



## MACHAKOS UNIVERSITY

University Examinations 2018/2019

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF MECHANICAL AND MANUFACTURING ENGINEERING

THIRD YEAR SECOND SEMESTER EXAMINATIONS FOR THE DEGREE OF  
BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING

EMM 317: DESIGN OF MACHINE AND MACHINE ELEMENTS

### **QUESTIONS ONE**

- a) Describe in details the life cycle of an engineering project **(12 Marks)**
- b) State three economic considerations that the designer must have in mind when designing a new product **(3 Marks)**
- c) State any 3 activities that must be carried out before commercialisation of an engineering product by a start-up company. **(3 Marks)**
- d) Define obsolescence and differentiate between planned and perceived obsolescence **(3 Marks)**
- e) Differentiate between rolling contact and sliding contact bearings **(3 Marks)**
- f) List any four (4) purposes of couplings in power transmission **(2 Marks)**
- g) Explain how solid shafts are manufactured **(3 Marks)**
- h) Describe a cam and give two applications of the same **(2 Marks)**

### **QUESTIONS TWO**

- a) A marine type flange coupling is used to transmit 4 MW at 150 rpm. The allowable shear stress in the shaft and bolts may be taken as  $50 \text{ MN/m}^2$ . The number of bolts on