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University Examinations 2022/2023

FIRST YEAR FIRST SEMESTER EXAMINATION FOR THE CERTIFICATE IN AGRICULTURE

AAC 1102: MATHEMATICS

DATE: AUGUST 2023 **TIME:1½ HOURS**

INSTRUCTIONS: *Answer question **one** and any other **two** questions*

QUESTION ONE (30 MARKS)

a) Evaluate $\dfrac{\frac{5}{6}of\left(4\frac{1}{3}-3\frac{5}{6}\right)}{\frac{5}{12}x\frac{3}{25}+1\frac{5}{9}\div 2\frac{1}{3}}$ without using a calculator (4 marks)

b) Given the sequence 2,4,6,8,10…Find:

i. The 20^{th} term of the sequence (3 marks)

ii. The sum of the first 20terms of the sequence (3 marks)

c) Determine the quadratic equation in x whose roots are 2 and -5 (4 marks)

d) Find the value of x which satisfies the equation (4 marks)

$32^{x}=18^{4x-3}$

e) If 3 people can complete a task in 4 hours, how long will it take 5 people to complete the same task, assuming the rate of work remains constant (4 marks)

f) Given that $\cos A=\frac{5}{13}$ and angle A is acute, find the value of (4 marks)

$2\tan A + 3\sin A$

g) The position vectors of points x and y are $x = 2i + j - 3k$ and $y = 3i + 2j - 2k$ respectively. Find $|x - y|$ (4 marks)

QUESTION TWO (15 MARKS)

a) Given that $P = \begin{matrix} 2 & 3 \\ 1 & 2 \end{matrix}$ and $\begin{matrix} 2 & -3 \\ -1 & 2 \end{matrix}$ find; the matrix product PQ. Hence solve the simultaneous equations below

$2x - 3y = 5$
$-x + 2y = -3$ (10 marks)

b) The displacements metres, of a particle after, t seconds is given by $s = 3t^3 + 4t^2 + 9t + 10$ Determine:

i. The velocity of the particle when t=10 seconds (3 marks)

ii. The value of t when the particle is momentarily at rest (2 marks)

QUESTION THREE (15 MARKS)

a) The marks scored by a group of form two students in a mathematical test were as recorded in the table below

Marks	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99
Frequency										

i. State the modal class (2 marks)

ii. Determine the class in which the median mark lies (2 marks)

iii. Using an assumed mean of 54.5, calculate the mean mark (6 marks)

b) Use integration to find the exact area between the curve $y = x^2 + 4x + 4$, the x-axis and the co-ordinates $x = -2$ and $x = 1$ (5 marks)

QUESTION FOUR (15 MARKS)

a) Without using logarithms or calculator evaluate (5 marks)

$2\log_{10} 5 - 3\log_{10} 2 + \log_{10} 32$

b) A committee of 2 people is to be chosen at random from 6 men and 7 women. Find the probability of choosing a man and a woman (4 marks)

c) Given that $m = 3, n = 2$ *and* $r = 1$, evaluate $\dfrac{2(m+n)^2 - (m-n)(n-r)}{3(m+n) - 2(n-r)}$ (6 marks)