



TECHNICAL UNIVERSITY OF MOMBASA

DEPARTMENT OF ELECTRICAL AND ELECTRONIC ENGINEERING

UNIVERSITY EXAMINATION FOR THE DEGREE IN BACHELOR OF SCIENCE IN
ELECTRICAL ENGINEERING (BSEE)

EME 2102 WORKSHOP PRACTICE I

END OF SEMESTER EXAMINATIONS

SERIES: DECEMBER, 2013

TIME: 2 HOURS

INSTRUCTION TO CANDIDATES

1. You should have the following for this examination:-
 - Answer Booklet
 - Electronic Calculator
 - Drawing Instruments
 2. This paper consists of **FIVE** questions.
 3. Answer Question **ONE** is **COMPULSORY** and any other **TWO** Questions.
 4. Maximum marks for each part of Question are as shown.
 5. This paper consists of **THREE** printed pages.
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Question ONE (Compulsory)

- (a) List down **FIVE** general safety practices to be observed in the workshop. **(5 marks)**
- (b) With the aid of a neat sketch, show the various parts of a file used in the workshops. **(8 marks)**
- (c) Differentiate between the functions of the following tools used in any machine workshop:
 - (i) Centre punch
 - (ii) Crosscut chisel
 - (iii) Three square filesShow neat sketches for the above tools. **(8 marks)**
- (d) (i) Define the term marking out **(1 mark)**

- (ii) Explain any **THREE** reasons for marking out. (3 marks)
- (iii) Sketch a labeled diagram of a vernier height gauge. (4 marks)
- (iv) State the uses of the height gauge. (2 marks)
- (e) Describe **TWO** classes of fires and the methods of distinguishing them. (4 marks)

Question TWO

- (a) Illustrate the driving mechanism of a shaper incorporating the following:
 - (i) Crank
 - (ii) Crank Pin
 - (iii) Bull wheel
 - (iv) Ram
 - (v) Link
 - (vi) Crank pivot(10 marks)
- (b) Using a sketch show the table feed mechanism of a shaper. (10 marks)

Question THREE

- (a) State **FOUR** operations that can be carried out on a lathe machine. (2 marks)
- (b) Define a face plate. (1 mark)
- (c) With the aid of sketches illustrate how the following procedures are carried out on a centre lathe:
 - (i) Turning a long taper by off-setting the tail stock
 - (ii) Turning a short taper using a formed tool
 - (iii) compound slide technique(13 marks)
- (d) List down **FOUR** factors that influence the choice of speed on a lathe machining a piece of work. (10 marks)

Question FOUR

- (a) State **FIVE** drilling faults, their causes and their remedial actions. (10 marks)

- (b) With the aid of a neat sketch, illustrate the various parts of the twist drill. **(10 marks)**

Question FIVE

- (a) With the aid of a diagram, illustrate a cutting tool grounded to the correct geometry for machining. Label its parts showing both the end and front elevations of the tool.

(4 marks)

- (b) In a cutting operation using the orthogonal conditions, the following details were recorded:

| | | |
|---------------------|---|--------|
| Cutting force | = | 2000N |
| Feed force | = | 1200N |
| Rake angle α | = | 15° |
| Depth of cut, t_o | = | 0.17mm |
| t_c | = | 0.6mm |

Determine the following:

- (i) The shear angle Φ (sphi)
- (ii) The normal shear friction force F_n
- (iii) Shear force, F_s
- (iv) Normal friction, N
- (v) Friction Force, F

(10 marks)

- (c) A certain cutting tool gave a life of 30 mins when the cutting speed was 200m/min and a life of 20min at a cutting speed of 260m/min. Determine the following using the Taylor's empirical equation of tool life.

- (i) Constant C
- (ii) Slope n
- (iii) Tool life corresponding to 160m/min

(6 marks)