INTERNATIONAL UNIVERSITY OF EAST AFRICA

'Learning to Succeed'

FACULTY OF SCIENCE AND TECHNOLOGY

END OF SEMESTER EXAMINATIONS - APRIL 2025

PROGRAMME: BIT

YEAR/SEM: YEAR 1/SEMESTER 2

COURSE CODE: BIT1203

NAME: MATHEMATICS FOR IT

DATE: 2025-04-15

TIME: 9:00AM-12:00PM

INSTRUCTIONS TO CANDIDATES:

1. Read the instructions very carefully
2. The time allowed for this examination is STRICTLY three hours
3. Read each question carefully before you attempt and allocate your time equally between all the Sections
4. Write clearly and legibly. Illegible handwriting cannot be marked
5. Number the questions you have attempted
6. Use of appropriate workplace examples to illustrate your answers will earn you bonus marks
7. Any examination malpractice detected will lead to automatic disqualification.

DO NOT WRITE ANYTHING ON THE QUESTION PAPER

Section A Attempt all (40 Marks, Write the correct alternative in the booklet provided)

Question 1:

1. What will be the probability of getting odd numbers if a dice is thrown? (02 Marks)
   A) Â½
   B) 1/6
   C) 3
   D) 1
2. The probability of getting two tails when two coins are tossed is - (02 Marks)
   A) 1/4
   B) 1/2
   C) 1/6
   D) 1/3
3. What will be the probability of losing a game if the winning probability is 0.3? (02 Marks)
   A) 0.7
   B) 0.5
   C) 0.3
   D) 0.6
4. Which of the following can be the probability of an event? (02 Marks)
   A) -0.5
   B) 007
   C) 488/489
   D) 4/3
5. A matrix having one row and many columns is known as? (02 Marks)
   A) Column matrix
   B) Identity matrix
   C) Row matrix
   D) Diagonal matrix

6. Consider the following five relations on the set $A = \{1, 2, 3, 4,5\}$: $R1 = \{(1, 1), (1, 2), (2, 3), (1, 3), (4, 4)\}$ $R2 = \{(1, 1)(1, 2), (2, 1), (2, 2), (3, 3), (4, 4)\}$, $R3 = \{(1, 3), (2, 1)\}$ and $R4 = A$ Ã? A, determine which of the relations are reflexive. (02 Marks)
   A) R1 and R2
   B) R3 and R4
   C) R1 and R4
   D) None
7. The function f is invertible if and only if (02 Marks)
   A) f is onto.

B) *f* is one-to-one and not onto.

C) *f* is both one-to-many and onto.

D) *f* is both one-to-one and onto.

8. A compound proposition that is always _____ is called a tautology. (02 Marks)

A) False

B) True

9. The composition function of f and g is written as fog (02 Marks)

A) True

B) False

10. Consider the following five relations on the set $A = \{1, 2, 3, 4\}$: $R1 = \{(1, 1), (1, 2), (2, 3), (1, 3), (4, 4)\}$ $R2 = \{(1, 1),(1, 2), (2, 1), (2, 2), (3, 3), (4, 4)\}$, $R3 = \{(1, 3), (2, 1)\}$ and $R4 = A$ Ã? A, the universal relation. Determine which of the relations are symmetric. (02 Marks)

A) R4 and R2

B) R1 and R3

C) R3 and R4

D) R1 and R4

11. Amatrix having many rows and one column is known as? (02 Marks)

A) Column matrix

B) Identity matrix

C) Row matrix

d) Diagonal matrix

12. The *domain* of a relation *R* is the set of all second elements of the ordered pairs which belong to *R* . (02 Marks)

A) True

B) False

13. Find the cardinal number of the set: $A = \{a, b, c, \ldots, y, z\}$ (02 Marks)

A) 5

B) 26

C) 25

D) 27

14. The integer value of -3.5 is given by (02 Marks)

A) -3.5

B) -3.

C) -4

D) -2

15. Which of the following statement is a proposition? (02 Marks)

A) Kampala is Somalia

B) God bless you!

C) What is the time now?

D) I can

16. The proposition Kampala is in Uganda or Nairobi is in Congo is (02 Marks)
    A) True
    B) False
17. A _____ is an ordered collection of objects. (02 Marks)
    A) Relation
    B) Function
    C) Proposition
    D) Set
18. The union of the sets A={1, 2, 5} and B={1, 2, 5,6} is the set _____ (02 Marks)
    A) {1, 2, 6, 1}
    B) {1,2,5}
    C) {1, 2, 1, 2}
    D) {5}
19. The intersection of the sets A={1, 2, 5} and B={1, 2, 5, 6} is the set _____ (02 Marks)
    A) {1, 2}
    B) {5, 6}
    C) B
    D) A
20. The set O of odd positive integers less than 10 can be expressed by (02 Marks)
    A) {1, 2,3,4,5,6,7,8, 9}
    B) {3,5,7,9}
    C) {1, 2, 5, 9}
    D) {1, 3, 5, 7, 9}

Section B Attempt any four (Each question carries 15 marks, 60 Marks)

Question 1:

In a container, there are 4 blue marbles and 2 yellow marbles. One marble is randomly drawn and then replaced. Another marble is drawn. Determine the probability that:

(a) Both marbles drawn are yellow (04 Marks)
(b) The marbles drawn are of different colors (04 Marks)
(c) The second marble drawn is blue given that the first marble drawn was yellow. (03 Marks)
(d) At least one of the marbles drawn is blue. (04 Marks)

Question 2:

Find the number *m* of ways that 10 people can arrange themselves:

(*a*) In a row of chairs, (04 Marks)

(*b*) Around a circular table. (04 Marks)

(c) Find n if $P(n, 2) = 72$. (03 Marks)

(d) Find the number of combinations of 4 objects, *A*, *B*, *C*, *D*, taken 4 at a time. (04 Marks)

Question 3:

Use crammer's rule to solve the following system of linear equations: (15 Marks)

x+3y+2z=9

2x-3y+z=-3

3x+y-2z=-13

Question 4:

(a) Use matrix inversion to solve the following pair of simultaneous equations (15 Marks)

$$-3x + y = -3$$

$$4x + 7y = 29$$

(b) Find AB where $A = \begin{bmatrix} 1 & 3 \\ 2 & -1 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 0 & -4 \\ 5 & -2 & 6 \end{bmatrix}$.

Question 5:

A bag contains 5 red balls and 3 green balls. A ball is drawn at random and then replaced. Another ball is drawn. What is the probability that

(a) both balls are green? (05 Marks)

(b) both balls have the same colour? (05 Marks)

(c) the balls are of different colours? (05 Marks)

Question 6:

Find the number *m* of ways that 7 people can arrange themselves:

(*a*) In a row of chairs; (04 Marks)

(*b*) Around a circular table. (04 Marks)

(c) Find n if $P(n, 2) = 72$. (03 Marks)

(d) Find the number of combinations of 4 objects, A, B, C, D, taken 3 at a time. (04 Marks)