BINDURA UNIVERSITY OF SCIENCE EDUCATION

FACULTY OF COMMERCE

DEPARTMENT OF HUMAN RESOURCES MANAGEMENT

Course: Quantitative Analysis for Business II BS 201 NOV 2015

Duration: 3 HOURS

INSTRUCTIONS TO CANDIDATES

1. Answer any **two** questions from section A and any **two** questions from section B.

INFORMATION TO CANDIDATES

1. All questions carry equal marks.
2. No unauthorised items must be brought into the examination room.

MATERIALS ALLOWED

1. Statistical Booklet
2. Graph Paper

SECTION A: Answer any **Two** Questions

QUESTION 1

a) The manager of Eastgate shopping mall in Harare believes that visitors to the mall spend on average 85 minutes in the mall on any one occasion. To test this belief the manager commissioned a survey with a random sample of 132 visitors to the mall, the average visiting time was 80.5 minutes. Assume a population standard deviation of 25 minutes and that visiting time is approximately normally distributed.

Required:

(i) Formulate the null and alternative hypothesis for this test situation. (4)

(ii) Conduct a hypothesis test at the 5% level of significance to support or refute the manager's belief. What management conclusion would be drawn from the findings? (8)

b) The Retail Association of Zimbabwe believes that the average amount spent on groceries by Harare shoppers on each visit to a supermarket is $175. To test this belief, the association conducted a survey among a random sample of 360 grocery shoppers at supermarkets in Harare. Based on the survey, the average value of grocery purchases was $182.40. Assume that the grocery purchase values are normally distributed with a standard deviation of $67.50.

Required:

Can the Retail Association of Zimbabwe conclude that grocery shoppers spend an average of $175 on each visit to a supermarket? Conduct a test at the 5% level of significance? (13)

[25]

QUESTION 2

A small publishing company decides to use one section of its plant to produce two textbooks called Microeconomics and Macroeconomics. The profit made on each copy is $12 for Microeconomics and $18 for Macroeconomics. Each copy of Microeconomics requires 12 minutes for printing and 18 minutes for binding. The corresponding figures for Macroeconomics are 15 and 9 minutes respectively. There are 10 hours available for printing and 10.5 hours available for binding.

Required:

i) Formulate a linear programming model such that the profit is maximized. (5)
ii) Solve graphically. (20)
[25]

QUESTION 3

a) At a wine tasting function, two judges were asked to independently rank the 10 wines on the exhibit from the most desirable (rank =1) to the least desirable (rank=10). The preferences were as follows:

Wine	A	B	C	D	E	F	G	H	I	J
Judge 1	3	7	10	2	9	1	5	4	6	8
Judge 2	1	10	9	4	8	3	2	7	5	6

Required:

i) Calculate the rank correlation coefficient. (10)
ii) What does the coefficient suggest about the relationship between the two judges preferences? (3)

b) A property analyst is examining the relationship between the City Council's valuation on residential property and the market value (selling prices) of properties. A random sample of 8 recent property transactions was examined as shown below:

City Council Valuation	12	45	32	50	28	56	18	40
Market Value	65	220	142	310	196	364	116	260

Required:

i) Find the correlation co-efficient between council valuation and market value. (10)
ii) Comment on your results. (2)
[25]

Section B: Answer Any Two Questions

QUESTION 4

a) An electronic components firm launches a new product on 1 January. During the following year a rough estimate of the number of orders, S, received t days after the launch is given by $S = t^2 - 0.002t^3$.

Required:

(i) What is the maximum number of orders received on any one day of the year? (5)
(ii) After how many days does the firm experience the greatest increase in orders? (4)

b) The profit in millions from a daily production run is given by P which is a function of the level of production, x (in thousands).
If $\frac{dp}{dx} = 11 - 2x$ and one profit break-even is known to be a production of 3000.

Required:

i) P as a function of x. (4)
ii) The other profit breakeven point. (4)
iii) The daily production run that gives the maximum profit. (4)
iv) The value of the maximum daily profit. (4)
[25]

QUESTION 5

The number of new business registrations in the Zimbabwe was recorded by the Zimbabwe Investment Centre for the period 2010 to 2014 are shown below:

Year	Quarter			
	Q1	Q2	Q3	Q4
2010	1 005	1 222	1 298	1 199
2011	1 173	1 371	1 456	1 376
2012	1 314	1 531	1 605	1 530
2013	1 459	1 671	1 762	1 677
2014	1 604	1 837	1 916	1 819

Required:

(i) Plot the line graph for the new business registrations in Zimbabwe for the given period. (4)
(ii) Calculate a four-period centred moving average and plot it on the same graph. (8)
(iii) Calculate the adjusted seasonal indices for new business registrations in Zimbabwe. (8)
(iv) Are new business registrations significantly influenced by seasonal forces? Comment. (5)
[25]

QUESTION 6

a) The changes in industrial production and in the prices manufacturers paid for raw materials since 1992 are to be compared. Unfortunately the index of industrial production which measures changes in production and the Producer Price Index which measures the change in the prices of raw materials have different base periods. The production index has 1987 as the base period and the Producer Price Index uses 1992 as the base period are shown below:

Year	Industrial Production Index 1987=100	Producer Price Index 1992= 100
1992	115.3	100.0
1997	129.8	105.4
2004	142.8	119.2
2007	172.3	131.8
2010	185.6	138.0
2012	191.3	138.9
2044	194.7	143.3

Required:

Shift the Industrial Production Index base period to 1992 and make the two series comparable and comment. (15)

b) The following price indices in the table below relates to school uniforms in a certain education department:

Year	1995	1996	1997	1998	1999	2000
Price Index	97.6	100	105	103.6	108.5	114

Required:

Change the base year from 1996 to 1999 as a base period and calculate the new index numbers. (10)

[25]

End of Paper