UNIVERSITY OF THE PUNJAB

B.A. / B.Sc. Part – I
Supplementary Examination - 2017

Roll No. .....

Subject: Statistics-I
PAPER: A (Statistics-I)

TIME ALLOWED: 3 hrs.
MAX. MARKS: 75

NOTE: **Attempt any FIVE questions selecting at least TWO questions from each section. Use of Scientific Calculators and Statistical tables is allowed.**

SECTION-I

Q.1 a) Descriptive statistics is thought to be back bone of any Statistical inquiry; discuss. **(05)**

b) Write six major uses of Statistical information? **(03)**

c) Construct a frequency distribution for the data below. Indicate the class boundaries and class limits clearly. **(07)**

41.78	29.32	31.47	35.35	32.82	39.42
61.65	28.31	44.63	22.78	44.44	48.12
81.71	33.47	50.35	29.19	51.26	50.32
26.84	18.95	48.19	43.72	43.89	47.15
60.20	44.43	41.17	37.50	22.35	29.17

Q.2 a) What are the principal criteria for a satisfactory average? State giving reasons the circumstances in which it would be preferable to use the median. **(4+3)**

b) The following are the scores made by two batsmen A and B in a series of innings: **(05)**

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

Who is the more consistent player?

c) Prove that the variance of the sum or difference of two independent variables is equal to the sum of their respective variances. **(03)**

Q.3 a) Differentiate between Weighted aggregative price index and Weighted average of relatives price index. **(04)**

b) Prove that the simple aggregate value index numbers $\left(i.e. \frac{\Sigma p_n q_n}{\Sigma p_0 q_0} \right)$ satisfy the circular tests but do not satisfy the factor reversal test. **(04)**

c) Find the chain indices from the following price relatives of four commodities, using the geometric mean of the relatives for each year. **(07)**

Year	Commodity			
	A	B	C	D
1991	81	77	119	55
1992	62	54	128	82
1993	104	87	111	100
1994	93	75	154	96
1995	60	43	165	88

Q.4 a) Critically comment on various methods of eliminating seasonal variations from a time series. **(08)**

b) Compute 4 quarter centered moving average for the following data. **(07)**

Year	Quarters			
	1	2	3	4
2000	102	71	47	98
2001	125	106	73	231
2002	281	229	209	488
2003	484	447	457	966

PTO

Q.5 a) What is meant by the standard error of estimate? If the regression line of Y on X is given by $\hat{Y} = a + bX$, prove that the standard error of estimate is given by (05)

$$s_{y.x} = \sqrt{\frac{\sum Y^2 - a\sum Y - b\sum XY}{n-2}}$$

b) Given the following sets of values: (10)

Y	6.5	5.3	8.6	1.2	4.2	2.9	1.1	3.0
X	3.2	2.7	4.5	1.0	2.0	1.7	0.6	1.9

i) Compute the least-squares regression equation for Y values on X values.
ii) Compute the standard error of estimate, $s_{y.x}$.

SECTION-II

Q.6 a) Define with example; event, independent event and random experiment. (06)
b) Write a Priori definition of Probability; why it is called A Priori definition? (2+2)
c) The probability that a man will be alive in 25 years is 3/5, and the probability that his wife will be alive in 25 years is 2/3. Find the probability that (i) both will be alive, (ii) only the man will be alive, (iii) only the wife will be alive. (05)

Q.7 a) There are three families, each having four children; 2 boys and 2 girls; 3 boys and 1 girl; and 1 boy and 3 girls. A child from each family is invited to a party. Find the probability (i) that only girls turn up for the party, (ii) that two girls and one boy turn up for the party. (05)
b) A man invited 5 friends. He was born in April as also all the invited friends. What is the probability that none of the friends was born on the same day of the month as the host. (04)
c) Three cooks A, B and C, bake a special kind of cake, and with respective probabilities 0.02, 0.03 and 0.05 it fails to rise. In the restaurant where they work, A bakes 50 percent of these cakes, B 30 percent, and C 20 percent. What proportions of "failures" is caused by A? (06)

Q.8 a) Distribution function (discrete) is always an increasing function; explain with the help of any suitable example. (05)
b) A bag contains 4 red and 6 black balls. A sample of 4 balls is selected from the bag without replacement. Let X be the number of red balls. Find the p.d. for X. (04)
c) A pair of fair dice is tossed. Let x represent the sum of the outcome on both dice. Find (i) Range of x (ii) Probability distribution of x. (iii) Mean and variance of x. (06)

Q.9 a) Write the situations when one have to use Poisson probability. (04)
b) Flaws in a certain type of drapery material appear on the average of one in 150 square feet. If we assume the Poisson distribution, find the probability of at most one flaw in 225 square feet. (05)
c) A skilled typist, on routine work, kept a record of mistakes made per day during 300 working days. (06)

Mistakes per day	0	1	2	3	4	5	6
No. of days	143	90	42	12	9	3	1

Compute the frequencies of the Poisson distribution which has the same total frequency and mean as the above distribution.

Q.10 a) If X is $N(\mu, \sigma^2)$ and if Y=a + bX, then Y is N(a + b μ, $b^2\sigma^2$). (06)
b) If the heights (X) of college students are normally distributed with mean 69 and variance 9, find the probability that (i) X<65 and (ii) 65≤X≤70. (04)
c) The heights of applicants to the police force are normally distributed with mean 170 cm and standard deviation 3.8cm. If 30% of applicants are rejected because they are too small, what is the minimum acceptable height for the police force? (05)