

STA 2190

vulnerability of the enterprise; uncontrollable risks such as
inflation, adverse political outcomes; unfavourable legal outcomes W1-2-60-1-6



JOMO KENYATTA UNIVERSITY
OF
AGRICULTURE AND TECHNOLOGY

University Examinations 2015/2016

FIRST YEAR FIRST SEMESTER EXAMINATION FOR THE DEGREE OF
BACHELOR OF SCIENCE IN ACTUARIAL SCIENCE

STA 2190 INTRODUCTION TO ACTUARIAL SCIENCE

DATE: December 2016

TIME: 2 HOURS

INSTRUCTIONS: Answer question one and any other two questions

Question one

- a) Discuss the development of Actuarial profession standards' organisations that aided in the formative stages of the profession. (4 marks)
- b) Outline the management issues that actuaries working in a multidisciplinary team endeavour to answer. (4 marks)
- Is the risk insurable
- Does the company have effective claims administration to determine dan
- Does the company have sufficient claims handling to cover counterparty risk
- c) Define the following terms
i. Simple discount (1 mark)
ii. Nominal rate of interest - *nominal interest rate, paid more freq. than 1 year* (1 mark)
iii. Insurance (1 mark)
iv. Liability insurance (1 mark)
v. Endowment insurance (1 mark)
- d) Consider two overlapping time periods. Period one has length k time units and period two has length m time units. If the effective period one interest rate is i , express the equivalent effective period two interest in terms of i , k and m . (3 marks)
- e) State the principles of consistency as used in theory of interest. (2 marks)
- f) Find the accumulated value on 4th July 2016 of Ksh 12,987 invested on 6th January 2016, assuming an effective rate of interest of 29% pa. (3 marks)
- g) Discuss the steps involved the construction of a life table (3 marks)

- h) Construct a hypothetical life table starting with a radix on 100,000. Give a maximum of five ages. (3 marks)
- i) Discuss the difference between proportional and nonproportional reinsurance treaties. (3 marks)

Question two

- a) Discuss the role of the actuary in (4 marks)
- i. Insurance (4 marks)
 - ii. Insurance brokerage firm (6 marks)
- b) Outline the principles of insurable risks (6 marks)
- c) Discuss the operationalisation of the quota share reinsurance treaties outlining the advantages and disadvantages of the same. (6 marks)

Question three

- a) With the help of a well labelled diagram, discuss the stages that are involved in the actuarial control cycle (11 marks)
- b) Consider the problem of premium rating of a life insurance product. Clearly describe what will be involved in each stage of the control cycle. (6 marks)
- c) Outline the considerations that come into play for insurance companies wanting to set retentions. (3 marks)

Question four

- a) Discuss the four main types of retirement plans. (4 marks)
- b) Describe, while giving examples, the following benefit plans: (4 marks)
- i. Defined benefit plans (4 marks)
 - ii. Defined contribution plans (4 marks)
 - iii. Hybrid plans (4 marks)
- c) Discuss the allocation of risks between the employee and the employer in retirement benefits (4 marks)