LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – **STATISTICS**

FIFTH SEMESTER – **NOVEMBER 2013**

ST 5507/5503 - COMPUTATIONAL STATISTICS

Date : 12/11/2013   Dept. No.   Max. : 100 Marks
Time : 9:00 - 12:00

Answer any THREE of the following:

1) a) Calculate seasonal indices by the ratio-to-moving average method from the following data:

QUARTER	YEAR			
	2001	2002	2003	2004
Q_1	75	86	90	100
Q_2	60	65	72	78
Q_3	54	63	66	72
Q_4	59	80	85	93

b) Fit a straight line trend by the method of least squares to the following data relating to the sales of a leading departmental store.

Year	1997	1998	1999	2000	2001	2002	2003	2004
Sales (Rs. In crores)	76	80	130	144	138	120	174	190

   c) From the following data find Laspeyre's , Paasche's and Fisher's price and quantity index numbers.

	1995		2005	
Commodities	Price	Quantity	Price	Quantity
A	20	8	40	6
B	50	10	60	5
C	40	15	50	15
D	20	20	20	25

(16 + 9 + 8)

2) a) The mean height of 50 male students who showed above average participation in college athletics was 68.2 inches with a standard deviation of 2.5 inches, while 50 male students who showed no interest in such participation had a mean height of 67.5 inches with a standard deviation of 2.8 inches. Test the hypothesis that male students who participated in college athletics are taller than other male students. Use 5% significance level.

   b) A random sample of 10 boys had the following IQ's 72, 122, 112, 103, 90, 85, 97, 100, 109 and 102. Do these data support the assumption of a population mean IQ of 105? Use 1% level of significance.

   c) The following data give frequency of aircraft accidents experienced by 2546 pilots during a four year period:

No. of accidents	0	1	2	3	4	5
Frequency	2036	422	71	13	3	1

Fit a Poisson distribution and test the goodness of fit at 5% level of significance.   (8 + 10 + 15)

3) The following table represents the summary of data for complete census of all the 2010 farms in a region. The farms were stratified according to farm-size in acres into seven strata, as shown in the table.

Stratum No.	Farm size (in acres)	No. of Farms (N_i)	Average area under wheat per farm in acres. ($\bar{Y}_i$)	Standard deviations of area under Wheat per farm in acres S_i
1	0-40	394	5.4	8.3
2	41-80	461	16.3	13.3
3	81-120	391	24.3	15.1
4	121-160	334	34.5	19.8
5	161-200	169	42.1	24.5
6	201-240	113	50.1	26.0
7	More than 240	148	63.8	35.2

Calculate the sampling variance of the estimates area under wheat for the region from a sample of 150 farms: (i) if the farms are selected by the method of srs without stratification and (ii) if the farms are selected by the method of srs within each stratum and allocated in proportion to (a) the number of farms in each stratum N_i, and (b) the product N_iS_i. (33)

4) a. Twelve 3-year-old boys and ten 3-year-old girls were observed during two sessions of recess in a nursery school. Each child's play was scored for incidence and degree of aggression as follows:
Boys: 96   65   74   78   82   121   68   79   111   48   53   92
Girls: 12   47   32   59   83   14   32   15   17   82
At 5% level, is there evidence to suggest that there are gender differences in the incidence and amount of aggression? Use Wald-Wolfowitz Run test. (17)
b. Random sample of two models of scooters were tested for mileage.
BAJAJ   :   60   54   76   48   66   52   62   72   68
HONDA   :   62   58   52   48   70   56   47   70
Use Mann-whitney U- test, at 5% level of significance, test whether the average mileage of these two models are same. (16)

5) a) 500 apples are taken at random from a large basket and 50 are found to be bad. Estimate the proportion of bad apples in the basket and assign limits within which the percentage most probably lies. (10)
   b) Salt free diets are often prescribed to people with high blood pressure. The following data were obtained from an experiment designed to estimate the reduction in diastolic blood pressure as a result of following a salt – free diet for two weeks. Assume the diastolic readings are normally distributed. (13)

Before	93	106	87	92	102	95	88	110
After	92	102	89	92	101	96	88	105

   To determine whether Salt free diets had any effect on reduction in diastolic blood pressure.
   c) A man buys 50 electric bulbs of Phillips and 50 electric bulbs of Crompton. He finds that Phillips bulbs give an average life of 1500 hours with standard deviation of 60 hours and Crompton bulbs give an average life of 1512 hours with a standard deviation of 80 hours. Is there a significant difference in the mean life of the two makes of bulbs? (10)

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