

PUSASQF204
Introduction to Actuarial Model

Time: 2 hours
Total Marks: 60 marks

Note:

- 1) The candidate has option to either attempt question 4A or question 4B. Rest all questions are mandatory.
- 2) Numbers to the right indicate full marks.
- 3) The candidates will be provided with the formula sheet and graph papers (if required) for the examination.
- 4) Use of approved scientific calculator is allowed.

Q1. Attempt All Questions.

15 Marks

1)

When data on some observations is missing, the data is said to be ____.

- a) Cross-sectional
- b) Longitudinal
- c) Truncated
- d) Censored

2)

____, ____ and ____ are examples of sensitive data.

- a) financial data, date of birth, caste
- b) financial data, health data, gender
- c) genetic data, favorite food and political beliefs
- d) bank details, religious affiliation, biometric data

3)

Changes in daily recorded temperatures (rounded to the nearest degree) will be modelled with the following state space and time space.

- a) discrete state space, discrete time space
- b) discrete state space, continuous time space
- c) continuous state space, discrete time space
- d) continuous state space, continuous time space

4)

Stock price movements generally are ____

- a) homoskedastic
- b) heteroskedastic
- c) depends on economic cycle
- d) time-varying

5)

Standing at a crossroads and asking passersby questions is an example of ____ sampling.

- a) random
- b) purposive
- c) convenience
- d) stratified

6)

Models are not used for

- a) optimization
- b) calibration
- c) replication
- d) estimation

7)

Any unauthorised or accidental disclosure, acquisition, sharing, use, alteration, destruction of or loss of access to, personal data that compromises the confidentiality, integrity or availability of personal data is called ____.

- a) hacking
- b) firewall breach
- c) phishing
- d) personal data breach

8)

The variable of interest in a regression model is called ____ variable.

- a) explanatory
- b) regressor
- c) response
- d) independent.

9)

Which of the following is not an advantage of reproducibility?

- a) Helps in technical review
- b) Useful for comparison with similar studies
- c) Helps in analysis of expenses of study
- d) Assists in compliance with regulation

10)

The data principal has the right to correct data, erase data and update data subject to certain conditions.

- a) True
- b) False
- c) Partially true
- d) Can't say

Q2. Attempt All Questions.

A)

How is a function selected for modelling?

5 Marks

B)

Discuss the weighted least squares regression method.

5 Marks

C)

Discuss the advantages and limitations of modelling.

5 Marks

Q3. Attempt All Questions.

A) 5 Marks

"Model validation is the most important step in the modelling process."
Discuss.

B) 5 Marks

Elaborate on the assumption, "Random errors have a constant standard deviation."

C) 5 Marks

The data principal needs to consent to the processing of the data and the consent needs to be valid. Discuss.

Q4. Attempt Q4 A or Q4 B.

A) 15 Marks

A professional orchestra that performs classical music concerts in a few locations around one city is about to undertake its first international tour. The objective of the tour is to raise the profile of the orchestra and generate income both now and into the future. Over three weeks there will be a twelve concert tour across six different countries. There are about 150 people of many different nationalities in the tour entourage including musicians and support staff. The tour director has asked an actuary to model its future cashflows to assess the tour's profitability and/or likelihood of achieving its objectives.

i) State the basic features of general actuarial models.

ii) Describe the cash flows relating to this tour that would need to be allowed for by a model that aims to assess the tour's profitability.

iii) Set out how sensitivity analysis would be used in conjunction with modelling the cash flows.

B) 15 Marks

i) Describe the objectives of and requirements for building a model to project the profits of a supermarket chain.

ii) Briefly talk about big data and its applications.