



TECHNICAL UNIVERSITY OF MOMBASA

**Faculty of Engineering &
Technology in Conjunction with
Kenya Institute of Highways and
Building Technology (KIHBT)**

DEPARTMENT OF ELECTRICAL & ELECTRONIC ENGINEERING

HIGHER DIPLOMA IN ELECTRICAL & ELECTRONIC ENGINEERING

EEE 3101: MECHANICAL TECHNOLOGY II

END OF SEMESTER EXAMINATION

SERIES: AUGUST 2014

TIME: 2 HOURS

Instructions to Candidates:

You should have the following for this examination

- *Answer Booklet*
- *Electronic Calculator*
- *Drawing Instruments*

This paper consists of **FOUR** questions. Answer any **THREE** questions

All questions carry equal marks

Maximum marks for each part of a question are as shown

This paper consists of **THREE** printed pages

Question One

- a) With the aid of sketches, clearly explain the difference between a sliding bearing and a rolling bearing. **(8 marks)**
- b) (i) State SIX advantages that rolling bearings have over sliding bearings.
- (ii) Represent the following types of bearings in a sketch, two for each:
- (i) Single-Row radial ball bearing
 - (ii) Double-Row radial roller bearings
- (12 marks)**

Question Two

Figure 1 shows a shaft with masses at plane B and C. Find the masses and the angle at which they should be positioned in planes A and D at a radius of 70mm in order to produce complete balance of the system shown. **(20 marks)**

Question Three

- a) Describe briefly the following properties of lubricants:
- (i) Viscosity
 - (ii) Flash point and Fire Point
 - (iii) Dropping Point
 - (iv) Load Carrying Ability
- (10 marks)**
- b) (i) Name FIVE most common lubricant additives.
- (ii) State the effects for each of the lubricant additives named in (i)
- (iii) Suggest a suitable lubricant for a wire rope.
- (iv) Explain the suitability of the lubricant suggested in (ii) above **(10 marks)**

Question Four

- a) Name the THREE principle factors that govern the selection of an isolator for a particular machine. **(3 marks)**
- b) Give a brief description of SIX important considerations to be made when selecting a vibration Isolator. **(9 marks)**
- c) Describe briefly the following terms in relation to vibrations:
- (i) Source
 - (ii) Path
 - (iii) Receiver
- (3 marks)**
- d) State FIVE vibration solutions based on source. **(5 marks)**

Question Five

- a) State SIX advantages of gear drives. **(6 marks)**
- b) Figure 2 shows a wheel hanging from a string fixed at one end. The wheel has a mass of 0.5kg and a radius of gyration of 0.02m. The radius of the drum is 0.01m. The wheel is left to fall a distance of 0.6m, determine:
- (i) The linear velocity at end of fall of 0.6m
 - (ii) The angular velocity at end of fall of 0.6m **(14 marks)**