UNIVERSITY OF SWAZILAND

FINAL EXAMINATION PAPER

PROGRAMME: BSc. in Agricultural Economics and Agribusiness
             Management Year II
             BSc. in Agricultural Education Year II
             BSc. in Agronomy Year II
             BSc. in Animal Science Year II
             BSc. in Food Science, Nutrition and Technology Year II
             BSc. in Consumer sciences Year II
             BSc. in Consumer sciences Education Year II
             BSc. in Horticulture Year II
             BSc. in Agricultural & biosystems engineering Year II
             BSc. in Textiles Apparel Design and Management Year II

COURSE CODE: AEM 201

TITLE OF PAPER: Elementary statistics.

TIME ALLOWED: 2:00 Hours

INSTRUCTION: ANSWER QUESTION ONE AND CHOOSE ANY
                   OTHER TWO FROM THE REMAINING
                   FOUR QUESTIONS
                2. QUESTION ONE CARRIES 50 MARKS AND
                   THE OTHER TWO CARRIES 25 EACH.

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GRANTED BY THE CHIEF INVIGILATOR**

Question one

State the most correct answer for each of the following.

1.1 when a distribution is positively skewed, the relationship pf the mean, median and mode from left to the right will be

    a .mode, median ,mean

    b .median, mode, mean

    c. mean, mode, median

    d. mean, median ,mode

1.2 If the mean of ten values is 72 and the nine of the values are 48,71,79,56,45,96,88,75 and 66 then the tenth value will be

    a. 70

    b. 65

    c.45

    d. None of the above

1.3 Which statistic are not affected by extreme values?

    a. mode

    b. standard deviation

    c. Median

    d. a and c

1.4 A manufacturer of television tubes has two types of tubes, A and B .The tube have respective mean life time $\overline{X}_A$ = 1495 hours and $\overline{X}_B$ = 1875 and standard deviation σ_A =280 hours and σ_B =310

which tube has the   greater relative dispersion?

    a, Tube A

    b. tube B

    c. Both are equal

    d. None of the above

1.5 The Z- score corresponding to a number below the mean is

    a. always negative

    b. always positive

    c. mostly positive

    d .mostly negative

1.6 The trade union consists of 4567 members .A representative group of 35 members were selected and asked questions. The 35 is conceded

    a. the population

    b. the parameter

    c. a sample

d. a statistic

1.7 Which one is not a property of the normal probability distribution?
   a. symmetrical about the central mean value
   b. smooth bell shaped curve
   c. the tail of the curve are asymptotic
   d. none of the above

1.8 Which average is the largest measure of central tendency in a positively skewed distribution?
   a. mode
   b. mode
   c. median
   d. all are equal

1.9 Given the following eight observations: 5,6,6,7,6,3,2,2. Then 6 is ____ of those observation?
   a. mean
   b. mode
   c. median
   d. range

1.10 Which of the following is true about bar chart?
   a. A bar chart is used when the data are measured on a nominal or ordinal scale.
   b. The height of the bar corresponds to the frequency.
   c. There is a space separating each bar from the next
   d. All of the above.

1.11 In how many ways can 6 differently colored marbles be arranged in a row?
   a. 6
   b. 36
   c. 120
   d. 720

1.12 The out comes in a binomial experiment are
   a. 1
   b. 2
   c. 3
   d. 4

1.13 In the standard normal distribution the area outside the rang $Z = -2$ to $Z = +1.6$ is
   a. 0.92245
   b. 0.47725
   c. 0.07755
   d. none of the above

1.14. If the following data are given for 20 observations

$$\sum_{i-1}^{18} x_i = 306 \quad , \sum_{i=1}^{18} x_i^2 = 54900, \quad x_{19} = 16 \quad , x_{20} = 10$$

the standard deviation for the 20 observations is
  a. 49.9
  b.2
  c.59
  d .none of the above

1.15. Sampling is inevitable in the situations
  a. Blood test of a person
  b. when the population is infinite
  c. Test of life of dry battery cells
  d. all of the above.

1.16 If each and every unit of the population has equal chance of being
    included in the sample, it is known as
  a. restricted sampling
  b. Purposive sampling
  c. sample random sampling
  d .none of the above

1.17 Sampling random sample can be drawn with the help of
  a. lip method
  b. Random number table
  c. calculator
  d. all the above

1. 18. A section procedure of a sample having no involvement of probability
    is known as
  a. purposive sampling
  b. Judgment sampling
  c. subjective sampling
  d. all the above

1.19. Five establishment are to be selected from a list of 50 establishments
    by systematic random sampling. If the first number is 7, the next one is
  a. 8
  b. 16
  c. 17
  d. 21

A

1.20 Which of the following can never be negative value?
    a. median
    b. mode
    c. standard deviation
    d. correlation coefficient

QUESTION TWO.

2.1 The coefficient of variation of a certain frequency distribution
    was found to be 50% and its standard deviation was 21.2.
    find its arithmetic mean?

2.2 The following table of raw data is the result of taking a sample
    of 40 values from a population of lambs for an experimental study,
    the data being measured to 2d.

18.34	17.34	19.02	19.13	18.71	19.63	18.73	18.38
18.22	18.84	19.02	17.91	18.54	18.84	19.04	18.91
18.73	18.51	17.71	18.81	19.21	18.81	19.20	18.78
18.62	18.81	18.74	17.84	18.24	1798	18.38	18.09
18.43	18.02	17.91	18.53	19.14	18.68	18.81	18.47

Organize the data to form a frequency distribution table with 6 equal classes
beginning 17.50 up to 17.90. Calculate the class boundaries and mid class points
for the classes obtained.

QUESTION THREE.

To investigate a process which is carried out repeatedly in a chemical works, the amount, x, of a chemical added to a mixture is varied and the concentration, y, of the final product is noted. the result are as follows;

X(g)	10	10	15	15	20	20	25	25	30	30
Y(g)	2.7	2.9	4.5	4.0	6.3	6.2	8.0	7.4	9.7	10.1

3.1 Draw a scatter diagram of the data

3.2 Calculate the equation of the regression line of y on x and draw it on the scatter diagram

3.3 assuming a linear relationship between x and y find and assess the product moment correlation coefficient

3.4 State, giving a reason, whether varying the amount of chemical added is an effective way of controlling the final concentration. What advice would you give to the works manager who requires the final concentration to be consistently in the range 3.5 to 3.5?

QUESTION FOUR.

4.1 In a box there are 5 red 7 white balls, what are the possibilities of drawing
   a) 4 red balls at the same time
   b) 2 red balls and 2 white balls in drawing 4 ball at a time?

4.2 Use the coding $U = \dfrac{x - 125}{5}$ to find the mean and standard deviation of the following distribution

x	105	110	115	120	125	130	135	140	145
y	14	26	2	70	68	35	11	2	1

4.3 You are interested in estimating the mean age (years) of a population. The population is an approximately normal and has a standard deviation of 5. You sample 24 individuals and calculate a mean of 25.
   a) Calculate a 95% confidence interval for the mean age in the population. Interpret this confidence interval.
   b) Calculate a 99% confidence interval for the mean age in the population.

Standard Normal Probabilities

z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.0000	0.0040	0.0080	0.0120	0.0160	0.0199	0.0239	0.0279	0.0319	0.0359
0.1	0.0398	0.0438	0.0478	0.0517	0.0557	0.0596	0.0636	0.0675	0.0714	0.0753
0.2	0.0793	0.0832	0.0871	0.0910	0.0948	0.0987	0.1026	0.1064	0.1103	0.1141
0.3	0.1179	0.1217	0.1255	0.1293	0.1331	0.1368	0.1406	0.1443	0.1480	0.1517
0.4	0.1554	0.1591	0.1628	0.1664	0.1700	0.1736	0.1772	0.1808	0.1844	0.1879
0.5	0.1915	0.1950	0.1985	0.2019	0.2054	0.2088	0.2123	0.2157	0.2190	0.2224
0.6	0.2257	0.2291	0.2324	0.2357	0.2389	0.2422	0.2454	0.2486	0.2517	0.2549
0.7	0.2580	0.2611	0.2642	0.2673	0.2704	0.2734	0.2764	0.2794	0.2823	0.2852
0.8	0.2881	0.2910	0.2939	0.2967	0.2995	0.3023	0.3051	0.3078	0.3106	0.3133
0.9	0.3159	0.3186	0.3212	0.3238	0.3264	0.3289	0.3315	0.3340	0.3365	0.3389
1.0	0.3413	0.3438	0.3461	0.3485	0.3508	0.3531	0.3554	0.3577	0.3599	0.3621
1.1	0.3643	0.3665	0.3686	0.3708	0.3729	0.3749	0.3770	0.3790	0.3810	0.3830
1.2	0.3849	0.3869	0.3888	0.3907	0.3925	0.3944	0.3962	0.3980	0.3997	0.4015
1.3	0.4032	0.4049	0.4066	0.4082	0.4099	0.4115	0.4131	0.4147	0.4162	0.4177
1.4	0.4192	0.4207	0.4222	0.4236	0.4251	0.4265	0.4279	0.4292	0.4306	0.4319
1.5	0.4332	0.4345	0.4357	0.4370	0.4382	0.4394	0.4406	0.4418	0.4429	0.4441
1.6	0.4452	0.4463	0.4474	0.4484	0.4495	0.4505	0.4515	0.4525	0.4535	0.4545
1.7	0.4554	0.4564	0.4573	0.4582	0.4591	0.4599	0.4608	0.4616	0.4625	0.4633
1.8	0.4641	0.4649	0.4656	0.4664	0.4671	0.4678	0.4686	0.4693	0.4699	0.4706
1.9	0.4713	0.4719	0.4726	0.4732	0.4738	0.4744	0.4750	0.4756	0.4761	0.4767
2.0	0.4772	0.4778	0.4783	0.4788	0.4793	0.4798	0.4803	0.4808	0.4812	0.4817
2.1	0.4821	0.4826	0.4830	0.4834	0.4838	0.4842	0.4846	0.4850	0.4854	0.4857
2.2	0.4861	0.4864	0.4868	0.4871	0.4875	0.4878	0.4881	0.4884	0.4887	0.4890
2.3	0.4893	0.4896	0.4898	0.4901	0.4904	0.4906	0.4909	0.4911	0.4913	0.4916
2.4	0.4918	0.4920	0.4922	0.4925	0.4927	0.4929	0.4931	0.4932	0.4934	0.4936
2.5	0.4938	0.4940	0.4941	0.4943	0.4945	0.4946	0.4948	0.4949	0.4951	0.4952
2.6	0.4953	0.4955	0.4956	0.4957	0.4959	0.4960	0.4961	0.4962	0.4963	0.4964
2.7	0.4965	0.4966	0.4967	0.4968	0.4969	0.4970	0.4971	0.4972	0.4973	0.4974
2.8	0.4974	0.4975	0.4976	0.4977	0.4977	0.4978	0.4979	0.4979	0.4980	0.4981
2.9	0.4981	0.4982	0.4982	0.4983	0.4984	0.4984	0.4985	0.4985	0.4986	0.4986
3.0	0.4987	0.4987	0.4987	0.4988	0.4988	0.4989	0.4989	0.4989	0.4990	0.4990

The values in the table are the areas between zero and the z-score. That is, P(0<Z<z-score)