KERALA AGRICULTURAL UNIVERSITY

B.Sc. (Hons.) Agriculture – 2009 Admission - IInd Semester

Final Examination - August 2010

Cat. No. : Stat 1201 — Max. marks: 80

Title : Basic Statistics (1+1) — Time : 3 hours

Part A

For questions 1 to 20 write answers in one-word only

(20 x 0.5 = 10 Marks)

1	Name the author of the book "Statistical Methods for Research Workers".
2	What is the upper limit of coefficient of correlation.
3	Name a measure of central tendency.
4	If the mean of a normal distribution is 30, what is its median?
5	Name the statistical test used for testing equality of means of two population.
6	What is the mean of standard normal distribution?
7	Name the statistical test used for testing equality of variances of two populations.
8	What is the mode of the following data? 8.3, 8.6, 8.7, 8.8, 9.1, 9.3, 8.7, 9.4, 9.9
9	What is the test of significance in ANOVA?
10	What is the probability of simultaneous occurrence of two mutually exclusive events?
	State whether the following statements are true or false
11	For a normal distribution with mean μ and variance σ^2, nearly 95% of the observations lie within the range of $\mu \pm \sigma$.
12	No distribution has its mean and variance as the same parameter.
13	The null hypothesis with regard to m x n contingency table is that 'the row factor is independent of the column factor'.
14	The variable 'number of nuts in a bunch', is an example for a quantitative variable.
15	All distributions are symmetric.
	Fill in the blanks:
16	The coefficient of correlation between two independent variables is ----------
17	The skewness of a normal distribution is ----------
18	When simple random sampling is followed, the estimator of population mean is the ----------
19	The list of sampling units that divide the population into non-overlapping parts is called ----------
20	Probability of Type I error is referred as ----------

Part B

For questions 21 to 30, write answers in a word or a sentence only

(10 x 1 = 10 Marks)

21	When a coin is tossed what is the probability of getting either head or tail?
22	If the mean of a character is 20 and variance is 4, what is its coefficient of variation?
23	What is the mean of a binomial distribution with parameters n = 10 and p = 0.2.
24	Name the sampling method in which units are selected at fixed interval.
25	A sample of size n is drawn from a normal distribution $N(\mu,\sigma^2)$. What is the distribution of the sample mean?
26	The covariance of two random variables is 20 and their variances are 25 and 64. What is the coefficient of correlation between the variables?
27	To obtain the average holding size in a panchayat, a sample of 100 farmers were selected by following SRS (without replacement) from a list of 1000 farmers. The holding size (y_i) of the selected farmers were collected and the data was summarized as $\Sigma y_i = 1200$ cents. What is the estimate of average holding size in that panchayat?
28	If the class value (mid point of the class interval) of i^{th} class in a frequency distribution is denoted x_i and corresponding frequency by f_i, write the formula for obtaining the mean.
29	Write the expression of coefficient of correlation between two random variables X and Y in terms of covariance between them and their variances.
30	Define range.

Part C

Write short answers/note on any ten questions

(10 x 2 = 20 Marks)

31	Probability of the event A is 1/6. The conditional probability of the event B (given that the event A is occurred) is 6/36. What is the probability of simultaneous occurrence of the events A and B?
32	Obtain the relative frequencies of each of the class intervals in the following table Class Interval : 2-3.99 4-5.99 6-7.99 8-9.9 Frequency : 10 30 45 15
33	The regression coefficient of nut weight on whole fruit weight was obtained as 0.49, based on a random sample of size 20. The test statistic (t-test) was obtained as 10.6. What is the degrees of freedom of the test statistic? State whether the regression coefficient is significant or not. The critical value (5%) of the test statistic is 2.1
34	Draw the histogram for the following frequency table: Obtain the cumulative frequency distribution for that data and plot the same. Class interval 2 – 3.99 4 – 5.99 6 – 7.99 8 – 9.99 Frequency 1 5 2 4

35	Obtain the scatter plot for the following data and interpret the results. Number of nuts : 18 6 14 10 22 Oil produced (ml) : 16 8 12 11 20
36	An independent sample of size 37 from a normal population gave the mean as 23.2 and standard deviation 6.4. What is the test statistic for testing the hypothesis that the population mean is 20.
37	Write any three advantages of sampling over complete census.
38	Define type-I error.
39	Define power of a statistical test.
40	What is simple random sampling?
41	A sample of size 21 was drawn and obtained the sum of the observation as $\Sigma y_i = 2340$; and sum of squares of observations as $\Sigma y_i^2 = 21854$. What is the estimate of average holding size in that Panchayat? Obtain also the standard error of the estimate 95% confidence limits.
42	Write the linear regression equation of the variable biomass (X) on rain fall (Y).

Part D

Write short essays on any four of the following

(4 x 5 = 20 Marks)

43	Define any three measures of central tendency. What are the characteristics of an ideal average?
44	Write down the definitions of probability. Probability of the event A is represented by P(A) and probability of the event B is by P(B). Give expressions for $P(A \cup B)$, $P(A \cap B)$ and P(A/B). There are three alleles in a cattle population, say, A_1, A_2, and A_3 with frequencies as 0.3, 0.5 and 0.2 respectively. Under random mating what will be the frequency of the genotype. A_2A_2 among the progenies?
45	Write short note on chi-square tests. In a cross between red-flowered and white-flowered plants, it was found that, out of 452 flowers obtained, 119 were white and the rest red. Does this corroborate the hypothesis that the red and white flowers are in the ratio 3:1? The critical value (5%) of the test statistic is 3.841.
46	Describe stratified random sampling. Explain the estimator for population mean.
47	There are 6 levels for Factor A and 4 levels for Factor B in two-way classified data. Complete the elements of the following ANOVA with regard to this data. Test whether the levels of Factor A are significantly different. The critical value of F at 5% to be considered is 3.86.

Source	Df	Sum of squares	Mean Sum of squares	F
Total	-	242		
Factor A	-	-	-	-
Factor B	-	50		
Error	-		10	

48 Write a short note on correlation analysis. Write a short note on the relationship between the characters as indicated in the following correlation matrix.

	Fruit weight (FW)	Nut weight (NW)	Volume of water (VW)	Endosperm Weight (EW)	*Copra Weight (CW)*
FW	1	.929	.769	.888	.772
NW	.929	1	.922	.960	.924
VW	.769	.922	1	.896	.929
EW	.888	.960	.896	1	.894
CW	.772	.924	.929	.894	1

Part E

Write essays on any two of the following

(2 x 10 = 20 Marks)

49	Write a detailed account of regression analysis. Give examples for its application in agriculture. Distinguish between regression and correlation.
50	Give a detailed account on sample surveys in agriculture. Explain in detail the cluster and multi stage sampling
51	Describe in detail, one application each of a small sample test and a large sample test.