TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF MECHANICAL ENGINEERING

UNIVERSITY EXAMINATION FOR:

BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING

INSTITUTON BASED

EMG 2312 : METROLOGY

END OF SEMESTER EXAMINATION

SERIES: AUGUST 2017 SERIES

TIME: 2 HOURS

DATE: Pick Date Aug 2017

Instructions to Candidates
You should have the following for this examination
   -*Answer Booklet, examination pass and student ID*
   -*Drawing instruments*
This paper onsists of five questions. Attempt any THREE questions.
Do not write on the question paper.

Question ONE

a) A 120 mm sine bar is used to set an angle of 32.50^0. Determine the list of slip gauges needed? Use the set provided below in Q2.   (10 Marks)

b) . With the help of a neat sketch, explain construction, principle and working of johanson Microkator type Mechanical comparator   (10 marks)

Question Two

a) Explain FIVE precautions to observe in the use of slip gauges   (5 marks)

b) You are provided with a set of M87 slip gauges below. Build up the following dimensions using the least number of gauges.   (10 marks)

i) 28.748

ii) 47.0635

Range	increment	pieces
1.001 – 1.009	0.001	9
1.01 -1.49	0.01	49
0.5 – 9.5	0.5	19
10 – 90	10	9
1.0005		1

C) Describe grades of slip gauges and for each provide one application   (5marks)

Question Three

a) Explain the following dimensions with the aid of diagrams.
   i)Basic size
   ii)Deviation
   iii)Tolerance
   iv)Fundamental deviation   (8 Marks)
b) Describe Selective Assembly. State Two examples.   (6 marks)

 c) State Taylor's Principle as applied to the design of Limit gauges.   (6 Marks)

Question Four

a) Use the following set of metric angle gauges to build up the following angles.
   i) 33^0 -9' -15 "

   ii) 101^0 -7' -42 ".
             Give a graphical arrangement of the sets above, i) and ii)   (10 marks)
 Degrees; 1 3 9 27 41   plus square

 Minutes; 1 3 9   27

 Seconds: 3 6   18 30

Show the arrangements in (i) and (ii) above of the angle gauges with a neat sketch.

 b) i) Distinguish between mechanical comparators and optical comparators
       ii) State FOUR disadvantages of mechanical comparators.   (10 marks)

Question Five

a) The heights of peaks and valleys of 20 successive points on a surface are 20, 10, 48, 36, 28, 42, 30, 12, 11, 23, 63, 52, 40, 40, 70, 70, 11, 39, 32, 32 microns respectively, measured over a length 20 mm.

Determine the CLA and RMS values of roughness surface.

b)State four methods of surface comparisons.

c)Mention an instrument that determines Surface texture.