MACHAKOS UNIVERSITY

University Examinations 2019/2020

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF MATHEMATICS, STATISTICS AND ACTUARIAL SCIENCE

SECOND YEAR SECOND SEMESTER EXAMINATION FOR

DIPLOMA IN INFORMATION COMMUNICATION TECHNOLOGY

COMPUTATIONAL MATHS

DATE: 5/11/2020   **TIME: 11:30 – 2:30 PM**

INSTRUCTIONS: Answer Question One and Any Other Two Questions

1. a) Expand $(2\text{-}x)^6$ up to the fourth term. hence use your expansion to estimate the value of $(1.75)^6$ (4 marks)

    b) Two concentric circles area of radii 3.5cm and 14cm respectively. Find in terms of πcm2

    　　i.　　The area of the inner circle

    　　ii.　　The area of the larger circle

    　　iii.　　Find the probability that a print selected at random lies within the smaller circle (3 marks)

    c) Given the data 2,3,4,5

    　　Calculate

    　　i.　　Harmonic mean

    　　ii.　　Geometric mean

    　　iii.　　Standard deviation (7 marks)

    d) Expand $(x + \frac{1}{2x})^6$ up to the independent term.

    　　Use the expansion above to find the largest value $(^{28}/_9)^6$ correct to 4 significant figures. (5 marks)

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e)   Evaluate.

   i. $4c_3$ (2 marks)

   ii. $5p_4$ (2 marks)

f)   List three characteristics of measures of dispersion (3 marks)

2.   The heights of 200 students were recorded in the table below:

Height in (h) cm	Frequency
140-150	2
150-160	28
160-170	63
170-180	74
180-190	20
190-200	11
200-210	2

a)   Write down the model group (1 mark)

b)   i   Calculate mean (4 marks)

   ii.   Median of the data (4 marks)

   iii.   Standard deviation (4 marks)

c)   Plot a cumulative frequency curve for this data (grids for plotting curves required)

(7 marks)

3.   Use the trapezoidal rule to find area

a)   Between the curve $Y=X^2+3X+3$, the X-axis and the ordinates X = -2 and X= 2. Taking the values of x at interval of ½ unit

b)   use integration method to find the exact area

$Y=X^2+3X+3$

c)   Find the percentage error in estimating area (3 marks)

d)   Integrate the following (4 marks)

$8x^3-3x^2+2x+6$

e)   Find the equation of the tangent to the curve

$Y=x^3$ at the point (2, 8) (4 marks)

4. A paint dealer mixes three types of paint A, B and C in the ratio's A: B 3:4 and B:C1:2. The mixture is to contain 168 litres of C.

    a) Find the ratio A: B: C (2 marks)

    b) Find the required number of litres o f B (2 marks)

    c) The cost per litre of type A is ksh.160, type B is 205 and type C is ksh.100.

    i. Calculate the cost per litre of the mixture (4 marks)

    ii. Find the percentage profit if the selling price of the mixture is ksh.182 per litre

    (3 marks)

    iii. Find the selling price of a litre of the mixture if the dealer makes a 25% profit

    (3 marks)

d) Tap A can fill a tank in 5 hours while B can fill the same tank in 7 hours. Tap C can empty the same tank in 6 hours, how long would it take;

    i. Tap A and B to fill the tank when its empty and tap C is closed (3 marks)

    ii. Tap A and B to fill the empty tank with Tap C open (3 marks)