

M.72

**AN ROINN OIDEACHAIS AGUS EOLAÍOCHTA
LEAVING CERTIFICATE EXAMINATION, 2002**

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

THURSDAY 20 JUNE AFTERNOON 2.00 to 4.30

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

OVER →

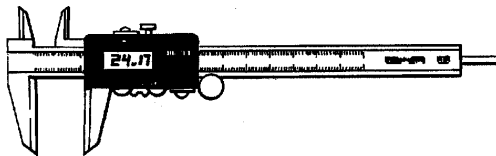
SECTION A - 30 marks

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

- (a) What is meant by capillary action?
 (b) Name the electrical component shown.



- (c) Give an example where annealing of metals is required.
 (d) Name **two** forms of screw thread.
 (e) Name the gauge shown and give an application for its use.

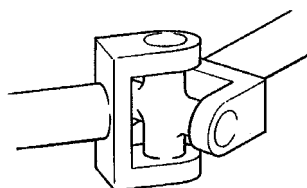


- (f) Name **two** forms of hard soldering.
 (g) Name **two** methods of holding work when machining.
 (h) Name **two** safety precautions to be observed when using a pedestal drilling machine.

SECTION B - 35 marks

Answer **any three** of the following:

- (i) Describe the function and operation of **any one** of the following:
 Multimeter; Scanner; Light Dependent Resistor (LDR).
 (j) Explain **any two** of the computer terms:
 WWW, Computer Control, ROM, Desk Top Publishing.
 (k) Explain the function and operation of the device shown.



- (l) Name a manufacturing process where the terms *charging bell* and *tuyere* are used.
 (m) Give an example of the application of a rack and pinion mechanism.

2.

(45 marks)

- (a) Distinguish between hardening and annealing of metals.
- (b) (i) Explain how a centre punch made from high carbon steel is tempered after hardening;
(ii) Why is this process necessary?
- (c) State the type of heat treatment used in each of the following cases:
(i) A screwdriver point made from mild steel;
(ii) A copper candle holder which is hammered to shape.
- (d) Explain the following terms in relation to the properties of metals:
(i) Conductivity;
(ii) Elasticity.

3.

(45 marks)

- (a) Name the process used to produce each of the following materials:
(i) Pig Iron; (ii) Steel; (iii) Cast Iron.
- (b) With the aid of a diagram, explain **one** of the processes in (a).
- (c) What metals make up the composition of soft solder?
- (d) Name **two** non-ferrous metals.

OR

- (d) Name **two** types of electrical circuit.

4.

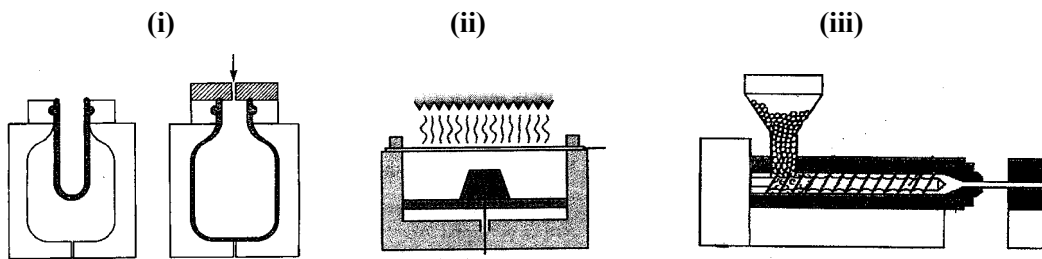
(45 marks)

- (a) Answer the following briefly with regard to the soldering of components on a circuit board:
- (i) What is the heat source used;
 - (ii) Why is the selection of flux important?
 - (iii) How is the flux applied?
 - (iv) What is the melting point of solder?
- (b) Explain the differences between the following in relation to oxy-acetylene welding:
- (i) Neutral flame;
 - (ii) Oxidising flame;
 - (iii) Carburising flame.
- (c) Name **three** safety precautions to be observed when using electric arc welding equipment.

5.

(45 marks)

- (a) Explain **three** methods used to join plastics.
- (b) Name the following moulding processes which are used in the production of plastic components:



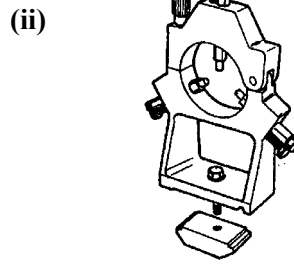
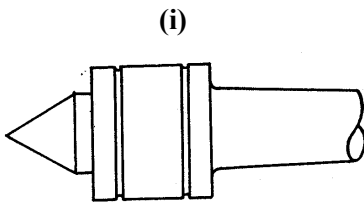
- (c) Describe **one** process in (b) identifying the components it produces.
- (d) Name **two** safety precautions to be observed, when using the Plastics Dip Coating tank.

OVER →

6.

(45 marks)

- (a) Name the lathe tools shown and explain the function of **one**.



- (b) State **two** uses for a lathe tailstock.

- (c) What is the purpose of reaming?

- (d) Give **two** reasons why the bed of a lathe is made from cast iron.

OR

- (d) List **two** advantages of using a CNC lathe as compared to a conventional lathe.

7.

(45 marks)

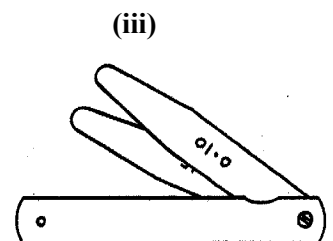
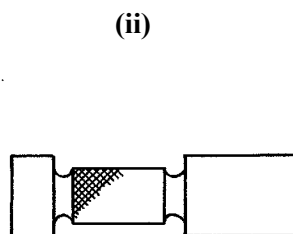
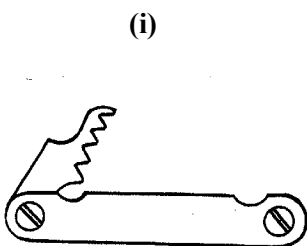
- (a) In relation to limits and fits, explain the following:

- (i) Interference fit; (ii) Clearance fit.

- (b) A shaft is to be manufactured to a diameter of 80 ± 0.05 mm. Determine:

- (i) The maximum diameter of the shaft;
(ii) The minimum diameter of the shaft;
(iii) The tolerance on the shaft.

- (c) Name the **three** gauges shown and give an application for **any one**.



OR

- (c) Explain the operation of **any one** of the following:

- (i) Single acting pneumatic cylinder;
(ii) Transistor.