



# TECHNICAL UNIVERSITY OF MOMBASA

## DEPARTMENT OF MECHANICAL AND AUTOMOTIVE ENGINEERING

SECOND YEAR SECOND SEMESTER UNIVERSITY EXAMINATION FOR THE  
DEGREE IN BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING AND  
BACHELOR OF ENGINEERING IN MECHANICAL ENGINEERING (BSME & BEME)

### EMG 2209 WORKSHOP PROCESSES & PRACTICE III

#### END OF SEMESTER EXAMINATIONS

**SERIES:** DECEMBER, 2013

**TIME:** 2 HOURS

#### INSTRUCTION TO CANDIDATES

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

- (a) (i) List any **THREE** equipment used with vertical milling machine.
- (ii) Index the following:
- (I) 65 divisions on a Brown and Sharpe head  
 $62^{\circ}15'$
- (II) angle on a Cincinnati and Parkinson head
- (7 marks)**
- (b) (i) State any **THREE** advantages and disadvantage of a hydraulic shaping machine over the mechanical one.
- (ii) State the circumstance when a shaper is preferred to a milling machine.

(iii) Illustrate the disposition of a slotter tool.

**(7 marks)**

(c) (i) List any **THREE** factors upon which grinding wheel grades selection is based.

(ii) With the aid of a sketch describe the procedure of grinding the bore of bush on a cylindrical grinding machine.

(iii) Calculate the speed required on 25mm wheel whose surface speed is 750 meters per minute.

**(9 marks)**

(d) (i) List the equipment required in a gas metal arc welding.

(ii) Briefly describe the gas tungsten arc welding process.

(iii) Describe any **THREE** safety devices fitted in metal-forming machines.

**(7 marks)**

**SECTION B** : (Answer any **TWO** Questions from this Section)

**Question TWO**

(a) (i) List any **THREE** practical application of gas tungsten arc welding (GTAW).

(ii) State **THREE** advantages and **TWO** disadvantages of GTAW.

**(8**

**marks)**

(b) (i) Briefly describe the **THREE** different ways of carrying out gas metal arc welding (GMAW).

(ii) State any **TWO** causes and their remedies for the each of the following faults in GMAW:

(I) Incomplete fusion

(II) Lack of penetration

**(9 marks)**

(c) With the aid of a layout diagram describe the features of resistances spot welding.

**(3 marks)**

### Question THREE

(a) List any **FOUR** major processes done when carrying-out metal forming operations. (4 marks)

(b) Briefly describe the operations carried-out with the following metal-forming equipment:

- (i) Drawers
- (ii) Hammers
- (iii) Extrusion machine
- (iv) Benders

(8 marks)

(c) With the aid of sketches explain the procedure of making a vee-face and a base slot on metal bar whose elevation is shown in Figure 1.

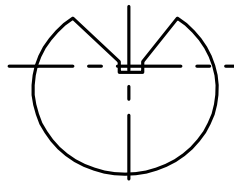


Fig. 1

(Select appropriate dimension)

### Question FOUR

(a) (i) State the **FOUR** factors that influence the selection of a grinding wheel. (8 marks)  
(ii) List the **FOUR** common methods of holding work on surface grinder. (8 marks)

(8 marks)

(b) Briefly explain with aid of sketch the procedure of truing a mounted grinding wheel. (6 marks)

(6 marks)

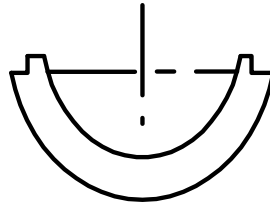
(c) With the aid of a sketch briefly explain the procedure of grinding two parallel strips. (6 marks)

(6 marks)

### Question FIVE

(a) List any **FOUR** types of machine relieved cutters and **ONE** use for each. (4 marks)

- (b) State **FOUR** design considerations for fixtures used in milling large numbers of similar surfaces. **(4 marks)**
- (c) Illustrate the details of a dividing head. **(5 marks)**
- (d) With the aid of sketch write the procedure for milling a bracket cap (Figure 2) in a vertical milling machine.



**Fig. 2**  
**(Assume any suitable dimensions)**

**(7 marks)**