LEAVING CERTIFICATE EXAMINATION, 1997

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

FRIDAY, 27 JUNE - AFTERNOON 2.00 to 4.30

Answer <u>Question 1, Sections A and B</u>, and <u>any three</u> other questions

1.   **(65 marks)**

<u>SECTION A - 30 marks</u>

Give <u>brief</u> answers to <u>any six</u> of the following:

(a) Name <u>two</u> safety precautions to be observed when using electrical power tools.

(b) State <u>two</u> main reasons for annealing metals.
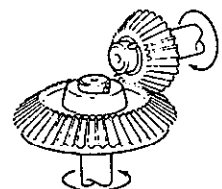
(c) Name the gauges shown.

(i)   **(ii)**

(d) Name <u>two</u> types of pneumatic compressor.

(e) Explain the function of a fuse in an electrical circuit.

(f) Give the reading of the micrometer screw gauge.

(g) What is meant by the *set* of hacksaw teeth?

**(h)** What is the function of a variable resistor in a circuit?
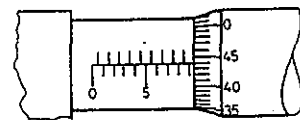
<u>SECTION B - 35 marks</u>

Answer <u>any three</u> of the following:

(i) Describe the function and operation of <u>any one</u> of the following:

    (i) Plastics dip coating tank;

    (ii) Morse taper sleeve;

    (iii) Electrical solenoid.

(j) Explain <u>any two</u> of the computing terms; CD-ROM, Plotter, INTERNET, Input Device.

(k) Name the gears shown and give an application for their use.

(l) Explain <u>any two</u> of the terms: Matrix board, Blind hole, Mottling, Torsion.

(m) Name the gauge shown and explain its function.

OVER →
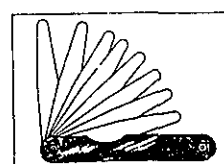
2. (45 marks)

(a) Using a **simple line drawing** describe the mass production of mild steel. Label the following on your drawing:

    (i) Ore used;
    (ii) Furnace used in smelting;
    (iii) Furnace used in the production of steel;
    (iv) The percentage of carbon in mild steel.

(b) What is the essential difference between bright and black mild steel?

(c) List **two** properties of cast iron.

(d) Explain the terms; *Ductility* and *Malleability*.

3. (45 marks)

(a) Name the **three main classes** of fit in the assembly between a hole and shaft and explain the purpose of each class of fit.

(b) The limits of a hole and shaft assembly are shown in the table below.

LIMITS	HOLE	SHAFT
High Limit	60.03	60.051
Low Limit	60.00	60.032

    State: (i) The tolerance on each part;
           (ii) The maximum allowance;
           (iii) The minimum allowance;
           (iv) The type of fit.

OR

(b) Describe the operation of **one** of the following:

    (i) A control system operated by a bi-metal strip;
    (ii) A *Pop Rivet Gun*.

4.

(a) Explain the principal difference between hard soldering and soft soldering.

(b) Describe the process of brazing and refer especially to the following:

(i) Composition of filler rod;

(ii) Fusion temperature;

(iii) Type of Flux;

(iv) Source of heat.

(c) Name **two** safety precautions to be observed during the process of brazing.

(d) Name an electric arc welding process where an uncoated electrode is used.

OR

(d) Name the component below and explain the function of 1, 2, and 3.
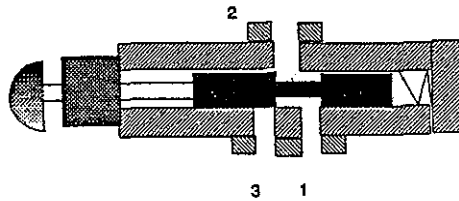

5. (45 marks)

(a) Explain the following terms, used in plastics technology:

(i) Monomer   (ii) Polymer

(b) Name the plastics which would be best suited for the following applications and state whether they are thermosetting or thermoplastic materials.

(i) Bearings;

(ii) Cavity of dwelling house walls;

(iii) Electronic breadboard.

(c) Explain **any two** uses for the following processes:

(i) Dip coating;   (ii) Stripheating;

(iii) Laminating;   (iv) Blow moulding.

6.

(a) Identify **the six** illustrations.
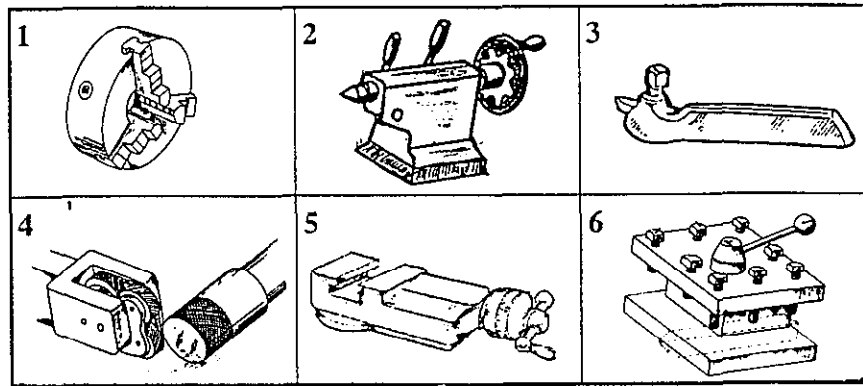
(b) Describe with the aid of a sketch, how you would use a mandrel when turning a piece of work.

(c) Name **three** methods of taper turning.

OR

(c) Explain the following terms associated with a CNC lathe and use simple line diagrams to illustrate your answer.

    (i) Incremental Co-ordinates;

    (ii) Absolute Co-ordinates;

    (iii) Tool Park Position;

    (iv) Linear interpolation.

7.

(a) Name the alloy formed by:

    (i) lead and tin;

    (ii) copper and zinc.

(b) Name **two** precious metals.

(c) Describe how copper is annealed and give an example of its use.

(d) In the production of copper, name the **final product** after smelting the copper concentrates.