



# THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

(A Constituent College of JKUAT)

(A Centre of Excellence)

## Faculty of Engineering & Technology

DEPARTMENT OF MECHANICAL & AUTOMOTIVE ENGINEERING

**UNIVERSITY EXAMINATION FOR:**  
BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING

EMG 2209: WORKSHOP PROCESS & PRACTICE III

**END OF SEMESTER EXAMINATION**

**SERIES: DECEMBER 2012**

**TIME: 2 HOURS**

### **Instructions to Candidates:**

You should have the following for this examination

- *Answer Booklet*
- *Scientific Calculator*
- *Drawing Instruments*

This paper consists of **FIVE** questions. Answer any other **THREE** questions

Maximum marks for each part of a question are as shown

This paper consists of **TWO** printed pages

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### **Question One**

a) Describe the following types of moulding sand.

- (i) Green sand
- (ii) Synthetic sand
- (iii) Core sand
- (iv) CO<sub>2</sub> – sand
- (v) Facing sand

**(10 marks)**

b) Explain the following moulding sand tests:-

- (i) Grain finess test
- (ii) Permeability test

**(10 marks)**

### Question Two

- a) (i) List **FOUR** characteristics of forged parts.
- (ii) State any **FOUR** defects that may occur in forged components. **(8 marks)**
- b) Briefly describe the process of forging the head of a bolt. **(6 marks)**
- c) Explain the principles of the following forging operations:
- (i) Punching
  - (ii) Bending **(6 marks)**

### Question Three

- a) Explain the following terms associated with the grinding wheel.
- (i) Wheel dressing
  - (ii) Wheel truing
  - (iii) Wheel glazing
  - (iv) Wheel loading **(8 marks)**
- b) A grinding wheel specified as WA19P10RBE was to be used in a certain operation. Outline the specific factors considered in the choice of this wheel. **(6 marks)**
- c) Explain the principles of operation of a cylindrical grinding machine. **(6 marks)**

### Question Four

With respect to Oxyacetylene gas welding explain:

- (i) The principles of gas welding
- (ii) The equipment used
- (iii) The different types of flames used
- (iv) The moment of the flame **(20 marks)**

### Question Five

- a) With the aid of a sketch, explain differential indexing. **(10 marks)**
- b) Using a Brown and Sharpe dividing head provided with:
- A plate having 15, 16, 17, 18, 19, 20 holes and  
tooth gears 20(2), 24, 28, 32, 40, 44, 48, 56, 64, 72, 86 and 100 teeth.
- Determine the indexing required for milling gear of 113 teeth. **(10 marks)**

