

**AN ROINN OIDEACHAIS AGUS EOLAÍOCHTA
LEAVING CERTIFICATE EXAMINATION, 2001**

ENGINEERING - MATERIALS AND TECHNOLOGY
(Ordinary Level - 200 marks)

THURSDAY, 21 JUNE - AFTERNOON 2.00 to 4.30 p.m.

Answer **Question 1, Section A and B**, and **any three** other questions.

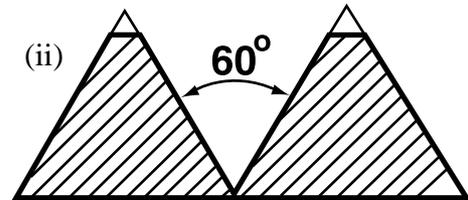
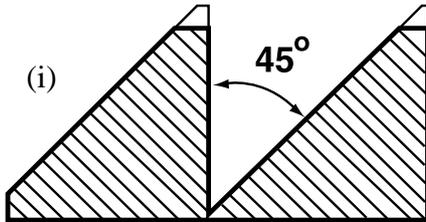
1.

(65 marks)

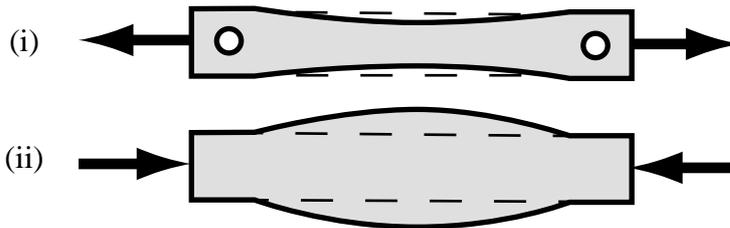
Section A - 30 marks

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

- (a) Name a plastic material suitable for wall insulation.
- (b) Explain the abbreviations A.C. and D.C. in relation to an electricity supply source.
- (c) Name two non-ferrous metals.
- (d) Name the two screw threads shown.



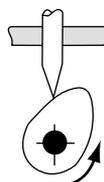
- (e) Name two safety precautions to be observed when using an electric arc welder.
- (f) What is haematite?
- (g) Name the ores from which copper and aluminium are produced.
- (h) Identify the two types of force shown.



Section B - 35 marks

Answer **any three** of the following:

- (i) Describe the function and operation of **any one** of the following:
Bicycle dynamo; Electric soldering iron; Plotter.
- (j) Explain **any two** of the computing terms:
byte; downloading; icon; input device.
- (k) Define elasticity in relation to the properties of metals.
- (l) Explain **any two** of the terms:
Polymer; Insulator; Computer Numerical Control (CNC).
- (m) Name the mechanism shown and explain the type of motion it produces.



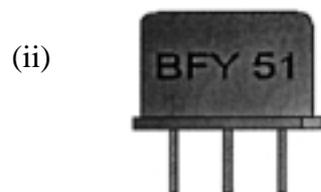
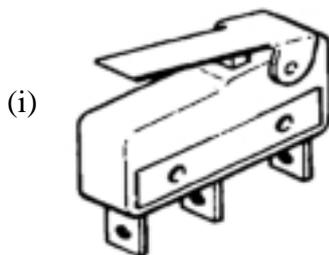
2. (45 marks)
- (a) Explain what is meant by the term 'work hardening'. How can the condition be treated.
 - (b) Explain why low carbon steel may be case hardened, rather than hardened.
 - (c) What does normalising mean?
 - (d) Compare the process of hot rolling and cold rolling of metals, listing the advantages and disadvantages of each.

3. (45 marks)
- (a) Name **three** modern methods used for the production of steel, and describe **one** method with the aid of a labelled diagram.
 - (b) What is an alloy?
 - (c) Name the materials used and the reason for the choice in the manufacture of the following:
 - (i) Lathe bed; (ii) Centre punch; (iii) Motor cycle Windshield.
 - (d) Name the ores from which tin and lead are produced.

4. (45 marks)
- (a) What two gases are most commonly mixed to give a flame hot enough for welding?
 - (b) Explain the differences between a passive and an active flux in the soldering process.
 - (c) Explain the basic differences between gas welding and manual arc welding.
 - (d) Explain the function of fluxed electrodes in manual arc welding.

OR

- (d) Name the two electrical components shown.



5.

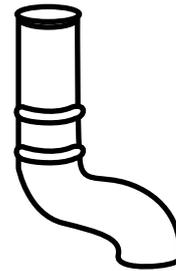
(45 marks)

- (a) What are the main differences between thermoplastic and thermosetting plastics.
- (b) Describe **one** of the following processes used to form plastics:
(i) Vacuum forming; (ii) Blow moulding; (iii) Compression moulding.
- (c) Name **three** safety precautions to be observed when using a Plastics Dip Coating Tank.
- (d) Name the plastic used in the manufacture of the two components shown:

Safety Goggles



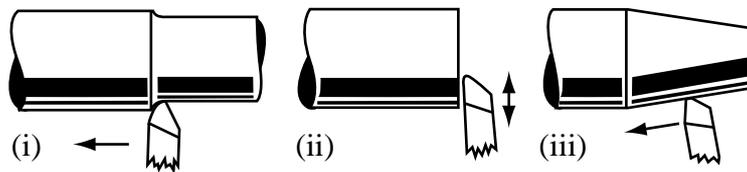
Drain Pipe



6.

(45 marks)

- (a) Name the lathe turning operations shown.



- (b) Describe **one** of the following work holding methods used in machining, and state the type of work machined.
(i) Between centres; (ii) Mandrel; (iii) Independent jaw chuck.
- (c) Sketch a lathe cutting tool, showing the following angles:
(i) Top rake; (ii) Front clearance; (iii) Side clearance.

OR

- (c) Name **three** advantages of a CNC lathe over a conventional lathe.

7.

(45 marks)

- (a) Explain (i) Interference fit; (ii) Clearance fit and (iii) Transition fit.
- (b) A shaft is to be made 80 ± 0.05 . Determine:
(i) The maximum diameter of the shaft;
(ii) The minimum diameter of the shaft;
(iii) The tolerance on the shaft.
- (c) Explain, with the aid of sketches, the following thread terms: (i) Pitch; (ii) Crest; (iii) Root.

OR

Explain clearly the purpose of **any three** of the following:

- (i) Diode; (ii) Solar cell; (iii) Reamer; (iv) Centre drill.

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