



**Coimisiún na Scrúduithe Stáit  
State Examinations Commission**

**LEAVING CERTIFICATE EXAMINATION, 2005**

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**ENGINEERING – MATERIALS AND TECHNOLOGY**

(Ordinary Level – 200 marks)

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FRIDAY, 24 JUNE, MORNING 9.30 – 12.00

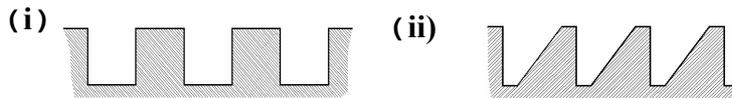
Answer **Sections A and B of Question 1** and **three** other questions.

OVER →

## SECTION A - 30 marks

Give **brief** answers to **any six** of the following:

- (a) List **two** safety precautions to be observed when using a centre lathe.  
 (b) Name the electrical component shown opposite.  
 (c) Explain the difference between a ferrous and a non-ferrous metal.  
 (d) Name a plastic material suitable for wall cavity insulation.  
 (e) Identify the **two** thread forms shown.

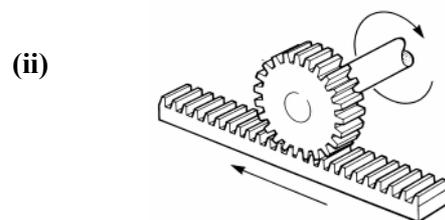
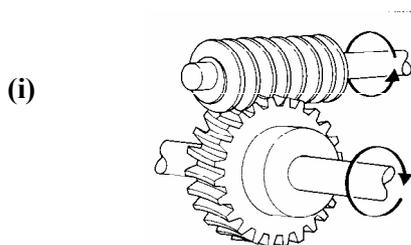


- (f) Name **two** computer output devices.  
 (g) Explain the following terms: (i) Tapping size hole, (ii) Clearance size hole.  
 (h) What is meant by the term Computer Aided Manufacture (CAM)?

## SECTION B - 35 marks

Answer **any three** of the following:

- (i) Describe the function and operation of **any one** of the following:  
 Variable resistor, Strip Heater, Thermostat.  
 (j) Explain **any two** of the computing terms:  
 DVD, Desktop, Broadband, CPU.  
 (k) Describe the main reasons for alloying and give **one** example of a metal alloy.  
 (l) Explain **any two** of the terms:  
 Self-locking nut, Light Dependent Resistor (LDR), Gearbox, Countersink drill.  
 (m) Name the **two** gear systems shown:



2.

(45 marks)

- (a) Name the furnaces used to produce **any three** of the following metals:
- (i) Mild Steel;
  - (ii) High Carbon Steel;
  - (iii) Pig Iron;
  - (iv) Cast Iron.
- (b) With the aid of a simple diagram, describe **one** of the furnaces in (a).
- (c) Give a suitable application for **any two** of the following metals:
- (i) Brass;
  - (ii) Lead;
  - (iii) Bronze.
- (d) Identify **two** methods for protecting steel from corrosion.

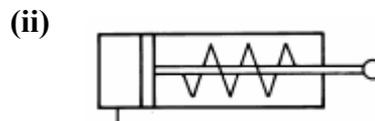
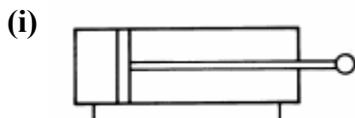
3.

(45 marks)

- (a) Explain what is meant by **any one** of the following:
- (i) Work hardening,      (ii) Case hardening,      (iii) Annealing.
- (b) Name the materials used in the manufacture of **any two** of the following:
- (i) Hand file,      (ii) Twist Drill,      (iii) Screwdriver point.
- (c) Describe how the cutting edge of a cold chisel is:
- (i) Hardened;
  - (ii) Tempered.
- (d) Explain **each** of the following in relation to the properties of metals.
- (i) Malleability,      (ii) Ductility.

OR

- (d) Name **each** of the pneumatic cylinders below:



4.

(45 marks)

(a) Name the type of flame produced with **each** of the following gas settings:

(i) Equal balance between oxygen and acetylene;

(ii) Excess acetylene;

(iii) Excess oxygen.

(b) State the purpose of **any three** of the following welding terms:

(i) Flux, (ii) Filler rod, (iii) Pressure gauge, (iv) Generator.

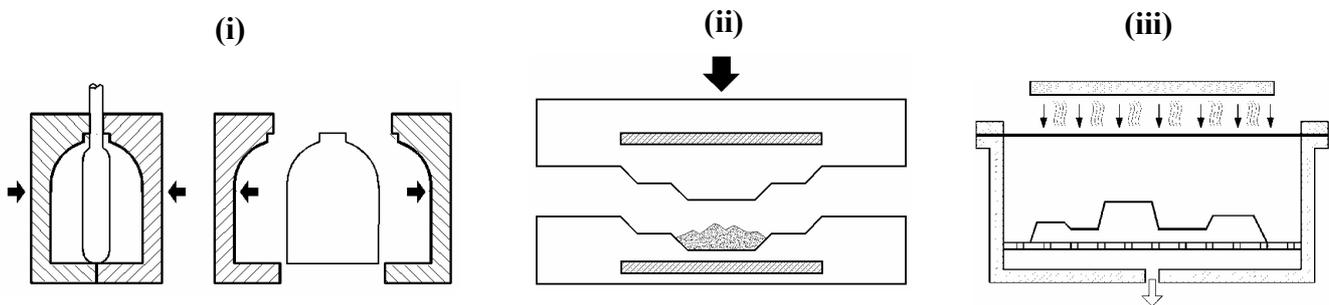
(c) Describe **three** steps necessary to ensure a successful soft soldered joint.

(d) A face shield must be worn when arc welding. Explain **two** reasons for this.

5.

(45 marks)

(a) Three manufacturing processes for the production of plastic components are shown. Name **each** process.



(b) For **one** of the processes in (a):

(i) Describe how the component is formed;

(ii) Identify a suitable component produced.

(c) Describe **any two** of the following terms associated with plastics:

(i) Thermoplastic, (ii) Elastic memory, (iii) Thermosetting plastic.

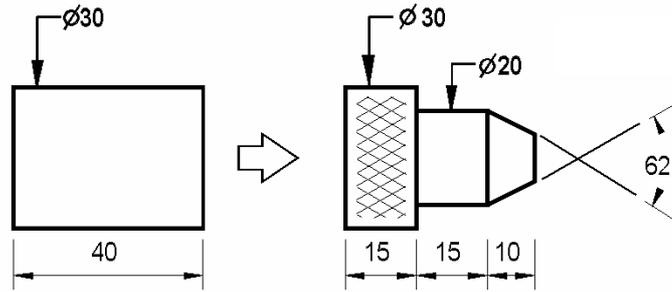
(d) Identify **two** safety precautions to be observed when using adhesives.

OVER →

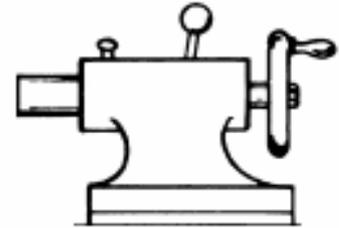
6.

(45 marks)

- (a) The part shown is to be turned on a centre lathe from a 30 mm diameter aluminium bar. Name **three** of the turning operations used during its production.



- (b) (i) Identify the lathe component shown opposite.  
(ii) Describe **two ways** in which it may be used on the lathe.



- (c) Explain **any two** of the following terms:  
(i) Rake angle, (ii) Centre drill, (iii) Clearance angle.

OR

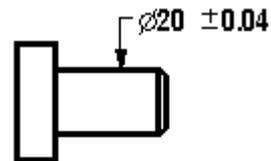
- (c) Describe **two** advantages in using a CNC lathe instead of a manual lathe.

7.

(45 marks)

- (a) A steel shaft is manufactured to the dimensions shown.

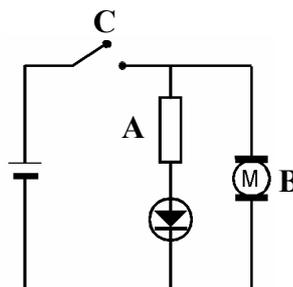
- State the
- (i) Nominal diameter of the shaft;
  - (ii) Maximum diameter of the shaft;
  - (iii) Minimum diameter of the shaft;
  - (iv) Tolerance on the shaft.



- (b) Using sketches, explain the difference between an interference fit and clearance fit of a hole and shaft assembly.  
(c) Describe **any three** of the following:  
(i) Plug gauge, (ii) Vernier height gauge, (iii) Gap gauge, (iv) Feeler gauge.

OR

- (c) Name the components **A** and **B** and explain the operation of the circuit when switch **C** is closed.



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