

LEAVING CERTIFICATE EXAMINATION, 1998

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

4419

FRIDAY, 26 JUNE - AFTERNOON 2.00 to 4.30

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

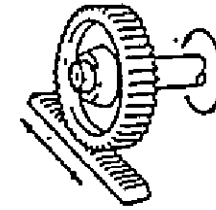
1.

(65 marks)

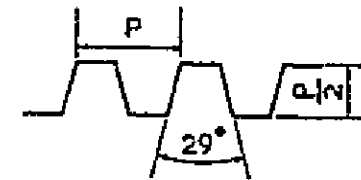
SECTION A - 30 marks

Give brief answers to any six of the following:

- (a) Explain the essential difference between thermoplastic and thermosetting plastics.
- (b) What is meant by the **fusion process** in the joining of metals.
- (c) Name two properties of cast iron.
- (d) State two safeguards necessary when using adhesives in the workshop.
- (e) Name the gear mechanism shown and give an application for its use.



- (f) Explain the difference between a **ferrous** and a **non-ferrous metal**. Give an example of each.
- (g) Name the thread form and give an application for its use.



- (h) Name two materials suitable for the following electrical applications:
 - (i) Insulation
 - (ii) Conduction

SECTION B - 35 marks

Answer any three of the following:

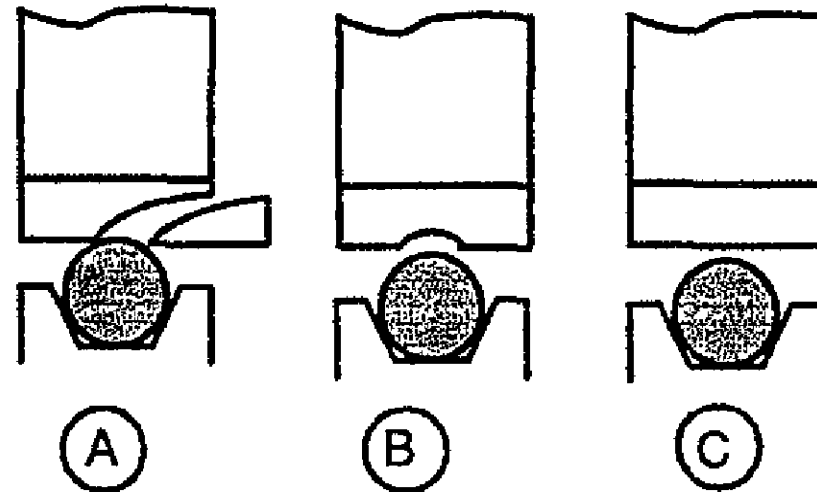
- (i) Describe the function and operation of any one of the following:
 - (i) Electronic relay
 - (ii) Feeler gauge
 - (iii) Pneumatic shuttle valve.
- (j) Explain any two of the computing terms:
Modem, Plotter, Scanner, Inkjet Printer, Laptop.
- (k) Define **interference** as used in a system of limits and fits.
- (l) Explain any two of the terms:
Gap Gauge, Voltmeter, Extrusion, Diode.
- (m) Name the lathe attachment shown and give an application for its use.



2.

(45 marks)

- (a) Describe in detail, naming the processes, the procedure for hardening and tempering a cold chisel.
- (b) On testing a number of chisels the results below were experienced.
Explain A, B and C.



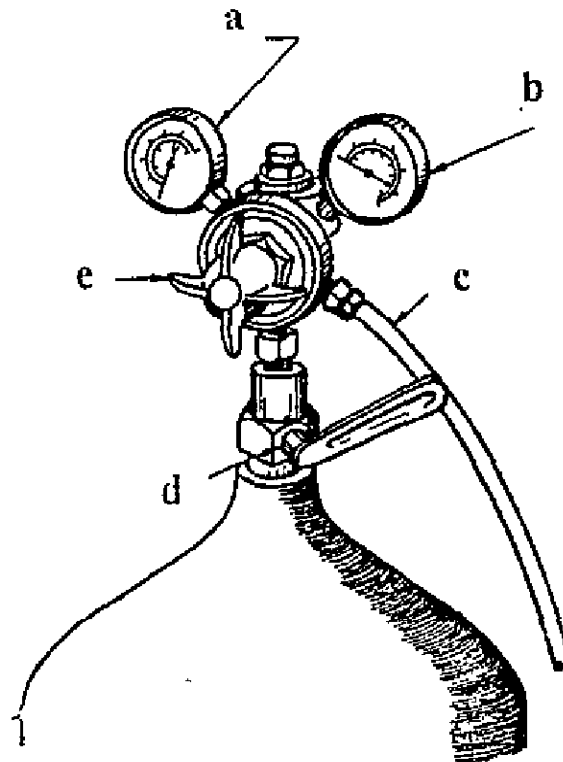
- (c) Describe the essential difference between cold rolling and hot rolling of mild steel.
- (d) Explain why low carbon steels are case-hardened rather than hardened and tempered.

3.

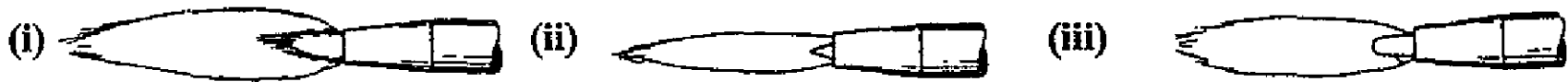
(45 marks)

- (a) Describe in stages how cast iron is produced.
- (b) Name three pieces of equipment produced from cast iron, listing the advantages over other metals.
- (c) Give brief descriptions of the properties and uses of the following metals:
(i) Mild Steel; (ii) Copper; (iii) Carbon Steel; (iv) Aluminium.

- (a) Identify the components marked a,b,c,d,e on the gas cylinder shown.



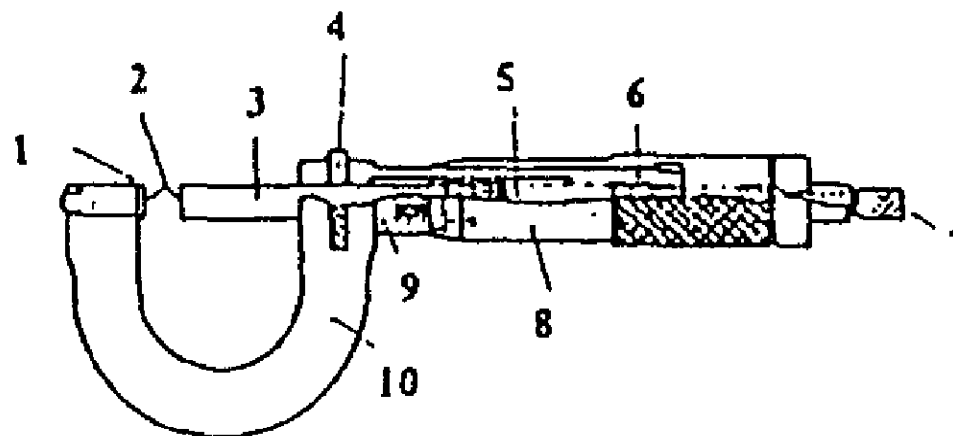
- (b) Name the type of flame shown in each diagram:



- (c) Name three safety precautions to be observed when using the Oxy/Acetylene welding process.
 (d) Name two other welding processes and give a simple description.

OR

- (d) Name the main parts of the micrometer screw gauge shown.



- (a) Blow Moulding, Extrusion and Vacuum Moulding are three methods of manufacturing plastic components.

With the aid of a diagram explain the construction and operation of one method and the type of article which is produced.

- (b) Explain the purpose of the following:

(i) Strip Heating; (ii) Laminating; (iii) Dip Coating.

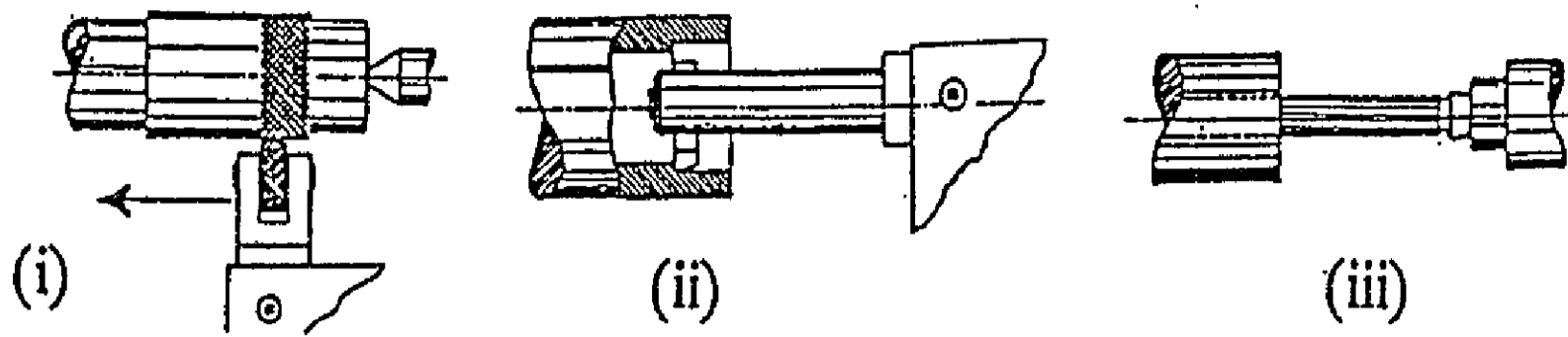
- (c) Name the plastics usually associated with the following applications:

(i) Computer Keyboard; (ii) Thermal Insulation; (iii) Bearings.

6.

(45 marks)

(a) Name the lathe processes shown and give an application for each:



(b) Name two safety precautions to be observed for each of the lathe processes shown above.

(c) With the aid of a diagram show how the tailstock is guided along the bed of the lathe.

(d) Make a simple sketch of the centre lathe to indicate the following:

(i) Swing; (ii) Distance along bed; (iii) Distance between centres.

OR

(d) Name the three planes of movement in a Computer Numerical Control (CNC) lathe.

7.

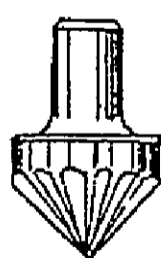
(45 marks)

(a) What is meant by a transition fit in the ISO system of limits and fits?

(b) A shaft is made to the dimensions 80 ± 0.05 . State the following:

(i) Nominal dimension; (ii) Upper Limit; (iii) Lower Limit; (iv) Tolerance.

(c) Describe each of the cutting tools shown and give an example of their use:



(i)



(ii)



(iii)

OR

(c) Explain the following terms:

(i) Mottling; (ii) Enamelling; (iii) Etching.