**PAN AFRICA CHRISTIAN UNIVERSITY**

**SCHOOL OF LEADERSHIP, BUSINESS & TECHNOLOGY**

**END OF SEMESTER EXAMINATION FOR THE DEGREE OF**

**BACHELOR OF BUSINESS LEADERSHIP**

**BACHELOR OF COMMERCE**

**BACHELOR OF BUSINESS AND INFORMATION TECHNOLOGY**

**MAY-AUGUST 2019 SEMESTER**

**CAMPUS: ROYSAMBU**
**DEPARTMENT: BUSINESS STUDIES**
**COURSE CODE: BUS2123|BCM102|BIT102**
**COURSE TITLE: BUSINESS MATHEMATICS**
**EXAM DATE: MONDAY 5th AUGUST 2019**
**DURATION: 2 HOURS**
**TIME: 2:00PM-4:00PM**
**INSTRUCTIONS**

- Read the instructions and questions carefully before you write the answers.
- Write your **STUDENT NUMBER** in the Answer Booklet given
- *Write clearly and legibly.*
- This exam script consists of **Six (6)** questions.
- Answer question **ONE** and ANY other **THREE** Questions.
- *ALL PAC University's examination rules and regulations apply*

**QUESTION ONE: (compulsory)** **(30 marks)**

a. If A = {1, 3, 5}, B = {3, 5, 6} and C = {1, 3, 7}. Verify that A ∪ (B ∩ C) = (A ∪ B) ∩ (A ∪ C) (6 marks)

b. Solve the following

i. $\log_2(x+1) + \log_2(2 - x) = 3$ (3 marks)

ii. $\ln(x-1)=1+\ln(3x+2)$ (3 marks)

c. Solve the simultaneous equations using substitution method :

I. $3x-y = 8$

$x + y = 4$ (3 marks)

II. Two years ago, a man was 7 times as old as his son. In 3 years-time, he will be only 4 times as old as son (5 marks)

d. Meme 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)

e. Solve the following inequality $\frac{x+1}{x+3} \leq 2$ (5 marks)

**QUESTION TWO** **(10 marks)**

a. Write each of the following as a single logarithm with a coefficient of 1.

i. $7\log_{12}x+2\log_{12}y$ (3 marks)

ii. $3\log x-6\log y$ (3 marks)

iii. $5\ln(x+y)-2\ln y-8\ln x$ (4 marks)

**QUESTION THREE** **(10 marks)**

a. 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: $150,000

Cash flow year four: Kshs. 150,000

i. Using a 10% discount rate for this project and the NPV model should this project be accepted or rejected? (10 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 ½ and ninth term 64:

i. Determine the value of **r.** ( 4 marks)

ii. Find the value of **a** (2marks)

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

**QUESTION SIX** **(10 marks)**

a. A company of 60 people, 27 like cold drinks and 42 like hot drinks and each person likes at least one of the two drinks. How many like both coffee and tea? (5 marks)

b. There are 35 participants in art class and 57 participants in dance class. Find the number of participants who are either in art class or in dance class.

i. When two classes meet at different hours and 12 participants are enrolled in both activities. (3 marks)

ii. When two classes meet at the same hour. (2 marks)