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)

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)