DEPARTMENT OF MATHEMATICS AND PHYSICS
DAC SEPT 2016
AMA 2202: STATISTICAL TECHNIQUES

SPECIAL SUPPLEMENTARY   EXAMINATION
SERIES: AUGUST 2017

TIME ALLOWED: 2HRS

Instruction to Candidates

You should have the following for this paper

- *Mathematical Tables.*
- *Scientific Calculator.*

This paper consists of **FIVE** questions.
Answer question **ONE** compulsory and the other **TWO** questions.
Maximum marks for each of a question are as shown.
This paper consists of **FOUR** printed pages.

SECTION A

QUESTION ONE

a) Define the following terms as used in statistics
- A population   (1mk)
- A statistic   (1mk)
- Ordinal data   (1mk)
b) Let x_1, x_2 .... x_n, be a sample of a given population. Show that the sum of deviations of a set from its mean is zero.   (5mks)

c) A continuous random variable has a probability density Function (P.d.f) , f(x) = ¼ (2x + 3), 0≤ x ≤ 1.
   i.   Show that f(x) is a pdf   (4mks)
   ii. Find pr (0≤ x ≤ ½)   (2 mks)
d) The following data gives the distribution of seats in both houses of the Swedish parliament.

|	Conservatives	Central party	Liberals	Social Democrats	016.5
Upper house	25	21	25	11	1
Lower house	33	35	43	113	9

Display the data using pie diagrams (6 mks)

e) Show that the log G.m can also be expressed as
   log G.m
   $=1/N \sum_{i=1}^{n} fi \log x i$ (6mks)

f) The marks obtained in un end of term exam done by 3 Final year classes in march 2016 are as follows, 58, 23, 31, 53, 36, 27, 62, 27, 43, 45,, 42, 44, 32, 45, 45, 20, 49, 82, 53, 52, 25,65, 33, 52,15, 54, 40, 41,38,25, 23, 78, 10, 47, 49, 64, 49, 54,20, 58, 8, 22, 45, 96, 74, 49, 65, 54,20,34.
   Construct a frequency distribution table of class interval of 15
                                                                              (4mks)

SECTION B
QUESTION TWO
   a) A circular wheel is divided into 3 equal sectors, numbers 1, 2, 3 as shown. The wheel is ….. twice. Each time the score is the number to which the black arrow points. Calculate the probability that
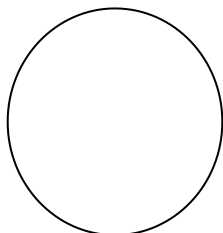
i.   Both scores are the same as each other   (2mks)

ii.   Neither score is a 2   (2mks)

iii.   Atleast one of the scores is a 3   (2mks)

iv.   Neither score is a 2 and both scores are the same   (2mks)

b) Compute the standard deviation of the following data given below

Marks	No. of Students
0-10	7
10-20	6
20-30	15
30-40	12
40-50	10

c) List any 3 uses of the ogives   (3mks)

d) A group of 20 members has a mean of 30 and another has a mean of 22. Find the combined arithmetic mean (3mks)

QUESTION THREE

a) In a certain school the head teacher collected the following data from 8 students. On the level of two variables x and y which he was investigating from each student.

x ; 15   20 18 16 19 20 18 22
y ; 12   15 22 14 16 17 15 18

i.   Calculate the product correlation coefficient between the two variables
(8mks)

ii.   Comment on the relationship   (8mks)

b) List the steps involved in a statistical exercise   (4mks)

c) Represent the following data in the form of a frequency distribution

5.1, 7.7, 2.4, 0.3, 4.5, 9.3, 3.0, 5.8, 0.3, 5.8, 6,4, 9.3, 1.5, 6.3,0.9, 4.4, 2.1, 6.3, 9.1, 0.9, 4.7, 5.5, 6.2, 8.7, 5.0, 5,4, 3.9, 6.5, 5.3, 6.5, 6.2, 2.1, 5.5, 3.6, 5,6, 8.4, 6.5, 5.0, 5.5   (6mks)

QUESTION FOUR

a) The following results of height and weight of 1000 students;

$\bar{x}$ = 170cm, y=60kg, r = 0.6, Jy=6.5cm Jx = 5kg. Anil weighs 45kg.

Sunil is 165 cm tall. Estimate the height of Anil from his weight and the weight of Sunil from his weight   (10mks)

b) The following data shows the types of trees, in given areas.

Type of tree	Number of Areas
Oak	20
Pine	
Cypress	15
Larch	1
	41

Represent this data using a bar graph   (4 mks)

c) Give the following set of data, determine the median, state why the median is more reasonable, a measure of central tendency than the mean in the set of data 2, 3, 3, 4, 4, 5, 5, 5, 8, 8, 17.   (6mks)

QUESTION FIVE

a) Let x be a random variable with the following p.d.f

f(x) = 1/18 (3+2x) 2 ≤ x ≤ 4

           0 elsewhere

   i.   Verify that f(x) is a pdf (5mks)

ii.   Obtain E(x) and Var x(5mks)

iii.   Find Pr$(2 \leq x \leq 3)$ (5mks)

b) List any five advantages of the median

(5mk)