Coimisiún na Scrúduithe Stáit
State Examinations Commission

LEAVING CERTIFICATE EXAMINATION, 2003

ENGINEERING - MATERIALS AND TECHNOLOGY

(Ordinary Level - 200 marks)

THURSDAY, 19 JUNE, AFTERNOON 2.00 - 4.30

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

OVER →

1. **(65 marks)**

SECTION A - 30 marks

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

(a) List **two** safety precautions to be observed when using an electric strip heater to bend plastics.

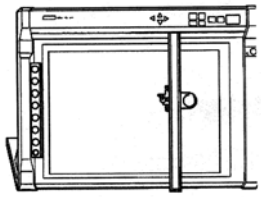
(b) What do the letters LED stand for in electronic circuits?

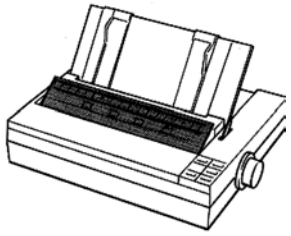
(c) Name **two** types of hard soldering.

(d) Name the metals derived from the following ores:

(a) Galena; (b) Bauxite.

(e) What is the essential difference between a plotter and a printer?





(f) Name the plastics used to produce (i) a Gear Wheel and (ii) a 3-Pin Plug.

(g) Name **two** types of screw thread.

(h) Name **two** electrical measuring instruments.

SECTION B - 35 marks

Answer **any three** of the following:

(i) Describe the function and operation of **any one** of the following:

Feeler gauge, Single acting pneumatic cylinder, Light Dependent Resistor (LDR).

(j) Explain **any two** of the computing terms:

CD-ROM, Graphics Card, Software, Formatting.

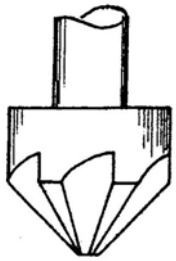
(k) Define ductility in relation to the properties of metals and give **one** example of a ductile metal.

(l) Explain **any two** of the terms:

Knurling, Enamelling, Conductor, Reaming.

(m) Name the two cutting tools shown:

(i) 

(ii) 

2. **(45 marks)**

(a) Name the metals produced in the following furnaces:

(i) Cupola;

(ii) Blast Furnace;

(iii) Electric Arc Furnace;

(iv) Basic Oxygen Furnace.

(b) What is the essential difference between ferrous and non-ferrous metals and give one example of each?

(c) Name the materials used to manufacture:

(i) Bit of a soldering iron;

(ii) TV aerial;

(iii) Scriber.

(d) State **one** industrial application for lead.

3. **(45 marks)**

(a) Name **three** different methods used in the heat treatment of steel.

(b) Describe the carburising process for case-hardening mild steel components.

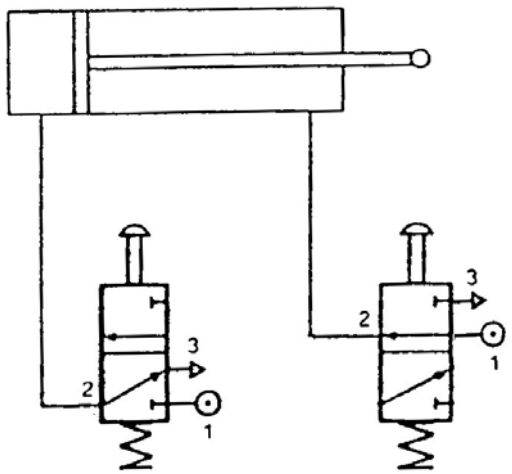
(c) Explain the effect of heat treatment on copper.

(d) **(i)** Explain hardness in relation to the properties of metals.

(ii) What is work hardening?

OR

(d) Explain how the pneumatic circuit shown operates and give an example of the use of such a circuit.



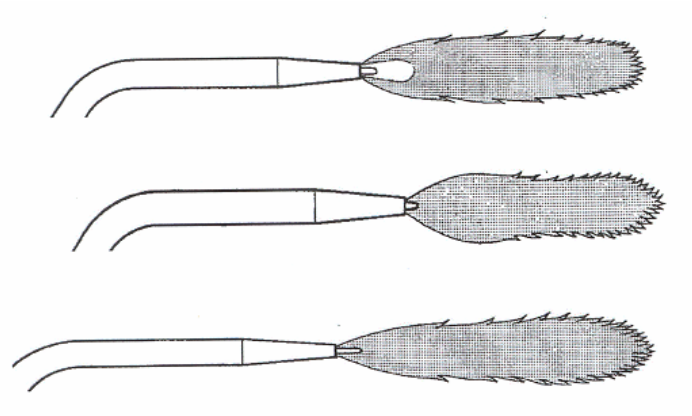
4. **(45 marks)**

(a) Identify the three types of oxyacetylene flame below:

(i)

(ii)

(iii)



(b) How is protection from oxides achieved during electric arc welding?

(c) Name the process used for making a permanent joint in each of the following materials:

(i) Light gauge aluminium;

(ii) Tinplate;

(iii) Mild steel plate.

(d) Name **<u>two</u>** safety precautions to be taken when operating electric arc welding equipment.

<u>OR</u>

(d) Sketch the symbols for the following components in an electrical circuit:

(i) Buzzer;

(ii) LED;

(iii) Motor.

5. **(45 marks)**

(a) Explain the following terms associated with the technology of plastics:

(i) Thermosetting;

(ii) Thermoplastic.

(b) Name **<u>three</u>** industrial manufacturing processes for producing articles from plastics.

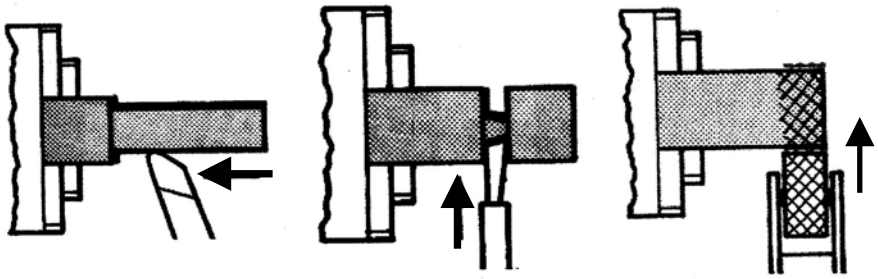
(c) Describe **<u>one</u>** process from **(b)** above, with the aid of a diagram, and identify the article produced.

(d) Name a plastic used in the manufacture of insulation.

OVER →

6. **(45 marks)**

(a) Identify the turning operations shown:



(i) **(ii)** **(iii)**

(b) Explain the necessity for clearance and rake angles on a lathe cutting tool.

(c) Name **three** methods of taper turning on the centre lathe and explain **one** method with the aid of a diagram and note.

7. **(45 marks)**

(a) A shaft is made to the following dimensions 80mm ± 0.05.

State the
(i) Nominal Diameter;
(ii) Upper Limit;
(iii) Lower Limit;
(iv) Tolerance.

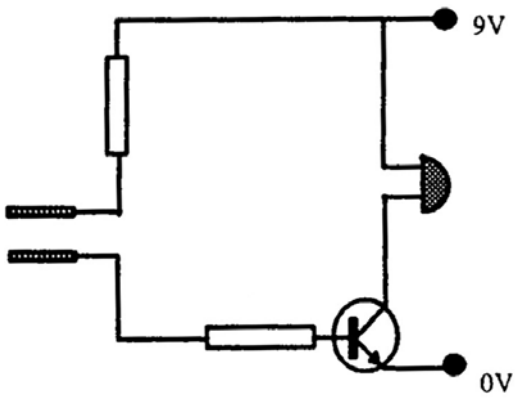
(b) Explain the following:

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

(c) Name the gauges shown and explain their function in relation to limits and fits.

OR

(c) Explain a function for the circuit shown and what purpose the transistor serves?



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