



**Coimisiún na Scrúduithe Stáit
State Examinations Commission**

LEAVING CERTIFICATE EXAMINATION, 2011

ENGINEERING – MATERIALS AND TECHNOLOGY

(Ordinary Level – 200 marks)

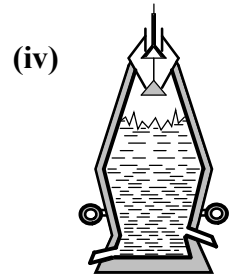
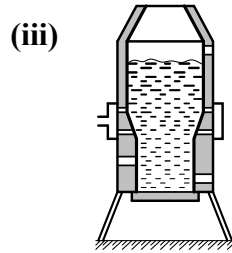
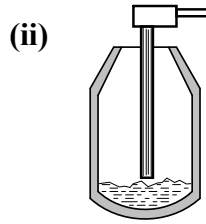
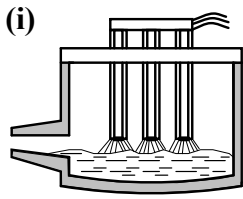
THURSDAY, 9 JUNE, MORNING 9:30 – 12:00

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

Question 2.

(45 marks)

(a) Name and state the functions of **any three** of the following furnaces.



(b) Describe **any three** of the following:

(i) High carbon steel, (ii) Metal ore, (iii) Tinplate, (iv) Tuyere.

(c) Name suitable components manufactured from **any three** of the following metals:

(i) Aluminium, (ii) Cast iron, (iii) Lead, (iv) High-speed steel.

(d) State **two** advantages of using metal alloys.

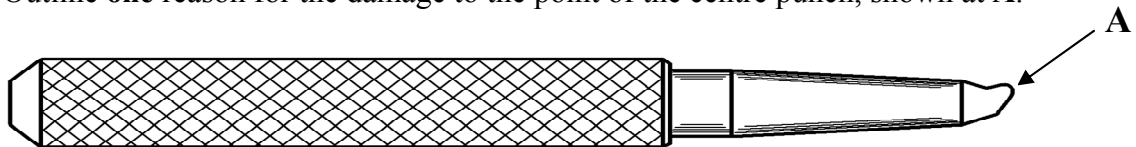
Question 3.

(45 marks)

(a) Describe **any two** of the following heat treatment processes:

(i) Hardening, (ii) Annealing, (iii) Tempering.

(b) (i) Outline **one** reason for the damage to the point of the centre punch, shown at A.



(ii) Explain **one** method to prevent damage to the point of a centre punch.

(c) State **two** safety precautions to be observed when using water for *cooling* during heat treatment.

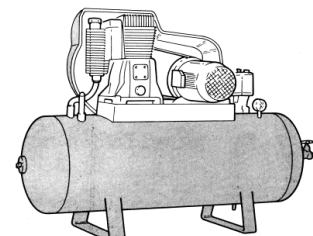
(d) Describe **any two** of the following material properties:

(i) Brittleness, (ii) Malleability, (iii) Conductivity.

OR

(d) (i) Explain the engineering technology term *pneumatics*.

(ii) State **one** application for a pneumatic circuit.



Question 4.

(45 marks)

- (a) With reference to the oxy-acetylene flame:
- (i) Name the **three** types of flame which can be produced.
 - (ii) State the proportions of oxygen and acetylene required for **each** flame.



- (b) Answer **any three** of the following:

- (i) State **any two** advantages for using pop rivets when joining sheet metal.
- (ii) Why is manual metal arc welding unsuitable for joining light-gauge sheet metal?
- (iii) State **any two** safety precautions to be observed when using adhesives to bond acrylic.
- (iv) Outline the differences between the two nuts **A** and **B** shown below.



A



B

- (c) Describe **any three** of the following terms in relation to soft soldering:
- (i) Oxides, (ii) Passive flux, (iii) Tinning, (iv) Chemically clean.

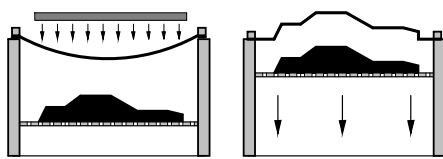
- (d) Dark goggles must be worn when brazing. Explain **two** reasons for this.



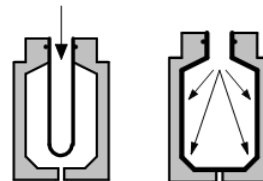
Question 5.

(45 marks)

- (a) For the plastic manufacturing processes shown at **A** and **B**:



A



B

- (i) Name **each** process;
 - (ii) Describe the main differences between process **A** and process **B**;
 - (iii) For **each** process, state a suitable end-product.
- (b) State **two** safety precautions to be observed when disposing of plastic materials.
- (c) Explain **any three** of the following in relation to plastic manufacturing:
- (i) Laminating, (ii) Adhesives, (iii) Strip heating, (iv) Dip coating.
- (d) Name **any two** types of thermoplastic material.

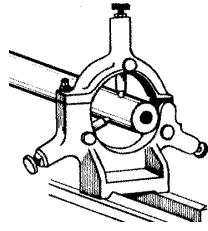
Question 6.

(45 marks)

(a) Name **any three** of the lathe work-holding methods shown.



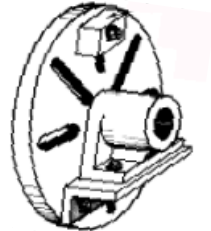
(i)



(ii)



(iii)



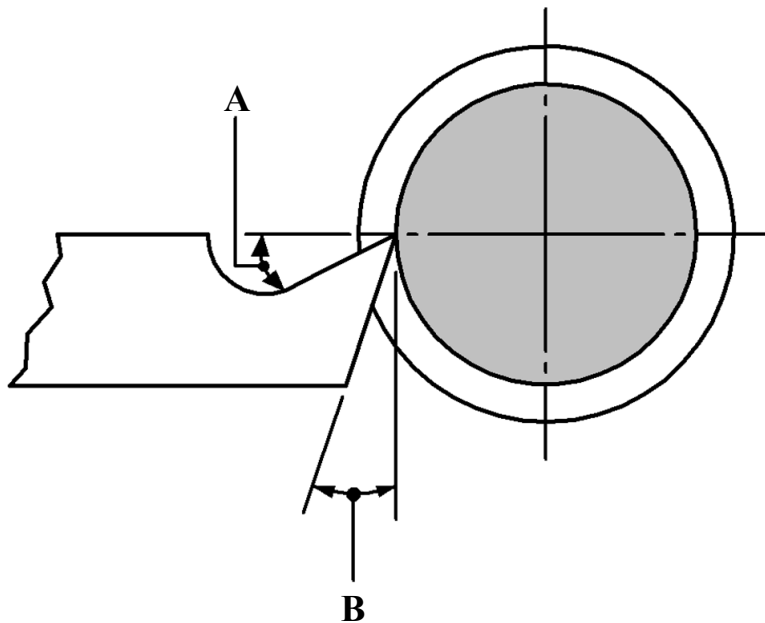
(iv)

(b) (i) State **two** reasons for using cutting fluids when machining.

(ii) List **one** safety precaution to be observed when using cutting fluids on the centre lathe.

(c) (i) Name the cutting-tool angles labelled **A** and **B**.

(ii) State the function of **any one** of the cutting-tool angles **A** and **B**.



OR

(c) Explain **any three** of the following Computer Numerical Control (CNC) machining terms:

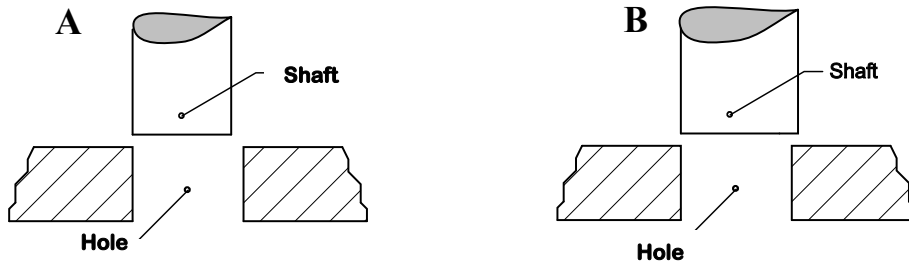
(i) CAD,

(ii) Simulation,

(iii) G codes,

(iv) CNC program.

(a) Name and describe the types of fit shown at **A** and **B**.



(b) With reference to **Figure 1** shown opposite, state the:

- (i) Nominal diameter of the hole;
- (ii) Smallest diameter of the hole;
- (iii) Largest diameter of the shaft;
- (iv) The type of fit which will result from the assembly of the smallest hole and the largest shaft.

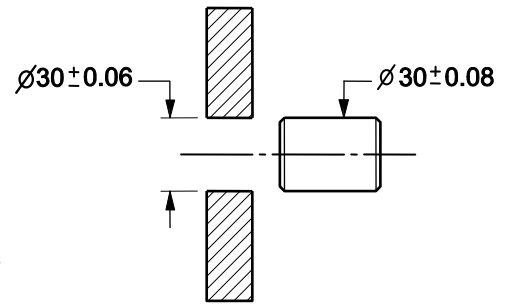
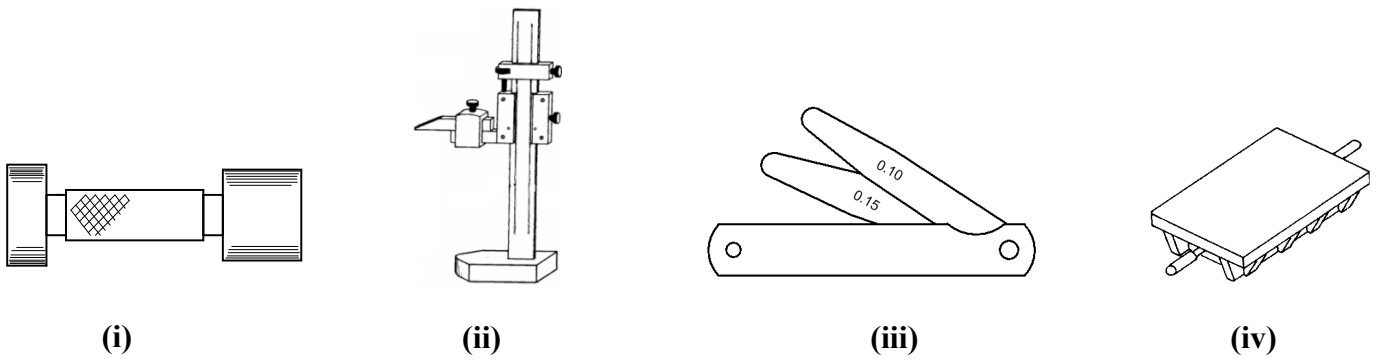


Figure 1

(c) Name and give **one** application for **any three** of the instruments shown below.



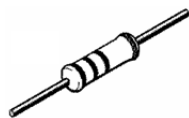
OR

(c) Draw the circuit symbols for **any three** of the following electronic components:

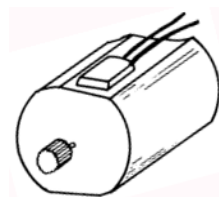
(i) LED,



(ii) Fixed resistor,



(iii) Motor,



(iv) Transistor.



Blank Page

Blank Page