TECHNICAL UNIVERSITY OF MOMBASA

Faculty of Engineering and Technology

DEPARTMENT OF MECHANICAL AND AUTOMOTIVE ENGINEERING

UNIVERSITY EXAMINATION FOR:

DIPLOMA IN MECHANICAL ENGINEERING (DMEN 6)

EAU 2305 MOTOR VEHICLE DRAWING AND DESIGN II

END OF SEMESTER EXAMINATION

SERIES: DEC 2016 PAPER-A

TIME: 2 HOURS

DATE: 2016

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

This paper consists of FIVE questions. Attempt ANY THREE.

Do not write on the question paper.

Question One

The Figure 1shows the instantaneous position of a mechanism in which member OA rotates anticlockwise with an angular velocity of 100rad/s and angular acceleration of 10,000rad/sec^2 in the same direction. BD is a continuation of the rigid link AB. The links have the following lengths:- OA = 30mm; BC = 90mm; AD = 168mm; AB = 120mm.

Determine:-

(a) The velocities of points A, B, and D.
(b) The absolute linear acceleration of points A and B.

(20 marks)

Question Two

A four-passenger car is to be designed to be used in Mombasa.

(a) Explain any ten factors that should be considered.

(b) Outline a typical procedure to be followed to undertake the task.

(20 marks)

Question Three

(a) Explain the importance of the following factors when designing a machine:-
   (i) Size
   (ii) Shape
   (iii) Weight
   (iv) Space

(8 marks)

(b) Differentiate between adaptive design and development design, giving typical examples.

(4 marks)

(c) Distinguish between unilateral and bilateral tolerances. Use diagrams to aid your answer and give specific examples.

(8 marks)

Question Four

(a) Describe the following types of bearings, stating where each is applicable in a motor vehicle:-
   (i) Sliding contact bearings
   (ii) Rolling contact bearings

(8 marks)

(b) Draw the bearings indicated below:-

(i) Cylindrical roller

(ii) Taper roller

(iii) Self-aligning bearing

(iv) Single row bearing

(12 marks)

Question Five

A gear wheel has 24 number of teeth, pressure angle of 20° and a module of 6.5. Construct thev gear tooth profile upto three teeth.