



# MERU UNIVERSITY OF SCIENCE AND TECHNOLOGY

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## UNIVERSITY EXAMINATIONS 2022/2023

SECOND YEAR SECOND SEMESTER FOR THE DEGREE OF BACHELOR OF  
SCIENCE IN ACTUARIAL SCIENCE

**SMS 3230: PRINCIPLES OF HEALTH CARE AND RESERVING**

**DATE: APRIL 2023**

**TIME: 2 HOURS**

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**INSTRUCTIONS: Answer Question ONE and any other TWO questions.**

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### QUESTION ONE (30 MARKS)

- a) Explain what an Income Protection (IP) Insurance is? (4marks)
- b) Describe the risk that the insurer will be exposed to as a result of using a standard rate to cover the whole family under the Private Medical Insurance (PMI). (3 Marks)
- c) Describe worksite marketing as a distribution channel and explain why it is not appropriate to the sell of Long-term Care Illness (LTCI) products. (4 Marks)
- d) If a policy lapses before the commission is fully earned (ie during the earnings period), then the insurer will clawback the proportion of indemnity commission that is deemed not to be earned at the point the policy is lapsed. You are given the following information:  

Earnings period:	24 months
Initial commission:	£650

Assuming the policy lapses after 6 months, and ignoring any discounting, calculate the commission clawback due. (2 Marks)
- e) State the principles of investment for a health and care insurance company. (3 Marks)
- f) Setting up of reserves is important for insurer. Hence, calculation of reserves is necessary for an insurer that sells health and care products. State four purposes of calculating reserves for a company that sells CT products. (4 Marks)

- g) Why is poor health bad news (in terms of the insurance premium paid by the policyholder) for prefunded plans but good news for immediate needs plans? (3 Marks)
- h) An insurer that writes just PMI has a stop loss reinsurance treaty as follows:
- lower limit of 108% of earned premium
  - upper limit of 135% of earned premium
  - reinsurer covers 85% of the claims in the layer.

Earned premiums were £295 million and the total incurred claims were £350 million. Calculate the reinsurance recovery from the stop loss reinsurance treaty. (4 Marks)

- i) Describe how the demographic profile of the target market affects the distribution channel chosen by the insurer to sell its products. (3 Marks)

### **QUESTION TWO (20 MARKS)**

- a) Define the term coinsurance (2 Marks)
- b) (i) Compare and contrast the cover provided by critical illness (CI) and income protection (II) insurance policies. (8 Marks)
- (ii) Describe the types of individual for which each of (CI) and (IP) insurance policies might be suitable. (4 Marks)
- c) A proprietary health and care insurance company transacting critical illness insurance business is reviewing its premium rates. The revised premium rates are not competitive. Discuss possible reasons for this and the courses of action open to the insurance company if it wishes to offer more competitive premium rates. (6 Marks)

### **QUESTION THREE (20 MARKS)**

- a) Explain the importance of policyholders' expectations as far as investment returns are concerned, for health and care insurance. (2 Marks)
- b) Describe how an insurer's investment strategy may be affected by the regulatory framework in which it operates. (5 Marks)
- c) Property investment might be direct (i.e. actually buying a property) or indirect (eg through shares in a property company or a collective investment scheme that invests in property). Discuss the main characteristics of direct property investments. (6 Marks)
- d) A health and care insurer sells immediate needs annuities that increase in line with an index of prices. It believes that the best matching assets are index-linked bonds with a range of terms up to six years.

- (i) Outline the factors that affect whether the insurer would mismatch its assets and liabilities. (3 Marks)
- (ii) Describe what is meant by an 'illiquidity premium' and discuss whether it is appropriate to allow for an illiquidity premium in the discount rate to value the liabilities. (4 Marks)

**QUESTION FOUR (20 MARKS)**

- (a) The government of a developed country is considering the ways in which it can provide health and care benefits (ie direct medical services) and welfare benefits (ie financial benefits when unable to work due to illness). Outline the objectives that the government may have in this regard, the rationale behind each one and any limitations there might be on its ability to meet these objectives. (6 Marks)

- (b) In Country A all health and care is free at the point of use.

A fundamental principle of health and care funding in Country B is the element of personal contribution. The level of cover provided by the State is a fixed percentage of the published tariff for the care received.

However, providers are free to charge consumers more than the tariff price.

Some examples of the percentages of the costs of care met by the State are:

<u>Treatment</u>	<u>Rate of reimbursement</u>
Major Surgery	95%
Minor Surgery	80%
Pregnancy & Childbirth	95% to 100%
Prescribed Medicines	35% to 65%
X Rays	70%
GP/Specialist Visits	70%

- (i) Describe the advantages and disadvantages to the State of each system.

(10Marks)

- (ii) Describe how each system might influence the market for private medical insurance in that country. (4 Marks)

**QUESTION FIVE (20 MARKS)**

- (a) How does a linked-claims period encourage claimants to return to work? (2 Marks)
- (b) Underwriting for both term insurance and income protection insurance is basically about assessing the health of the proposer. Why should the process be so much more difficult when the proposal is for an IP rather than a term insurance policy? (4 Marks)

- (c) Sketch a diagram that shows the main elements of the product cycle of an IP insurance and briefly explain each element. (14 Marks)