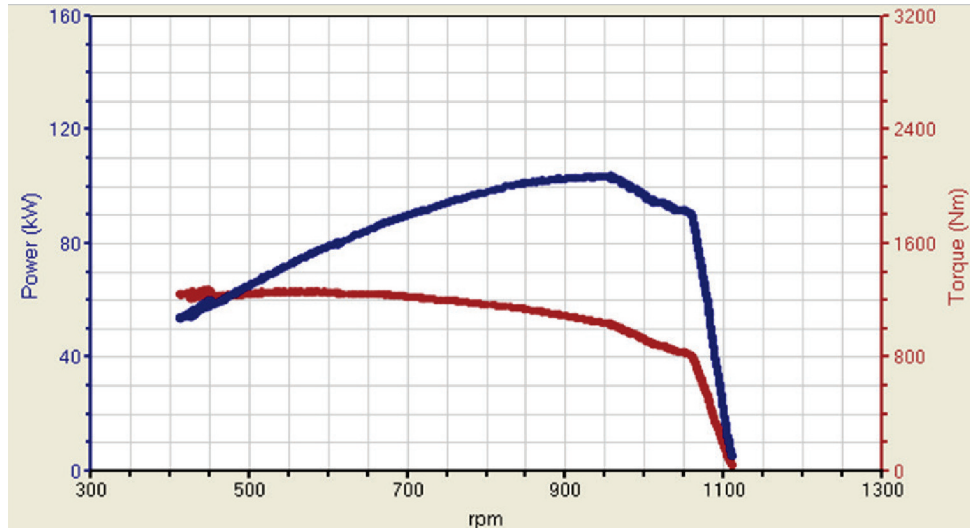


Figure 2

a) Using the graph in Figure 2, state engine power at 950 PTO rpm. (1 mark)

b) Using the graph in Figure 2, state the PTO torque at 1000 rpm. (1 mark)

c) Convert 90 kW to Horse Power. Show all your calculations. (3 marks)

4 Describe **four** benefits of weighting a tractor when using heavy rear mounted equipment. (4 marks)

5 a) A two stroke engine requires a fuel mixture of 50:1. What does this ratio mean? (1 mark)

b) Describe the effects of an incorrect fuel mixture ratio on engine operation. (4 marks)

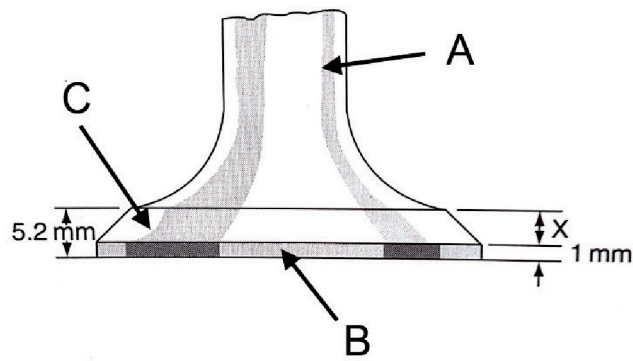
c) List **three** special properties of two stroke oil. (3 marks)

6 Explain the unit of measurement g/kW/hr.

(4 marks)

7 Identify the parts of the engine valve, in Figure 3, labelled A, B and C.

(3 marks)



Automotive science and maths Allen Bonnick

Figure 3

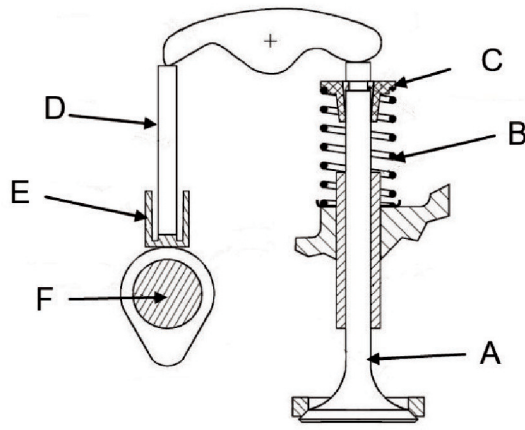


Figure 4

8 Referring to Figure 4,
a) identify the type of valve operation system (1 mark)

b) describe the function of the parts labelled B, E and F. (6 marks)

9 Describe the following engine lubrication terms.

a) Multi grade oil.

(1 mark)

b) Oil additives.

(1 mark)

10 Describe **two** advantages and **three** disadvantages of wet cylinder liners.

(5 marks)
