

UNIVERSITY OF SWAZILAND

FACULTY OF HEALTH SCIENCES

MAIN EXAMINATION PAPER – MAY, 2012

TITLE OF PAPER : HEALTH STATISTICS

COURSE CODE : HSC 307

TIME : 2 HOURS

MARKS : 70

INSTRUCTIONS :

- : ANSWER **ALL** QUESTIONS IN **SECTION A**
- : EACH QUESTION IN SECTION A IS 10 MARKS
- : ANSWER **ANY TWO** QUESTIONS FROM **SECTION B**
- : EACH QUESTION IN SECTION B IS 20 MARKS
- : NO FORM OF PAPER SHOULD BE BROUGHT INTO NOR TAKEN OUT OF THE EXAMINATION ROOM
- : BEGIN THE ANSWER TO EACH QUESTION ON A SEPARATE SHEET OF PAPER
- : **GRAPH PAPER AND FORMULA SHEETS ARE PROVIDED**
- : CALCULATORS MAY BE USED BUT THEY MUST BE THE SILENT TYPE
- : ALL CALCULATIONS/WORK-OUT DETAILS SHOULD BE SUBMITTED WITH YOUR ANSWER SHEET

SECTION A: COMPULSORY

ANSWER ALL QUESTIONS IN THIS SECTION.

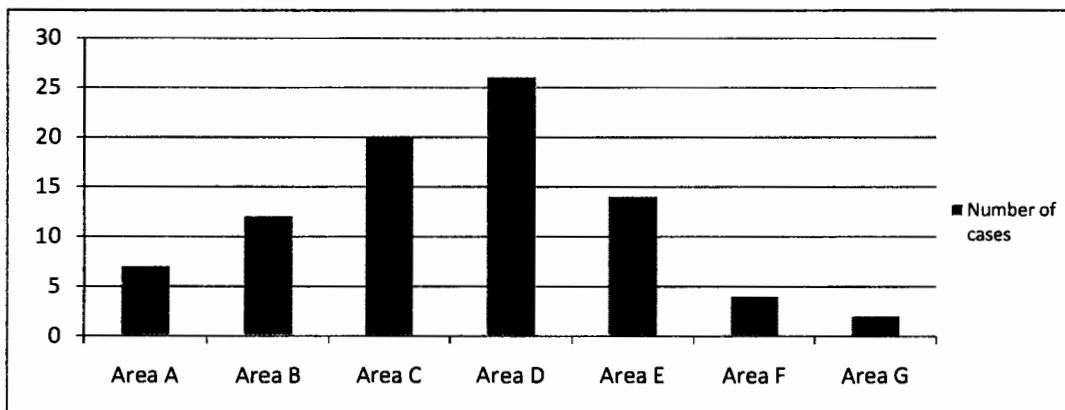
QUESTION 1

- a. Define:
- i. type II error (2)
 - ii. continuous variable (2)
 - iii. qualitative variable (2)
- b. For each of the following variables, indicate whether it is qualitative or quantitative:
- i. Administering diagnosis of patients admitted to a mental health clinic (1)
 - ii. Weights of babies born in a hospital during a year (1)
 - iii. Gender of babies born in a hospital during a year (1)
 - iv. Attendance of mothers to an antenatal clinic (1)

[10 marks]

QUESTION 2

A Health Inspector records the monthly number of flukes found in carcasses from cattle obtained from 7 breeding areas in the community. He uses the data to prepare the diagram below:



- a. Is the diagram a bar chart or a histogram? (1)
- b. Give two reasons for your answer in (a) (2)
- c. Interpret the diagram above in your own words. (3)
- d. What is the advantage of preparing a diagram like this in disease control? (2)
- e. What is the disadvantage of such a diagram? (2)

[10 marks]

QUESTION 3

In a study of the effectiveness of an insecticide against a certain insect, a large area of land was sprayed. Later, the area was examined for live insects by randomly selecting squares and counting the number of live insects per square. Past experience has shown the average number of insects per square after spraying to be 0.5. If the number of live insects per square follows a Poisson distribution, find the probability that a selected square will contain:

- a. more than one live insect (3)
- b. no live insects (2)
- c. exactly 4 live insects (2)
- d. one or more live insects (3)

[10 marks]

SECTION B: ANSWER ANY TWO QUESTIONS FROM THIS SECTION

QUESTION 4

Given below are the numbers of pit latrines constructed in 64 chiefdoms of the Kingdom of Swaziland over a 5-year period.

59	48	53	47	57	64	62	65
57	57	81	83	48	65	76	53
61	60	37	51	51	63	81	60
77	71	57	82	66	54	47	61
76	50	57	58	52	57	40	53
66	71	61	61	55	73	50	70
59	50	59	69	67	66	47	56
60	43	54	47	81	76	69	62

- a. Prepare a frequency distribution of the ages (4)
- b. Also, prepare a relative frequency distribution of the data (2)
- c. Use your frequency distribution to compute the:
 - i. mean (2)
 - ii. median (2)
 - iii. mode (2)
 - iv. standard deviation (2)
 - v. lower quartile (2)
 - vi. 60th percentile (2)
- d. Write a plausible interpretation of your answer to the mean. (2)

[20 marks]

QUESTION 5

The data below were obtained from two tutors, Miss Black and Miss Green, who independently ranked 10 essays in order of merit.

Essay	A	B	C	D	E	F	G	H	I	J
Miss Black	1	2	3	4	5	6	7	8	9	10
Miss Green	2	1	4	5	6	3	8	7	9	10

Find the correlation between the rankings of the two tutors.

[20 marks]

QUESTION 6

Researchers are interested in the mean age of a certain population. Let us say that they are asking the following question: Can we conclude that the mean age of this population is different from 30 years? The data available to the researchers are the ages of a simple random sample of 10 individuals drawn from the population of interest. From this sample a mean of 27 has been computed. It is also assumed that the population variance is 20. Use this data and determine if the researchers are safe to draw the conclusion stated above.

[20 marks]