



TECHNICAL UNIVERSITY OF MOMBASA

Faculty of Engineering and Technology

DEPARTMENT OF ELECTRICAL AND ELECTRONIC ENGINEERING CERTIFICATE IN ELECTRICAL POWER ENGINEERING (CEPE I)

EME 1102 WORKSHOP TECHNOLOGY I

END OF SEMESTER EXAMINATIONS

SERIES: DECEMBER, 2013

TIME: 2 HOURS

INSTRUCTIONS TO CANDIDATES:

1. You should have the following for this examination:
 - Answer Booklet
2. This paper consists of **FIVE** Questions.
3. Answer Question **ONE** is Compulsory.
Attempt any other **TWO** Questions marks are as shown.
4. All Questions carry equal marks.
5. **This paper consists of FOUR printed pages.**

QUESTION 1 (Compulsory)

- (a) (i) State **FOUR** major hazards which may arise from the use of electrical equipment.
- (ii) State **TWO** major responsibilities of an employee under the OSHA Act. (occupational Safety & Health Act).
- (iii) State **TWO** aims of the in (ii).
- (8 marks)**
- (b) (i) Show by means of the fire triangle, the three elements necessary to produce fire.
- (ii) List **THREE** types of fire extinguishing medium and the types of fire for which each is best suited.
- (iii) State **TWO** precautions to be taken to avoid accidents when using machinery.
- (8 marks)**
- (c) (i) Name **FOUR** methods used to join engineering parts.
- (ii) Differentiate between welding and soldering.
- (iii) State **FOUR** advantages of using adhesives instead of mechanical or heat joining methods.
- (iv) State **TWO** types of adhesives used in metal joining.
- (v) State the purpose of using flux during a brazing operation.
- (14 marks)**

(Attempt any other **TWO** Questions)

QUESTION 2

- (a) (i) Name **FOUR** cutting tool materials.
- (ii) Name **THREE** types of cutting fluid & state a typical application for each.
- (iii) State the **THREE** characteristics of a cutting tool material.
- (iv) State **FOUR** precautions to be observed when using an off-hand grinder.
- (13 marks)**
- (b) (i) Determine the rotating speed to turn a 150mm diameter bronze component using a tungsten carbide tool at a cutting speed of 180m/min?

- (ii) State the **TWO** angles necessary on a cutting tool for cutting to take place.
- (iii) What is the result of using an incorrectly sharpened drill with unequal lip lengths?
(7 marks)

QUESTION 3

- (a)
 - (i) State **THREE** precautions necessary when drilling holes in sheet metal.
 - (ii) State the purpose of using the following tools during a drilling operation:
 - (I) Reamer
 - (II) Counter bore
 - (iii) Give reasons why the following operations are necessary when drilling.
 - (I) To clamp the work
 - (II) To drill a clearance hole in the top part
 - (iv) State **TWO** precautions to be taken when drilling plastic materials.
 - (v) State the purpose of a morse taper.
(10 marks)
- (b)
 - (i) Use sketches to differentiate between countersinking and counter boring.
 - (ii) Sketch a labeled diagram of the bench drilling machine.
(10 marks)

QUESTION 4

- (a)
 - (i) Name **FOUR** types of work holding equipment used on a centre lathe.
 - (ii) State **THREE** methods used for taper turning.
 - (iii) Name **TWO** pieces of equipment used to prevent long slender work pieces flexing during machining a centre lathe.
- (b) What is the purpose of the following tools during a turning operation:

- (i) Thread cutting dial
- (ii) Centre drill
- (iii) Mandrel

(12 marks)

(c) Sketch a centre lathe and label **TEN** main parts.

(8 marks)

QUESTION 5

- (a)
 - (i) Name the **TWO** main essentials of a grinding wheel.
 - (ii) With the aid of a neat sketch, show the principle of operation of a permanent magnet chuck.
 - (iii) What is the effect of grain size on metal removal?
 - (iv) What is the most basic method of work holding on a surface grinder?
 - (v) Name **TWO** types of bonding material used in abrasive wheel.

(10 marks)

(b) Use sketches to differentiate between a pedestal and a bench grinder.

(10 marks)