

LEAVING CERTIFICATE EXAMINATION, 1996

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

FRIDAY, 21 JUNE - AFTERNOON 2.00 to 4.30

Answer Question 1 and any three other questions

1.

(65 marks)

SECTION A - 30 marks

Give brief answers to any six of the following:

- (a) Select a suitable plastic material for each of the following applications:
 - (i) Safety helmet
 - (ii) A transparent cover for an instrument.
- (b) List two safety precautions to be observed when using oxyacetylene equipment.
- (c) Name the ores from which copper and lead are produced.
- (d) Explain the essential difference between an ammeter and a voltmeter.
- (e) List two properties possessed by metals which are suitable for extrusion.
- (f) Explain the essential difference between hard and soft soldering.
- (g) Explain the function of a diode in an electrical circuit.
- (h) Give an example of the following types of motion:
 - (i) Linear motion;
 - (ii) Reciprocating motion.

SECTION B - 35 marks

- (i) Describe the function and operation of any one of the following:
 - (i) Three-two port valve;
 - (ii) Electric soldering iron;
 - (iii) Thread gauge.
- (j) Explain any two of the computing terms; software, CAD, VDU, hard disk.
- (k) Explain the function of a capacitor in an electrical circuit.
- (l) Explain any two of the terms: wire gauge, semi-conductor, compressor, reamer, AND gate.

2.

(45 marks)

- (a) Name the processes used to produce each of the following materials:
(i) Copper (ii) Wrought Iron (iii) Aluminium (iv) Steel.
- (b) With the aid of a line diagram, explain one of the processes in (a).
- (c) What is an alloy?
- (d) Give two practical applications for the use of silver steel.

3.

(45 marks)

- (a) Describe the process and purpose of tempering.
- (b) State two differences between:
(i) annealing; (ii) ductility.
- (c) Describe the process of pack hardening (case-hardening) and give one example for its use.
- (d) Identify two other methods of surface hardening.

4.

(45 marks)

- (a) Explain the difference between soldering, brazing and welding in terms of:
(i) temperatures required; (ii) strength of joint;
(iii) form of final joint; (iv) types of flux.
- (b) Explain, with the aid of a diagram, the operation of the electric arc process.
- (c) Name two safety precautions to be observed when operating the electric arc process.
- (d) What is the essential difference between the direct current supply and alternating current supply in the electric arc process?

5.

(45 marks)

- (a) Name three thermoplastic materials and state a typical application.
- (b) With the aid of a diagram describe the process of blow moulding.
- (c) Some car bumpers are injection moulded in polypropylene. What properties make this material suitable for the product?
- (d) Describe the type of plastic used to produce:
(i) garden hose;
(ii) body of a three pin plug.

6.

(45 marks)

- (a) Explain the meaning of the following centre lathe terms:
- (i) leadscrew;
 - (ii) travelling steady;
 - (iii) face plate;
 - (iv) mandrel.
- (b) With the aid of sketches describe the mechanism of a 3-jaw self centring chuck.
- (c) Why are chucks usually supplied with two sets of jaws?
- (d) What is meant by the terms, rake and clearance as applied to cutting edges?

OR

Explain three of the following terms associated with the CNC lathe:

- (i) the types of co-ordinates used;
- (ii) safety switch;
- (iii) spindle start forward;
- (iv) linear interpolation.

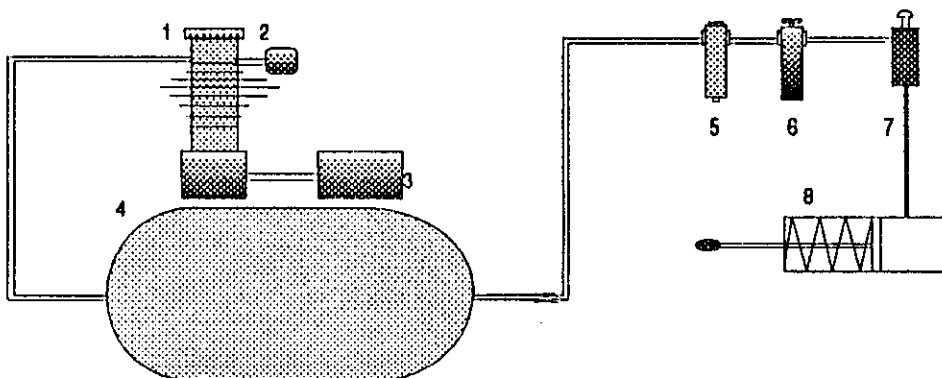
7.

(45 marks)

- (a) Name three principal classes of fit and give an example of each one.
- (b) Define the term tolerance as used in a system of limits and fits.
- (c) Holes and shafts of 80 mm nominal diameter are machined so as to give a precision location fit when assembled. The following conditions are specified:
- (i) Minimum hole diameter 80.00 mm
 - (ii) Minimum shaft diameter 79.971 mm
 - (iii) Minimum clearance 0.010 mm
 - (iv) Maximum clearance 0.059 mm

Determine the tolerance for the shaft and the hole

OR



The layout of a pneumatic system is shown. Identify the components labelled and state the function of any five.