NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

FACULTY OF INDUSTRIAL TECHNOLOGY

DEPARTMENT OF TECHNICAL TEACHER EDUCATION

Programme: BACHELOR OF TECHNICAL EDUCATION HONOURS DEGREE

SUPPLEMENTARY EXAMINATION

Course: STATISTICS FOR EDUCATORS **TTE3109**

Part/Year: III **JULY 2014**

Time: 3 hours **Lecturer: Dr N Phuthi** **100 marks**

INFORMATION AND DIRECTIONS TO CANDIDATES

1. Answer **Question 1** and any **THREE** others.
2. All questions carry equal marks.
3. Begin each question on a fresh page and parts of the same question must be submitted together.
4. A list of selected formulae is provided at the end of the question paper.
5. The use of silent, non-programmable calculators is encouraged unless advised otherwise.
6. Numerical answers should be given to two decimal places unless indicated otherwise.
7. Statistical tables are supplied in a separate booklet.
8. This paper consists of FIVE printed pages.

QUESTION 1

(a) Make an ordered data array and a stem-and-leaf diagram for the measurements below. [10]

8.14	5.28	10.11	9.02	10.56	5.45	12.61	8,73	6.97	10.11
6.37	5.77	10.45	11.20	10.68	5.90	9.32	13.83	8.66	8.74
8.99	10.35	5.86	15.15	7.51	6.87	8.66	8.88	7.33	14.22
9.25	7.79	14.19	8.36	11.29	6.44	5.95	12.55	5.29	7.62

(b) The marks below were obtained by 5 students in the coursework and final examination of a certain course. Given that the coursework mark counts as one quarter of the final examination, compute the weighted overall mark for each student. [10]

Student	Coursework	Final Examination	Overall Mark
A	54	68	
B	90	62	
C	67	36	
D	38	88	
E	25	50	

(c) If the pass mark is 50, comment on the students' strengths and weaknesses. [5]

QUESTION 2

In biology and agriculture tests, ten students received the following scores:

Student	Biology Mark	Agriculture mark
1	70	68
2	68	48
3	71	64
4	46	40
5	59	37
6	83	79
7	35	45
8	52	53
9	67	61
10	44	44

(a) Calculate Spearman's rank correlation coefficient for the data. [15]
(b) Fully explain the implications of the result you obtain in (a). [5]
(c) Explain the difference between continuous and discrete data. [5]

QUESTION 3

(a) Two groups of pupils in the same grade level were given a simple test and their scores were as below:

Group A : 6, 7, 8, 6, 5, 7, 8, 7, 7, 6, 6, 9, 7, 8, 6, 7, 8, 8, 7, 6
Group B : 9, 8, 5, 8, 7, 6, 4, 9, 9, 8, 7, 7, 6, 5, 9, 7, 6, 9, 6, 8, 8, 7

(i) Calculate the mean scores for the two groups and state which one performed better. [6]
(ii) Conduct a suitable test to determine if the difference in performance between the groups is significant, stating the level of significance. [10]

(b) A bag contains 4 red, 4 black and 2 white balls. Two balls are drawn without replacement. What is the probability that the two drawn are both red? [9]

QUESTION 4

(a) (i) Explain, in statistical terms, the difference between the 0.05 and the 0.01 levels of significance. [3]
(ii) The number of pies sold in a school tuck shop during a particular week is given in the table below:

Day	MON	TUE	WED	THUR	FRI
No of pies	88	117	124	90	76

Test the hypothesis that the number of pies sold does not depend on the day of the week. Use a significance level of 0.05 and show all your calculations, and hence interpret your results. [12]

(b) Explain, using a specific example, the use of the table of random digits (in your statistical tables booklet **or** using a calculator) to choose a random sample. [10]

QUESTION 5

The table below gives the scores obtained by a class in a Technology Theory examination.

Scores	25-27	28-30	31-33	34-36	37-39	40-42
Frequency	5	8	14	12	8	3

(a) Draw a cumulative frequency curve from the data. [10]
(b) From the curve, indicate the median mark. [2]
(c) Estimate also the number of students passing if the pass mark was set at 30. [3]
(d) Indicate on the graph and state the upper and lower quartiles. [2]
(e) Describe the *semi-interquartile range* and give its value in this distribution. [3]

QUESTION 6

Draw rough sketches of the following curves: normal, sigmoid, parabolic, hyperbolic. [4]

(b) The amounts, in millions of dollars, of expenditure on services in a city for the years 1991 and 1992 are shown in the table below.

	Expenditure ($m)	
	1991	**1992**
Education	160	x
Emergency services	120	y
Roads	80	65.80
Social services	70	82.31
Other services	50	104.34
TOTALS	w	z

Pie charts are drawn to compare the expenditure for these two years.

(i) Find the angle representing the Education sector in 1991. [3]
(ii) Given that there is a 20% increase in expenditure on education during the year 1992, and that the angles of the sectors representing Emergency Services are the same for the two years, calculate the value of x, y and z. [10]
(iii) Which sectors have decreased their expenditure relative to the whole budget? [2]
(iv) Given also that the radius of the pie chart for 1991 is 9 cm, calculate the radius of the pie chart for 1992. [6]

END OF EXAMINATION QUESTION PAPER