



PAN AFRICA CHRISTIAN UNIVERSITY

END OF SEMESTER EXAMINATION FOR THE DEGREE OF

MAY - AUGUST 2022

CAMPUS: ROYSAMBU

DEPARTMENT: BUSINESS

COURSE CODE: BIT102|BCM102|BUS2123

COURSE TITLE: BUSINESS MATHEMATICS

EXAM DATE:

TIME:

INSTRUCTIONS

- This examination script consists of **SIX (6)** questions.
- Answer question **ONE** and ANY other **THREE** Questions.
- Read all questions carefully before attempting.
- Write your **student number** on the answer booklet provided.

Question One (compulsory) (10 marks)

- a) Wangu travels to his father's home, 30km away from his place. He cycles for two third of the journey before the bicycle develops mechanical problems and he has to push it for the rest of the journey. His cycling speed is 10km/hr faster than his walking speed and he completes the journey in 3 hours and 20 minutes. Determine his cycling speed. (5 marks)
- b) Solve the following inequality $\frac{x+1}{x+3} \leq 2$ (5 marks)

Question Two (10 marks)

- a) If $A = \{1, 3, 5\}$, $B = \{3, 5, 6\}$ and $C = \{1, 3, 7\}$. Verify that $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$ (6 marks)
- b) Solve the following
- i. $\log_2(x) + \log_2(x-2) = 3$ (2 marks)

ii. $\log_2(\log_2(x)) = 1$ (2 marks)

Question Three (10 marks)

a) Calculate the tenth term of the series if $S_n = 2n + 3n^2$ (4 marks)

b) Solve the following simultaneous equation using the elimination method:

i.
$$\begin{array}{rcl} 6x + 4y & = & 24 \\ 7x - 4y & = & 2 \end{array}$$
 (3 marks)

ii.
$$\frac{a-1}{2} - \frac{b+1}{5} = \frac{1}{5}$$

$$\frac{a+b}{3} = b - 1$$
 (3 marks)

Question Four (10 marks)

Shelly decides to start saving money for her son's future. At the end of each month she deposits Kshs. 500 into an account at Durban Trust Bank, which earns an interest rate of 5.96% per annum compounded quarterly.

- i. Determine the balance of Shelly's account after 35 years. (6 marks)
- ii. How much money did Shelly deposit into her account over the 35 year period? (2 marks)
- iii. Calculate how much interest she earned over the 35 year period (2 marks)

Question Five **(10 marks)**

Given a geometric sequence with second term $\frac{1}{2}$ and ninth term 64.

a) Determine the value of r . (3 marks)

b) Find the value of a . (3 marks)

c) Determine the general formula of the sequence. (4 marks)

Question Six **(10 marks)**

Swanson Industries has a project with the following projected cash flows:

Initial Cost, Year 0: Kshs. 240,000

Cash flow year one: Kshs. 25,000

Cash flow year two: Kshs. 75,000

Cash flow year three: Kshs. 150,000

Cash flow year four: Kshs. 150,000

Using a 10% discount rate for this project:

i. Calculate the NPV model (9 marks)

ii. State whether the project should be accepted or rejected (1 mark)