TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF MECHANICAL AND AUTOMOTIVE ENGINEERING

DIPLOMA IN AUTOMOTIVE ENGINEERING

Y3S2

EAU 2307 MOTOR VEHICLE DRAWING AND DESIGN II

END OF SEMESTER EXAMINATIONS

SERIES: APRIL 2016

TIME: 2 HOURS

Instructions to Candidates

You should have the following for this examination:-

- Drawing instruments
- Scientific calculator

The paper consists of **FIVE** Questions**.**

Answer any **THREE** Questions.

All questions carry equal marks.

Maximum marks for each part of a question are shown in the parenthesis.

Question One

(a) Explain why:-

(i) Countersunk holes are provided at the top of the body of the bearing;

(ii) Elongated holes are generally provided in the base of a bearing;

(iii) The base of the bearing is generally kept hollow at the bottom

(6 marks)

(b) Draw the different shapes of the rolling elements used in anti-friction bearings.

(8 marks)

(c) Illustrate through sketches, the mounting of:-

(i) Radial ball bearing

(ii) Thrust ball bearing

(6 marks)

Question Two

Draw the complete profile of a gear having 20 teeth of involute form of 6.5 module and pressure angle of 20°.

(20 marks)

Question Three

For the fig. 1 given below, crank OA rotates at 200rev/min clockwise. Find the relative velocity of the piston and the angular velocity of AB about point A.

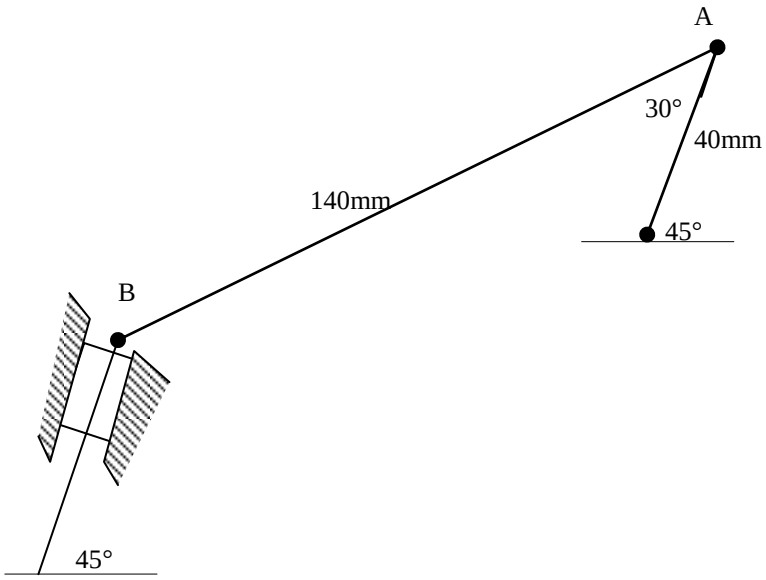

Fig. 1

(20 marks)

Question Four

(a) Explain the following classifications of fits:-

(i) Running fit

(ii) Push fit

(iii) Driving fit

(iv) Forced fit

(8 marks)

(b) Using well labeled diagrams, show the three different types of fits and briefly explain each.

(9 marks)

(c) List the three types of errors that occur during the manufacture of any component.

(3 marks)

Question Five

(a) Define the following terms with regard engineering design:-

(i) Manufacture

(ii) Reliability

(iii) Safety

(3 marks)

(b) Explain the importance of the following factors in machine design:-

(i) Size

(ii) Space

(iii) Shape

(iv) Weight

(8 marks)

(c) Describe the following types of engineering design based on methods:-

(i) Rational design

(ii) Empirical design

(iii) Industrial design

(9 marks)