Model Paper

Roll No. …….

GOVERNMENT COLLEGE UNIVERSITY, FAISALABAD

QUESTION PAPER FOR EXTERNAL EXAMINATIONS

BA/BSc (Composite) Annual -2012: Subject: Statistics

Course Title: Statistics Paper: A

Time Allowed: 03:00 Hours Maximum Marks: 75 Pass Marks: 33%(25)

Note:- **Attempt any five questions in all, at least two questions from each section.**

Scientific calculators and statistical tables are allowed

SECTION-I

Q-1 a) Differentiate between primary and secondary data. Describe briefly methods of collecting Secondary data.

b) Construct a stem and leaf display for the following observation.

96	93	88	68	84	75	82	68	90	73	85	75	61	65	75
87	74	62	95	95	69	74	68	60	96	78	89	61	75	83

Q-2 a) Prove the general formula connecting the moments about mean with the moments about origin

$$\mu_r' - r\mu_1'\mu_{r-1}' + \frac{r(r-1)}{2!}(\mu_1')^2\mu_{r-2}' - \ldots\ldots$$

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b) Given n=10 $\sum$ X^2=260 and S^2=10 find coefficient of variation.

c) The first three moments of distribution about the value 2 of the variable are 1, 16 and -40.Show that the mean is 3, the variance 15 and m_3=-86

Q-3 a) Prove that the simple aggregate value index number $\left[i - e\sum P_n q_n / \sum p_o q_o\right]$ satisfies the time reversal Test and circular test but do not satisfy the factor reversal test.

b) Calculate the Consumer Prince Index Number for 1994 on the basis of 1990 using

(i) Aggregate Expenditure Method (ii) Household Budget Method

Commodity	Quantity Consumed	Unit of Price	Price	
			1990	1994
Wheat	20kg	Rs per 40kg	200	240
Rice	8 kg	Rs per 40 kg	800	880
Sugar	4 kg	Rs per 40 kg	400	480
Ghee	1 kg	Rs per kg	30	40
Milk	25 litters	Rs per litter	10	12
Vegetables	16 kg	Rs per kg	200	240
Mutton	5 kg	Rs per 40 kg	100	120
Fuel	100 kg	Rs per 40 kg	800	920

Q. 4 (a) State the properties of correlation coefficient.

(b) If the equations of the least squares regression lines are:

Y=15-1.96(Yon X) and Y=15.91-2.22X (X on Y), Find the product moment coefficient of correlation.

Q. 4 (c) Given

$U = \frac{x-1250}{500}$ and $V = \frac{y-500}{200}$; $n = 66, \sum fu = -4, \sum fu^2 = 109, \sum fv = -53$

$\sum fv = -53 \sum fv^2 = 115 \sum fuv = 91$

Find i) Coeffient of Correlation ii) Regression oline of Y on X

Q. 5 (a) Define the following (i) Secular Trend (ii) Deseasonalization of data.

(b) Compute the seasonal indices for the four quarters by the method of ratio-to-moving averages.

Also deseasonalize the data for 1950.

Year	I	II	III	IV
1949	105	77	68	95
1950	107	83	74	106
1951	117	99	86	112

Section- II

Q. 6: (a) Define (i) Sample Space (ii) Mutually Exclusive Events (iii) Exhaustive Events.

(b) In a high school graduating class of 100 students, 54 studied Mathematics, 69 studied History, and 35 Studied both Mathematics and History. If one of these students is selected at random, find the probability that the student took Mathematics or History.

(c) If and B are any two events defined on a sample space S, show that

$$P\left[\left(A\cap\overline{B}\right)\cup\left(B\cap\overline{A}\right)\right]=P(A)+P(B)-2P(A\cap B)$$

Q. 7 (a) Two dice are cast; E_1 1 is the event that a "6" appears on at least one die, E_2 is the event that a "5" appears on exactly on die and E_3 is the event that same number appears on both dice (i) Are E_1 and E_2 independent (ii) Are E_2 and E_3 independent (iii) Are E_1 and E_3 independent.

(b) Three urns of the same appearance have the following proportions of white and black balls: Urn A: 1 white, 2 black balls. Urn B: 2 white, I black ball. Urn C: 2 white, 2 black balls.

One of these urns is selected at random and a ball is drawn from it. IT turns out to be white. What is the probability that urn C was chosen?

Q. 8 (a) Define a discrete random variable and explain what is meant by a discrete probability distribution.

(b) If X and Y are random variables, then show that E(X+Y) =E(X) +E(Y)

(C) If the joint probability distribution of X and Y is given by (x,y)= $\frac{x+y}{30}$ for x=0,1,2,3:y=0,1,2,. Find marginal probability functions of X and Y. Also find E(X) and E(Y)

Q. 9 (a) Write properties of the Binomial experiment.

(b) Find the Mean and Variance of the Poisson distribution.

(c) A committee of size 5 is to be selected at random from 3 women and 5 men. Find the probability distribution for number of women on the committee. Also find mean and variance.

Q. 10. (a) If the probability distribution of the r.v. X is given by f(x)= $\begin{cases} k\sqrt{x} \\ 0 \end{cases}$, *for* $\begin{matrix} o<x<1 \\ otherwise \end{matrix}$

Find (i) the value of k (ii) the distribution function of X (iii) $P(0.2\le X\le 0.3)$ using distribution funciont

(b) In a normal distribution with μ =47.6 and σ =16.2, find (i) Two points containing the middle 95% Area (ii) P_{30} (iii) D_7

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QUESTION PAPER FOR EXTERNAL EXAMINATIONS

BA/BSc (Composite) Annual -2012: Subject: Statistics

Course Title: Statistics Paper: B

Time Allowed: 03:00 Hours Maximum Marks: 75 Pass Marks: 33 %(25)

Note:- *Attempt any five question in all, at least two questions from each section. Use of Scientific calculators and statistical tables are allowed*

SECTION-I

Q.1 a) Define i) Simple Random sampling ii) Stratified Random Sampling iii) Systematic Random Sampling

b) The height of students is approximately normally distributed with a mean of 175 cm and a standard deviation of 7 cm. If 250 random samples of size 30 are drawn from this population, determine the number of sample means that fall between 172 and 176 cm inclusive. Means are recorded to the nearest centimeter.

Q. 2 a) A stratified random sample of size 90 is to be taken from a group of 2000 persons including 600 who are not Junior College or college graduate, 800 who are only Junior College graduate, 400 who are College graduate but hold no advance degree and 200 who hold advanced degrees. What part of the sample should be allocated to each of these strata, if the allocation is to be proportional.

b) It is believed that 16% of the household in city A have at least one preschool child. The such proportion in city B is believed to be 11%. If these figures are accurate, what is the probability that a random sample of 200household from city A and an independent random sample of 225 households from city B will yield a difference in sample proportions ($\left(\rho_{A-}\ \rho_B\right)$ as large as 0.10?

Q.3 a) Define i) Type I and Type II errors

ii) Level of Confidence and Power of the test

b) A drug was administered to 10 patients and the increment in their blood pressure were recorded to be 6,3, -2,4,-3.4,5,6,2. Is it reasonable to believe that the drug has No effect of change of blood pressure Use α = 0.05

Q. 4 a) Differentiate between

i) Simple and Composite Hypotheses

ii) Point and Interval Estimation.

b) A manufacturer claimed that 90% of the machine parts that is supplied to a factory conformed to specifications. An examination of 200 such parts revealed that 168 parts are not faulty. Determine whether the manufacturer's claim is legitimate at the 01% level of significance.

c) A factory is producing 50,000 pairs of shoes daily. From a sample of 500 pairs, 2% were found to be of substandard quality. Estimate the number of pairs that can be reasonably expected to be spoiled in the daily production and assign limits at 99% level of confidence.

Q. 5 a) Define F-Statistic and state its assumptions.

b) Two groups of executive are given a test to measure their levels of extroversion. Group I consists of 25 executives who started their careers as extroversion. Group I consists of 25 executives who stated their careers as salespersons. Group II consists of 30 executives who stated their careers as accountants. The Means and Variances computed from the sample data are $\overline{X}_1 = 58, S_1^2 = 80, \overline{X}_{II} = 67, S_{II}^2\ 35.$

i) Population of scores represented by Group I is more variable than that represented by Group II

ii) Population variability of scores represented by Group I is greater than 70.

SECTION-II

Q. 6 a) The following frequency distribution shows the number of deaths from overdoses of narcotics.

Age	15-19	20-24	25-29	30-34	35-39	40-44	45-49
No. of deaths:	40	36	33	11	15	14	05

Test the hypothesis that equal number die in all age groups.

b) A certain drug is claimed to be effective in curing colds. In an experiment on 166 people with colds, half of them were given the drug and half of them were given sugar pills. The patients rection to the treatment are recorded in the following table.

Category	Helped	Harmed	No Effect
Drug	52	11	20
Sugar	44	13	26

Compute the Co-efficient of contingency and interpret the result.

Q.7 a) Differentiate between partial Regression Co-efficient and Partial Correlation Co-efficient.

b) The following are the number of inquiries which a real estate agency received in eight weeks about houses for rent (X) and houses for sale (Y)

X:	60	72	47	38	17	45	33	57
Y:	82	85	62	53	29	50	69	88

i) Find a 95% confidence interval for the population correlations co-efficient

ii) Let Y = $\alpha + \beta X + \varepsilon$, find 90 % confidence interval for Mean—value of Y when X = 50

Q. 8 a) We are given the following calculations:

$\overline{X}1 = 8, \overline{X}2 = 7, X3 = 50\ S_1^2 15, S_2^2 = 23.33 S_3^2 = 668, r_{12} = -0891, r_{13} = -0.969$ $, r_{23} = 0.961, n = 6$

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b) How many pairs of observations must be included in a sample in order that an observed correlation co-efficient of 0.45 shall have a calculated value of :t: greater than 2.76?

(c) What is the least value of simple correlation co-efficient in a random sample of 30 pairs that is significant at the 0.10 level of significance.

Q. 9 a) Describe what is meant by “Partitioning the total sum of squares”. Partition total sum of squares into the error sum of squares and treatment sum of squares. Find the number of degrees of freedom associated with each of these.

b) The following table gives the yield of a hybrid variety of wheat, in quintals per acre, form 17 trail plots of land treated with four types of fertilizers (A, B, C, D)

A:	24	39	35		
B:	39	41	33	40	45
C:	31	25	26	21	
D:	38	32	35	34	26

Test whether there is any significant difference in the mean yield of wheat due to difference in fertilizer application. Find the value of LSD test to compare treatment A and B.

Q.10 a) Discuss the purpose of Randomization and Replication in the experimental design.

b) Four varieties A, B, C and D of a crop are tested in a randomized block design with five blocks. The layout is given below alongwith the plot yield in brackets against each variety. Analyse the experimental yields and state your conclusions.

	I	B(31)	A(15)	C(20)	D(30)
	II	C(45)	B(11)	D(26)	A(22)

Blocks	III	C(30)	D(44)	B(37)	A(33)
	IV	A(18)	B(31)	C(49)	D(34)
	V	D(21)	A(37)	B(30)	C(36)

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GOVERNMENT COLLEGE UNIVERSITY, FAISALABAD

QUESTION PAPER FOR EXTERNAL EXAMINATIONS

BA/BSc (Composite) Annual -2012: Subject: Statistics

Course Title: Statistics Paper: Optional

Time Allowed: 03:00 Hours Maximum Marks: 100 Pass Marks: 33%

Note:- *Attempt any four question. All questions carry equal marks.*

Q.1 a) Explain the difference between the primary and secondary data.

B) From the following data draw a cumulative frequency polygon:

Weight	118-126	127-135	136-144	145-153	154-162	163-171	172-80
F	3	5	9	12	5	4	2

Q. 2 a) Define mean, median and mode.

b) The following table shows the distribution of the maximum loads in short tons supported by certain cables produced by a company:

Maximum loads	9.8-10.2	10.3-10.7	10.8-11.2	11.3-11.7	11.8-12.2	12.3-12.7
No. of cables	7	12	17	14	6	4

Calculate mean, median and mode.

Q.3. a) Define range, quartile deviation and standard deviation.

b) The following are the scores made by two batsmen A and B in a series of innings:

A	12	15	6	73	7	19	199	36	84	29
B	47	12	76	48	4	51	37	48	13	0

Who is better as a run getter? Who is the more consistent player?

Q. 4 a) Define the Co-efficient of variation.

b) Compute Co-efficient of skewness by Bowleye's formula.

Monthly Income (Rs.)	No. of families	Monthly Income (Rs.)	No. of families
110-119	2	160-169	18
120-129	4	170-179	13
130-139	17	180-189	6
140-149	18	190-199	5
150-159	25	200-209	2

Q.5 a) Explain the following terms:

i) Variable ii) Attribute

b) Calculate the value of chi-square and test whether attributes A and B are independent. Use α = 0.05.

Attribute B	Attribute A		
	A1	A2	A3
B1	44	82	44
B2	265	257	171
B3	41	91	98

Q. 6 a) State the properties of regression line.

b) Computer the least squares regression equation of Y on X for the following data

X	5 6 8 10 12 13 15 16 17
Y	16 19 23 28 36 41 44 45 50

Q. 7 a) Define the terms:

i) Correlation ii) positive Correlation

iii) Negative Correlation

b) Calculate the co-efficient of correlation between the values of X and Y given below:

X	78	89	97	69	59	79	68	61
Y	125	137	156	112	107	136	123	108

Q. 8 a) Define population and sample.

b) A finite population consists of 1, 2, 3, 4, 5. Take all possible samples of size 2 without replacement. Obtain the sampling distribution of $\overline{X}$ and verify:

i) $\mu_{\overline{X}} = \mu$ ii) $\sigma^{\frac{2}{x}} = \frac{\sigma^2}{n}\left(\frac{N-n}{N-1}\right)$
