CARIBBEAN EXAMINATIONS COUNCIL

CARIBBEAN SECONDARY EDUCATION CERTIFICATE® EXAMINATION

07 MAY 2019 (a.m.)

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FILL IN ALL THE INFORMATION REQUESTED CLEARLY IN CAPITAL LETTERS.

TEST CODE | 0 | 1 | 3 | 7 | 3 | 0 | 2 | 0 |

SUBJECT INDUSTRIAL TECHNOLOGY
OPTION B – MECHANICAL ENGINEERING TECHNOLOGY – Paper 02

851

PROFICIENCY TECHNICAL

REGISTRATION NUMBER | | | | | | | | | | |

SCHOOL/CENTRE NUMBER					

NAME OF SCHOOL/CENTRE

A003

CANDIDATE'S FULL NAME (FIRST, MIDDLE, LAST)

DATE OF BIRTH | D | D | M | M | Y | Y | Y | Y |

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FORM TP 2019082

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MAY/JUNE 2019

CARIBBEAN EXAMINATIONS COUNCIL

CARIBBEAN SECONDARY EDUCATION CERTIFICATE® EXAMINATION

INDUSTRIAL TECHNOLOGY

OPTION B – MECHANICAL ENGINEERING TECHNOLOGY

Paper 02 – Technical Proficiency

2 hours 10 minutes

851

READ THE FOLLOWING INSTRUCTIONS CAREFULLY.

1. This paper consists of FIVE compulsory questions.
2. Use sketches where necessary to support your answers.
3. Write your answers in the spaces provided in this booklet.
4. Do NOT write in the margins.
5. You may use a silent, non-programmable calculator to answer questions.
6. This paper contains metric dimensions only. You should work your answers in the metric system.
7. You are advised to take some time to read through the paper and plan your answers.
8. If you need to rewrite any answer and there is not enough space to do so on the original page, you must use the extra lined page(s) provided at the back of this booklet. **Remember to draw a line through your original answer.**
9. **If you use the extra page(s) you MUST write the question number clearly in the box provided at the top of the extra page(s) and, where relevant, include the question part beside the answer.**

A003

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1. Figure 1 shows an aluminium mount for a desk mobile phone which mobile phone users can use when participating in hands-free conversations.

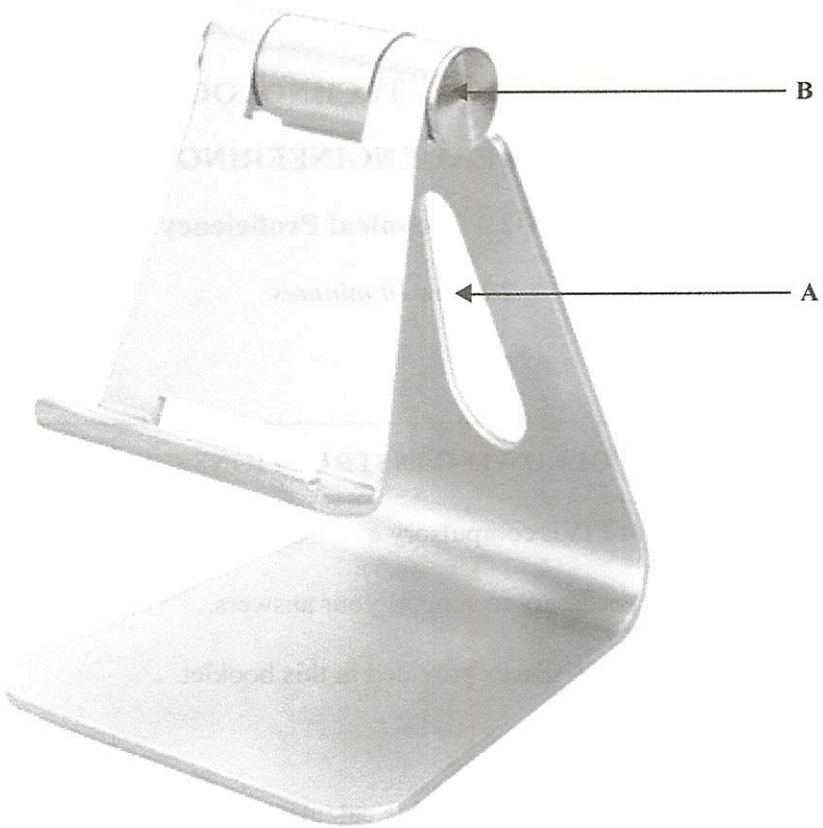


Figure 1. Aluminium desk mount for mobile phone

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(a) Outline the steps of procedure for cutting the slot labelled **A** in Figure 1.

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(6 marks)

(b) List SIX tools which may be used in combination to mark and cut out the slot labelled **A**.

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(6 marks)

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(c) You are required to modify the phone mount so that its angle can be adjusted at Point **B**, and can be quickly released and tightened by hand. With the aid of sketches, describe how this task can be accomplished.

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(6 marks)

Total 18 marks

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NOTHING HAS BEEN OMITTED.

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2. Figure 2 shows a simplified iron–carbon phase diagram, which is important in the heat treatment of steel.

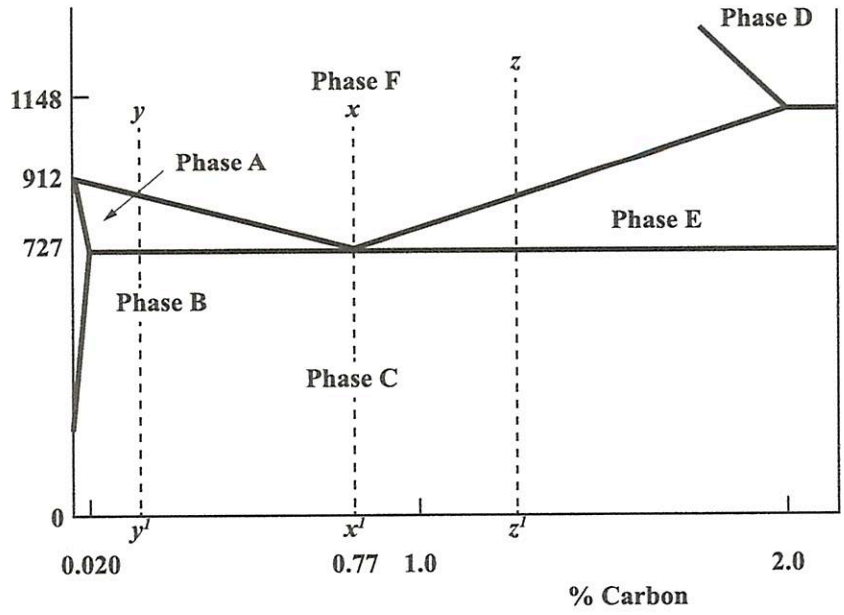


Figure 2. Simplified iron–carbon diagram for steel

(a) Identify EACH of the following labelled areas of the diagram.

Phase A .....

Phase B .....

Phase C .....

Phase D .....

Phase E .....

Phase F .....

(6 marks)

(b) List FOUR reasons why steel may be heat-treated.

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(6 marks)

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(c) State TWO media that may be used to quench tools.

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(2 marks)

(d) With reference to Figure 2, outline the steps involved in the

(i) full annealing of steel

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(3 marks)

(ii) normalizing of steel

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(3 marks)

Total 18 marks

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3. Welding is a fabrication process which joins metals by fusion. Figure 3 shows two pieces of 150 mm × 50 mm × 9 mm mild steel, which are to be electric arc welded using a vee-joint in the flat position.

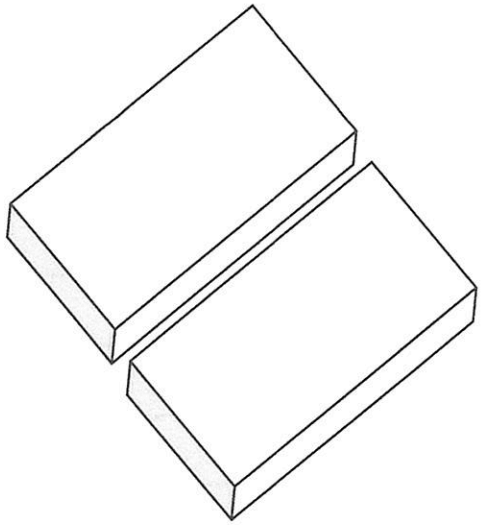


Figure 3. Steel plates to be welded

(a) Outline the steps involved in completing the weld joint using electric arc welding.

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(6 marks)

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(b) Name and describe THREE possible defects which may occur in this welded joint.

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(6 marks)

(c) Draw and label a cross-section of the vee-joint between the steel plates.

(6 marks)

Total 18 marks

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4. Figure 4 shows a sketch of the equipment used in drilling a 10 mm hole on the lathe.

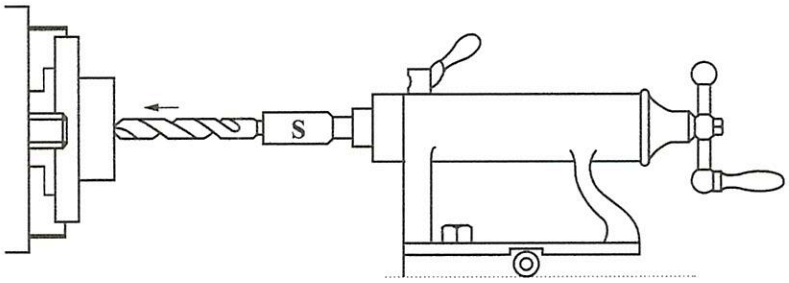


Figure 4. Drilling on the lathe

(a) Outline the steps of procedure for drilling the 10 mm hole in a bar of diameter 50 mm.

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(6 marks)

(b) List FOUR lathe tools or accessories which can be used to drill the 10 mm hole.

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(4 marks)

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(c) In the modern workshop, non-ferrous metals and plastics are used to create artifacts. The selection of non-ferrous metals and plastics depends on the application and the properties of the materials.

Complete Table 1 to show the following information:

- TWO non-ferrous metals
- TWO properties of EACH non-ferrous metal
- ONE application of EACH non-ferrous metal

TABLE 1: NON-FERROUS METALS AND APPLICATIONS

Non-Ferrous Metal	Properties	Application/Use
•	•	•
	•	
•	•	•
	•	

(8 marks)

Total 18 marks

5. Figure 5 shows a watering can made from 16-gauge tinplate. The primary purpose of the watering can is to conveniently water plants in a home garden.



Figure 5. Watering can

(a) List THREE joining methods which can be used in making the watering can.

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(3 marks)

(b) Outline ALL of the information that is required to produce a template for the development of the water spout.

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(6 marks)

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(c) With the aid of a sketch, outline the steps of procedure for making a template for the development of the spout.

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(6 marks)

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(d) Name THREE types of rivets which can be used to attach the handle to the body of the watering can.

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(3 marks)

Total 18 marks

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END OF TEST

IF YOU FINISH BEFORE TIME IS CALLED, CHECK YOUR WORK ON THIS TEST.

EXTRA SPACE

If you use this extra page, you MUST write the question number clearly in the box provided.

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CANDIDATE'S RECEIPT

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1. **Fill in all the information requested clearly in capital letters.**

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SUBJECT: INDUSTRIAL TECHNOLOGY
OPTION B – MECHANICAL ENGINEERING TECHNOLOGY – Paper 02

PROFICIENCY: TECHNICAL

REGISTRATION NUMBER: | | | | | | | | | | |

FULL NAME: _____
(BLOCK LETTERS)

Signature: _____

Date: _____

2. **Ensure that this slip is detached by the Supervisor or Invigilator and given to you when you hand in this booklet.**

3. **Keep it in a safe place until you have received your results.**

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INSTRUCTION TO SUPERVISOR/INVIGILATOR:

Sign the declaration below, detach this slip and hand it to the candidate as his/her receipt for this booklet collected by you.

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I hereby acknowledge receipt of the candidate's booklet for the examination stated above.

Signature: _____
Supervisor/Invigilator

Date: _____

