BOTSWANA COLLEGE OF DISTANCE AND OPEN LEARNING

In collaboration with

ZIMBABWE OPEN UNIVERSITY

Bachelor of Commerce
(Human Resources Management and Industrial Relations)

BUSINESS STATISTICS
(BS 201)

SPECIAL EXAMINATION

Time: 3 Hours **Marks: 100**

INSTRUCTIONS:

1. The examination consists of three sections A, B and C.
2. Begin each answer to a new question on a new page.
3. Answer questions according to instructions given in each section.
4. Write answers in the answer booklet provided.
5. You are allowed to use calculator.
6. Answer the questions in grammatical English.

SECTION-A. Multiple Choice. Answer ALL questions. **[15 marks]**

1. Which one of these variables is a qualitative variable?

A. Number of rings on a person's fingers

B. Height of a person

C. Weight of a person

D. A person's opinion about legalization of marijuana

2. Which one of the following statements is correct?

A. The mean is a measure of the deviation in a data set.

B. The standard deviation is a measure of dispersion (variability).

C. The range is a measure of central location.

D. The median is a measure of dispersion.

3. The following frequency table was constructed from responses which were obtained when 25 college students were asked the question, "About how many music CD's do you own?"

Class interval	Frequency	Cumulative Frequency
Under 50	9	9
50 – under 100	5	14
100 - under 150	4	18
150 – under 200	2	20
200 – under 250	3	23
250 – under 300	2	25

Which of the following statements is incorrect?

A. Seven students own 150 or more CD's.

B. The relative frequency for the class interval (100 – under 150's) is 16%.

C. The relative cumulative frequency for the class interval (100 – under 150) is 72%.

D. 5% of the students own 200 or more CD's.

4. The following data give the time (in minutes) taken to commute from home to work for 21 workers.

10	50	65	33	48	5	11	23	37	26	30
26	32	17	7	13	19	29	43	21	22	

A. The range is equal to 60.

B. The mean is equal to 26.

C. The mode is equal to 26.
D. The median is equal to 26.

5. A medical research study was carried out to test the effect of a certain drug taken during pregnancy. One of the questions asked: "This drug did have an effect on your health during pregnancy, did it not?"

A. A double-barreled question
B. A leading question
C. An applicable question
D. A jargon-filled question

6. The mean of the data set $x_i = 7, 3, 7, 11, 2$ is _____.

A. 6
B. 7
C. 0
D. 11

7. One of the properties of the Poisson distribution is that _____.

A. It is discrete.
B. It is associated with the variance.
C. It is associated with a sample size.
D. It neither deals with rare or unique events.

8. Two types of hypotheses are _____.

A. Null and Void.
B. Null and Alternative.
C. Null and Space
D. None of the above

9. What is the probability of getting an odd number less than 5 when a dice is tossed?

A. 0.10
B. 0.25
C. 0.33
D. 0.50

10. A sociologist is interested in drawing a random sample of six individuals from a group of 10 people. In how many ways can this be done?

A. 1
B. 6
C. 60
D. 210

11. A shoe store carries 570 pairs of Fancy Fit and 630 pairs of Snazy shoes. Let a success be the event of randomly selecting a pair of Fancy Fit shoes.
The probability of a success is _____.

A. 0.570
B. 0.475
C. 0.630
D. 1.200

12. The table below shows the distribution of 25 students according to gender and preschool experience.

	Gender	
Preschool experience	Male	Female
Preschool	8	9
No preschool	6	2

The probability that the student is female and did not go to preschool is _____.

A. 0.08
B. 2
C. 0.44
D. 0.32

13. The events A and B are mutually exclusive. Suppose P (A) = 0.30 and P (B) = 0.20. Which of the following statements is incorrect?

A. $P(A^c) = 0.70$
B. $P(A \text{ and } B) = 0$
C. $P(A / B) = P(B / A)$
D. *A and B are dependent events*

14. A pollster randomly selected 4 of 10 available people. How many different groups of 4 are possible?

A. 6
B. 210

C. 5040
D. 40

15. All but one of the following are measures of Central Location.
A. Mean
B. Standard Deviation
C. Mode
D. Median

SECTION-B. Short answer type. Answer ALL questions. **[35 marks]**

(a). Fill in the missing words in the following statements. **(10 marks)**

i. _____data has previously been manipulated.

ii. The data collection method defined as "the manipulation of variables under controlled conditions" is called _____

iii. The normal distribution function is _____ shaped and is _____about the central peak.

iv. The two outcomes of a binomial experiment are termed _____ and _____.

v. A Pearson's correlation coefficient of +0.3 indicates a _____ and _____ relationship between the independent and dependant variables.

vi. The _____ is the most frequently occurring value in a data set.

vii. Standard deviation is a measure dispersion or _____.

(b). Find the probability for the standard normal distribution, *z:*

P (*z*>1.0*)* **(4 marks)**

(c). The incomplete relative frequency table for events X_1, X_2, X_3, X_4 and $Y_1, Y_2 \text{ and } Y_3$ is given below:

	X_1	X_2	X_3	X_4	
Y_1		0.03	0.12	0.03	0.25
Y_2	0.05		0.10		
Y_3	0.08	0.12	0.18	0.10	
		0.22			

i. Find $P(Y_2 \text{ and } X_2)$ **(3 marks)**

ii. Find $P(Y_2 / X_4)$ **(3 marks)**

iii. Find $P(Y_3)$ **(3 marks)**

(d). The credit department of a large department store chain regularly receives applications. One of questions asked in the application is the annual income of the applicant. The stem-and-leaf display of the incomes (in thousands of Pula) is as follows:

1	2	5	5	8				
2	0	0	2	3	5	7		
3	1	3	3	4	5	5	6	8
4	0	2	6	6	6	7	7	
5	1	3	5	8				
6	5	6	8					

Calculate the following:

i. The median **(3 marks)**

ii. What percentage of the values lie between the values 30 000 and 40 000? **(3 marks)**

iii. The mode **(3 marks)**

iv. The sixth largest value **(3 marks)**

SECTION-C. Essay type. Answer any TWO questions. **[50 marks]**

Question-1

a. In a large supermarket, the monthly demand for a particular variety of breakfast cereal is normally distributed with a mean of 900 boxes and a standard deviation of 200 boxes.

What is the probability that in any month, the demand will be:

i. More than 1000 boxes **(5 marks)**

ii. Between 500 and 1000 boxes **(7 marks)**

b. The personnel department of a large marketing organization wishes to analyze the quarterly figures of sickness absence (hours) for all staff over the period 2008 – 2011, and the results are given in the following table:

	QUARTER			
Year	Q1	Q2	Q3	Q4
2008	134	174	166	128
2009	148	162	132	106
2010	116	152	122	110
2011	106	134		

i. Draw a graph of the above time series, and comment on its movement. **(3 marks)**
ii. Calculate the trend using 4-period moving average. **(10 marks)**

Question-2

The information in the following table shows the weekly amount spent on newspapers (nearest P) at a local supermarket over a 30-day period in 2012.

Class	f_i
100 - <110	3
110 - <120	7
120 - <130	12
130 - <140	4
140 - <150	2
150 - <160	1
160 - <170	1
Total	30

Calculate the following:

a. Mean **(5 marks)**
b. Median **(5 marks)**
c. Mode **(5 marks)**
d. Variance **(7 marks)**
e. Standard Deviation **(3 marks)**

Question-3

a. Bank robbers brandish firearms to threaten their victims in 80% of the incidents. An announcement that six bank robberies are taking place is being broadcast.

Find the probability that a firearm is being used in at least one of the robberies. **(5 marks)**

b. The data below shows the sales per for a certain company.

Year	Sales (millions of PULA)
2006	20
2007	25
2008	28
2009	22
2010	30

i. Assigning the years to sequential numbers (e.g. 2006=1; 2007=2; etc), calculate the linear regression equation. **(10 marks)**

ii. Use the equation to predict sales for 2011. **(3 marks)**

iii. Compute the Pearson's correlation coefficient and comment on its value. **(7 marks)**

END OF PAPER