

TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF MECHANICAL & AUTOMOTIVE ENGINEERING

UNIVERSITY EXAMINATION FOR:

BSC IN MECHANICAL ENGINEERING

EMG 2209: WORKSHOP PROCESSES & PRACTICE III

END OF SEMESTER EXAMINATION

SERIES: APRIL 2016

TIME: 2 HOURS

DATE: Pick Date Select Month Pick Year

Instructions to Candidates

You should have the following for this examination

- -Answer Booklet, examination pass and student ID
- -Drawing instruments

This paper consists of **FIVE** questions. Attempt any THREE questions.

Do not write on the question paper.

Question ONE

a) Briefly explain any **three** methods of holding a work piece on a milling machine.

(3 marks)

- b) Describe the following milling accessories.
 - i) Vertical milling attachment
 - ii) Slotting attachment
 - iii) The universal dividing head.

(6 marks)

- c) It is required to cut a gear with 59 teeth on a milling machine using compound indexing method. The machine has a dividing head provided with the following tooth gears: 20 (2), 24, 28, 32, 40, 44, 48, 56, 64, 72, 86 and 100 teeth. The dividing head has three plates with the following hole circles: plate number 1- 15,
 - 16, 18 and 20; plate number 2 21, 23, 27, 29, 31 and 33; plate number 3 37, 39, 41, 43, 47 and 49.
 - i) With the aid of a sketch explain the principle of compound indexing.

(5 marks)

ii) Determine the indexing required for cutting the gear.

(6 marks)

Question TWO

- a) Grinding is to be used to machine a certain machine component.
- i) List any **four** bonding materials that are used in the manufacture of a grinding wheel. (2 marks) © *Technical University of Mombasa*Page 1 of 2

ii) Explain any **four** factors which influence the choice of a grinding wheel. (4 marks) iii) A grinding wheel with a code 51 A 60 K 5 V 05 was to be used in a workshop. Explain the meaning of the code. (4 marks) b) Explain the following grinding processes i) Center less grinding ii) Surface grinding (10 marks) **Question THREE** a) For manual metal arc welding: i) Explain any **four** functions of coated flux. (2 marks) ii) Describe the principle of manual metal arc welding. (4 marks) iii) Explain any **four** safety precautions to be observed while arc welding. (2 marks) b) Explain the principles of the following welding techniques: i) Submerged arc welding. ii) Tungsten inert gas welding. iii) Spot welding. (12 marks) **Question FOUR** Briefly describe the following types of sand casting patterns: i) Split pattern. ii) Loose piece pattern. iii) Gated pattern. iv) Sweep pattern. (8 marks) b) Briefly explain the following sand molding techniques: i) Bench molding. ii) Floor molding. iii) Pit molding. (6 marks) c) With regard to casting defects: i) Explain any three causes of casting defects. ii) For each cause state at least two associated defects. (6 marks) **Question FIVE**

- a) Explain the following cold working processes.
 - i) Coining
 - ii) Hobbing (6 marks)
- b) Describe the following variations of piercing and blanking.
 - i) Lancing
 - ii) Perforating
 - iii) Nibbling
 - iv) Dinking (8 marks)
- c) With the aid of a sketch describe the basic components of blanking and piercing dies. (6 marks)