

UNIVERSITY OF SWAZILAND

FINAL EXAMINATION PAPER 2013

TITLE OF PAPER : DESCRIPTIVE STATISTICS

COURSE CODE : ST 132

TIME ALLOWED : TWO (2) HOURS

REQUIREMENTS : CALCULATOR

INSTRUCTIONS : THIS PAPER HAS FIVE (5) QUESTIONS. ANSWER ANY FOUR (4) QUESTIONS.

Question 1

[25 marks, 12+4+5+4]

- (a) The marketing manager of a company that manufactures and distributes farming equipment (such as combine harvesters, ploughs and tractors) recorded the number of farming units sold quarterly for the period 2003 and 2006.

Quarter	2003	2004	2005	2006
Summer	57	60	65	64
Autumn	51	56	60	62
Winter	50	53	58	58
Spring	56	61	68	

- (i) Find the quarterly seasonal indexes for farming equipment sold.
 (ii) Do seasonal forces significantly influence the sale of farming equipment? Comment
- (b) Two groups of bank trainees each wrote a banking exam with the following *percentage* results:

	Sample size	Mean	Variance
Group 1	34	76	110
Group 2	26	64	88

- (i) Which group showed greater consistency in *exam score* results? Why?
 (ii) Compute the mean and variance of the two groups combined.

Question 2

[25 marks, 6+4+6+4+5]

- (a) The average annual salary and staff complements (number of employees) for each of three IT job categories in a large IT consultancy organization are shown in the following table:

IT job categories	Annual salary (in SZL10 000)		No. of employees	
	2004	2007	2004	2007
Systems analyst	42	50	84	107
Programmer	29	36	96	82
Network manager	24	28	58	64

- (i) Calculate the Laspeyres composite index to reflect the overall average change in the annual salaries of IT personnel from 2004. What does this composite index mean in terms of the change of overall remuneration paid to these three IT job categories from 2004 and 2007?
 (ii) Compute the price relatives for each category of IT personnel. Which category has shown the largest increase in annual salary between 2004 and 2007?
- (b) A labour consultant analyzed the agreed *percentage wage increases* in 16 wage negotiations conducted between labour unions and employers. They were

5.6 7.3 4.8 6.3 8.4 3.4 7.2 8.5
 5.8 6.2 7.2 5.8 7.6 7.4 5.3 5.8

- (i) Find the mean and median negotiated *percentage wage increases*.
- (ii) Find the variance and standard deviation of the *percentage wage increases*.
- (iii) How consistent are the *percentage wage increases* agreements?

Question 3

[25 marks, 5+8+5+3+4]

- (a) A call centre requires that each new employee undertakes an aptitude test when hired. A year later, their job performance is evaluated. The call centre manager would like to know if aptitude test scores can be used to predict job performance. The aptitude scores (measured out of 10) and job performance scores (measured out of 100) of 12 random selected employees is recorded in the following.

Employee Performance Ratings		
Employee	Aptitude score	Performance ratings
1	7	82
2	6	74
3	5	82
4	4	68
5	5	75
6	8	92
7	7	86
8	8	69
9	9	85
10	6	76
11	4	72
12	6	64

- (i) Measure the strength of the statistical relationship by computing the correlation coefficient between the aptitude score and performance ratings of call centre employees.
 - (ii) Compute the simple linear regression equation and estimate the likely average performance rating score for call-centre employees with an aptitude score of 8.
 - (iii) Compute the coefficient of determination and interpret.
- (b) Find the average price paid per share in an equity portfolio consisting of: 40 shares bought for SZL15 each; 10 shares bought for SZL20 each; 5 shares bought for SZL40 each; and 50 shares bought for SZL10 each.
 - (c) Office rental agreements contain escalation clauses. For a particular office complex in Manzini, the escalation rates based on the previous year rentals over 4 years were 16%, 14%, 10% and 8% respectively. What was the *average annual escalation rate* in office rentals for this office complex over this 4-year period?

Question 4

[25 marks, 4+4+4+8+5]

- (a) A fish shop owner recorded the daily turnover of his outlet for 300 trading days as shown in the following table.

Daily turnover	Number of days
500– < 750	15
750– < 1000	23
1000– < 1250	55
1250– < 1500	92
1500– < 1750	65
1750– < 2000	50

- (i) Compute and interpret the average *daily turnover* of the fish shop.
- (ii) Find the median daily turnover of the fish shop. Interpret its meaning.
- (iii) Identify the maximum daily turnover associated with the slowest 25% of trading days.
- (iv) Compute the coefficient of skewness and interpret its meaning.
- (b) In the UK Index of Retail Prices for December 1986 (January 1974=100) the approximate index for beer was around 500 and that for cheese was 400. Consider the following statements about December 1986:
- (i) The price of beer was lower than the price of cheese.
- (ii) The price of beer was higher than the price of cheese.
- (iii) The change in the price of beer was 20 percent greater than the change in the price of cheese since January 1974.

Which of the statement(s) is/are true?

Question 5

[25 marks, 3+4+4+4+5+5]

The human resources department of an insurance company analyzed the *qualifications* profile of their 129 managers in terms of their highest qualification achieved. The findings are shown in the following table.

Qualification	Managerial Level		
	Section Head	Dept Head	Division Head
Matric	28	14	?
Diploma	20	24	6
Degree	?	10	14
Total	53	?	28

- (a) Define the two random variables, their measurement scale and data type.
- (b) What is the probability that a manager selected at random has only a matric?
- (c) What is the probability that a manager selected at random has either a matric, or a diploma, or a degree?
- (d) What is the probability that a manager selected at random is a section head and has a degree?
- (e) What is the probability that a manager selected at random is a departmental head given that the manager has a diploma?
- (f) What is the probability that a manager selected at random is either a division head or has a diploma or both?