UNIVERSITY OF KABIANGA

SCHOOL OF NATURAL RESOURCE

UNIVERSITY EXAMINATIONS 2015/2016

SECOND YEAR FIRST SEMESTER EXAMINATIONS FOR THE DEGREE OF BACHELOR OF FORESTRY AND AGRO FORESTRY

FOR 210 : INTRODUCTIORY STATISTICS

DATE: DEC 2015

DURATION: 3 HRS

INSTRUCTIONS: Answer Question ONE and any other TWO Questions

QUESTION ONE [30 Marks]

(a) Define the following terms: (5 marks)

(i) Probability

(ii) Population

(iii) Skewness

(iv) Median

(v) Sample

(b)The governing council of University of Kabianga consists of 8 professors, 6 associate professors, 4 lecturers, 6 government nominees and 2 student representatives. A subcommittee of 6 is to be selected from the council membership. Calculate the probability that the subcommittee will be composed of 1 professor, 2 associate professors, 2 lecturers and 1 student. (4 marks)

(c) State any **five** properties of a Normal Distribution (5 marks)

(d) A husband and wife appear in an interview for the same post. The probability of husband's selection is 2/5 and that of the wife's selection is 1/4. Calculate the probability that;

i) None of them is selected

ii) Both of them are selected

iii) Only one of them is selected (5 marks)

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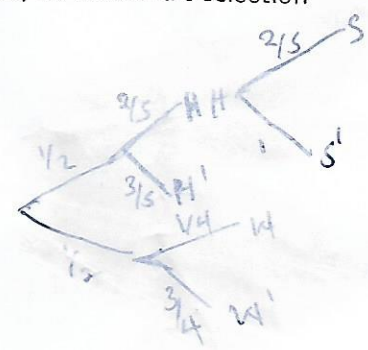
(e) The students of statistics for economists at University Of Kabianga scored the following marks in ARE: 112 in 2013 examinations. Calculate the median and the mode from this data. (6 marks)

Marks	0 – 9	10 - 19	20 - 29	30 – 39	40 – 49	50 – 59
No. students	8	15	22	20	10	5

(f) With the help of diagrams explain what is meant by the following types of distribution

   i) Symmetrical distribution (2 marks)   *median + mean are at same place*

   ii) Positively and Negatively Skewed distribution (3 marks)

QUESTION TWO [20 Marks]

Use the data below to answer the questions that follow

Marks	0 – 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60
No. of students	12	18	25	20	15	10

Calculate: (i) Mean (2 marks)   (vi) 65th Percentile (2 marks)

   (ii) Median (2 marks)   (vii) Standard deviation (3 marks)

   (iii) Mode (2 marks)   (viii) Coefficient of variation (2 marks)   *— $\dfrac{standard\ deviation}{mean}$*

   (iv) Quartile deviation (3 marks) (ix) Pearson's coefficient of skewness (2mks)

   (v) 6th Decile (2 marks)

QUESTION THREE [20 Marks]

$\dfrac{q_3 - q_1}{2}$

(a) i) Define a Binomial distribution   (1 mark)

   ii)State any three properties of the binomial distribution   (3 marks)

(b) Based on experience, 5% of the worm gears produced by an automatic, high speed carter-bell milling machine are defective. Calculate the probability that out of six gears selected at random;

   (i) exactly zero gears will be defective (2 marks)

   (ii) exactly one gear will be defective (2 marks)

   (ii) exactly four gears will be defective (2 marks)

(c)i) Define the Students t-distribution, state when it is used and the underlying mathematical assumption (3 marks)

   ii)State any three properties of the t-test distribution   (3 marks)

iii)The life time of electric bulbs for a random sample of 10 from a large consignment gave the following data:

Item	1	2	3	4	5	6	7	8	9	10
Life in '000 hours	4.2	4.6	3.9	4.1	5.2	3.8	3.9	4.3	4.4	5.9

Using t-test, test the hypothesis that the average life time of bulbs is 4 000 hours.(4 marks)

QUESTION FOUR [20 Marks]

(a) A bag contains 4 red and 6 yellow balls. The balls are identical in all aspects except colour. Three balls are picked one at a time at random without replacement. Find the probability that;

(i) all the three balls are yellow

(ii) at least two are red

(iii) at most two are yellow

(iv) there are more reds than yellows

(v) all the three balls are of the same colour

(10 marks)

(b) From the data below, calculate the mean, the mode, standard deviation and hence the Pearson's coefficient of skewness and comment on the value so obtained (10 marks)

marks	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89
Frequency	28	42	54	108	129	61	45	33

Class --

QUESTION FIVE [20 Marks]

(a) i) Define a Poisson distribution and give its formula   (2 marks)

    ii) State any five practical situations in which Poisson distribution can be used   (5 marks)

    iii) The Disneyland Bureau of printing and engraving (BPE) is responsible of printing this country's paper money. The BPE has an impressively small frequency of printing errors; of 0.5% of the bills are too flawed for circulation. What is the probability that out of a batch of 2,000 bills;(Take $e=2.7183$)

    i) none are too flawed for circulation? (1 mark)

    ii) two are too flawed for circulation? (2 marks)

    i) ten are too flawed for circulation? (2 marks)

(b) i) Define kurtosis and briefly explain how it is measured   (2 marks)

    ii) State and explain the three types of kurtosis   (6 marks)