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City & Guilds

0171-518 JUNE 2018
Level 3 Advanced Technical Extended Diploma in Land-Based Engineering (1080)

Level 3 Land-Based Engineering – Theory exam (2)

If provided, stick your candidate barcode label here.

Tuesday 19 June 2018
13:30 – 15:30

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 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.

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1 a) On a tractor, state the two standard speeds for the PTO shaft drive system. (2 marks)

b) State **two** functions of a universal joint as found in a PTO shaft drive system. (2 marks)

2 Describe **three** disadvantages of using straight spur gears in a transmission system. (6 marks)

3 a) Describe **two main** symptoms and causes of excessive differential backlash. (4 marks)

b) Describe **one** way to check differential backlash. (1 mark)

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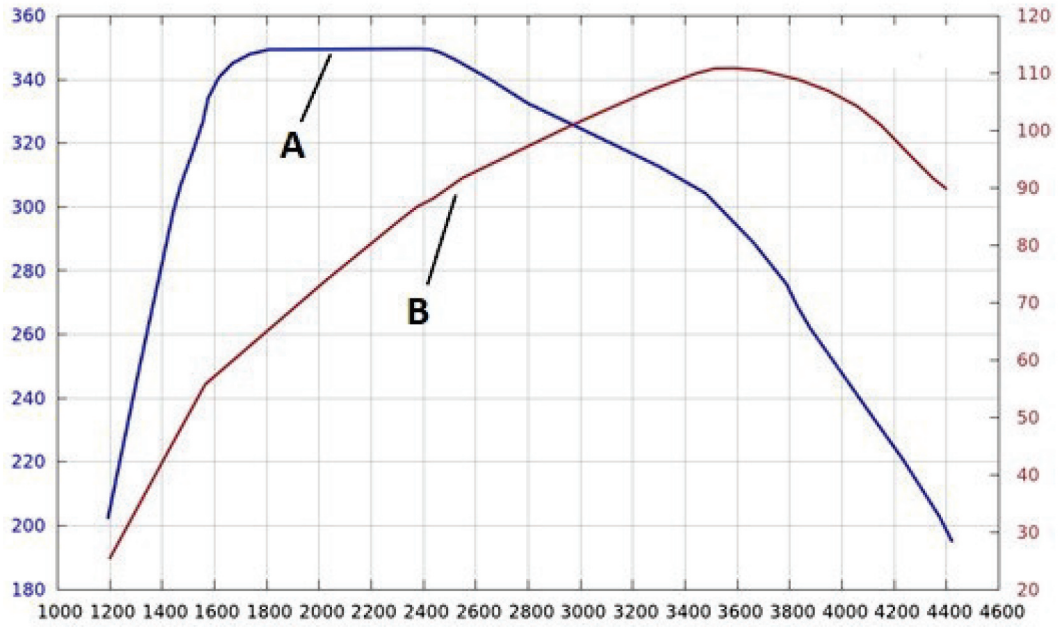


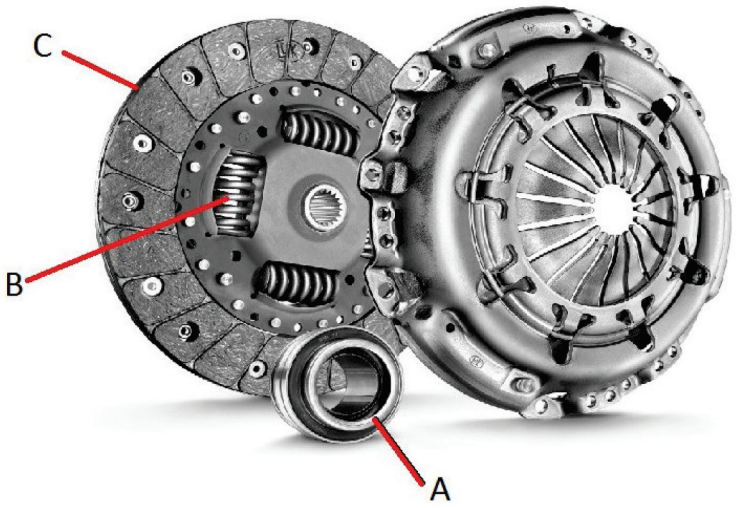
http://community.bugbeargames.com

Figure 1

4 a) In the graph shown in Figure 1, what does line A represent? (1 mark)

b) In the graph shown in Figure 1, what does line B represent? (1 mark)

c) What do the numbers on the X axis in Figure 1 represent? (1 mark)



http://x-engineer.org

Figure 2

5 a) Identify the type of clutch shown in Figure 2. (1 mark)

b) Using Figure 2, determine components A, B and C. (3 marks)

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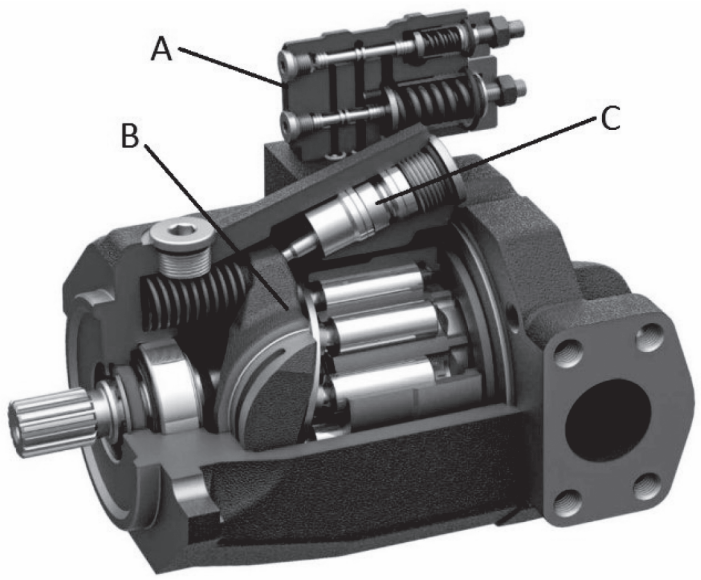
6 a) Explain **three** operational symptoms of worn synchronisers in a transmission system. (6 marks)

b) Describe how to check for synchroniser cone wear. (2 marks)

7 Explain **three main** advantages of a full-powershift transmission compared to a semi-powershift transmission. (6 marks)



http://www.directindustry.com

Figure 3

8 a) Identify the type of hydraulic pump shown in Figure 3. (2 marks)

b) Using Figure 3, identify the components labelled A and B. (2 marks)

9 A hydrostatic transmission circuit is overheating whilst driving. Describe **four** possible causes of the problem. (4 marks)

10 A typical epicyclic unit consisting of a sun gear, planatary gears, ring gear and planet carrier has a constant input speed on the sun gear.

a) What happens to the output speed if the ring gear is rotated in the opposite direction slower than the input? (1 mark)

b) What happens to the output speed if the ring gear is rotated in the same direction at the same speed as the input? (1 mark)

c) What is the gear ratio if the ring gear is rotated in the same direction at the same speed as the input? (1 mark)

d) What happens if the ring gear is rotated in the opposite direction faster than the input? (1 mark)

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11 A tractor has a full power-shift transmission with electro-hydraulic control and will not engage into the medium range. Discuss the preparation stages, resources and steps required to carry out a full diagnostic assessment. (12 marks)

End of examination