EMBU UNIVERSITY COLLEGE

(A CONSTITUENT COLLEGE OF THE UNIVERSITY OF NAIROBI)

FIRST SEMESTER EXAMINATIONS 2014/2015

THIRD YEAR EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN AGRICULTURE

ACS 306/AEB 307: STATISTICS II

DATE: DECEMBER 8, 2014   **TIME: 16:00 – 18:00**

INSTRUCTIONS:

Answer Question ONE and ANY Other TWO Questions.

QUESTION ONE

a) Give the difference between

    i)   Point estimate and Interval estimate   (2 marks)

    ii)   The z and t distributions   (2 marks)

b) A survey of 320 families with 5 children each revealed the following distribution.

No. of boys	5	4	3	2	1	0
No. of girls	0	1	2	3	4	5
No. of families	14	56	110	88	40	12

    i)   Obtain the required hypothesis.   (1 mark)

    ii)   Calculate the expected frequencies and use them to obtain the test statistic.

           (6 marks)

iii) Is this result consistent with the hypothesis that male and female births are equally probable? (3 marks)

c) The mean lifetime of a sample of 100 light tubes produced by a company is found to be 1570 hours with standard deviation of 80 hours. Test the hypothesis that the mean lifetime of the tubes produced by the company is 1600 hours at 95% level of confidence.

    i) Obtain the required hypothesis and standard error (2 marks)

    ii) Calculate the interval to make the decision rule. (2 marks)

    iii) Use the test statistic to make the decision rule and conclusion. (3 marks)

d) Give the six Fisher assumptions about the true value of a population and the residue error. (3 marks)

e) Briefly differentiate between arcsine, logarithmic and square root transformations. (6 marks)

QUESTION TWO

a) Two different types of drugs A and B were tried on certain patients for increasing weight, 5 persons were given drug A and 7 persons were given drug 'B'. The increase in weight (in kilograms) is given below:

    Drug A: 8 12 13 9 3

    Drug B: 10 8 12 15 6 8 11

Do the two drugs differ significantly with regard to their effect in increasing weight? (10 marks)

b) In one sample of observations, the sum of squares of the deviations of the sample values from sample mean was 120 and in the other sample of 12 observations it was 314. Test whether the difference is significant at 5% level of significance. (5 marks)

c) The following data shows the length (cm) and mass (kg) of some construction materials.

Length (cm)	168	146	157	133.7	318	195	107	171	122
Mass (kg)	381	419	487	228.5	685	645	266	649	533

Compute and interpret the Spearman's Rank correlation coefficient. (5 marks)

QUESTION THREE

a) Differentiate between a Randomized Complete Block Design and a Latin Square Design.

(5 marks)

b) A certain drug is claimed to be effective in curing cold. In an experiment on 500 persons with cold, half of them were given the drug and half of them were given the sugar pills. The patients' reactions to the treatment are recorded in the following table:

	Helped	Harmed	No Effect	Total
Drug	150	30	70	250
Sugar Pills	130	40	80	250
Total	280	70	150	500

On the basis of this data can it be concluded that there is no significant difference in the effect of the drug and sugar pills? (6 marks)

c) Consider the following experiment with 5 treatments each tested in 5 experimental units using a Completely Randomized Design.

Observation

Treatment	1	2	3	4	5
1	7	7	15	11	9
2	12	17	12	18	18
3	14	18	18	19	19
4	19	25	22	19	23
5	7	10	11	15	11

Determine if the effect of the treatments is the same. (9 marks)

QUESTION FOUR

a) Differentiate between parametric tests and non – parametric tests.   (2 marks)

b) Consider a case whereby cakes are to be baked from four types of wheat flour by four different workers. From each type of wheat flour, four different ingredients are used.

      i)   Show the best model to set up such an experiment.   (2 marks)

      ii)   Give the best ANOVA table in such a case.   (6 marks)

c) The following table shows the number of vehicles registration in a certain territory for a term of six years and the sale of motor tyres by a firm in that territory for same period.

Year	1	2	3	4	5	6
Motor Registration	600	630	720	750	800	850
Number of Tyres sold	1250	1100	1300	1350	1500	1600

Find the regression equation to estimate the sale of tyres when motor registration is known and estimate the number of tyres when registration is 900.   (10 marks)

QUESTION FIVE

a) How would you determine a good estimator?   (6 marks)

b) The following results were obtained from an experiment carried out in three blocks (replicates) with the goal of comparing 5 treatments. Determine if the treatment means are significantly different at 10% level.

		Block 1	Block 2	Block 3
Treatment	1	7.46	7.68	7.21
	2	7.76	7.73	7.74
	3	7.62	8.00	7.93
	4	8.14	8.15	7.87
	5	7.17	7.57	7.80

(14 marks)

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