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SYBCOM,Semester IV, May/June Supplementary -2012 (Old Course)

STATISTICAL TECHNIQUES

Duration:2 hours Max.Marks:80

Instructions:

1. All questions are compulsory.
2. Start each new question on fresh page.
3. Figures to the right indicate full marks
4. Graph paper will be provided on request.
5. Use of calculators is allowed

Q.1 a Explain the term regression? 3

b The average number of incoming telephone calls at a switch board per minute is 2.Find the probability that during a given minute, there are exactly two calls is received. (Given $e^{-2}=0.135$). 6

c A bag contains 6 Blue balls, 5 Green balls and 3 Red balls. If two balls are drawn at random from the bag, find the probability that one is green and other is red. 7

Or

QI x Define scatter diagram and depict the scatter diagram for perfect positive correlation, perfect negative correlation and no correlation. 3

y A die is thrown three times. Getting a '2' or a '5' is considered a success. Find the probability of getting exactly two successes. 6

z Find the probability that in a family of 3 children chosen at random there are 2 boys given that first child is a boy. 7

Q.2 a Define equally likely and complementary events with example of each. 3

b The regression equations are $2x-y+10=0$ and $3x-4y+100=0$. 6

1. Find the mean values of x.
2. Find the regression coefficient i.e. byx and bxy
3. Find the correlation coefficient 'r'

c The following table indicates the results obtained from an inspection of equipment (product line).Work out the control limits and draw the c-chart for the same. Also comment on the state of control. 7

Product No.	1	2	3	4	5	6
Product defects(number)	4	3	11	1	2	3

OR

Q.II x Define mutually exclusive events and independent events. 3

y The following are ranks given by 2 judges A and B .Tell whether their opinions are more / less the same or different. 6

Rank by A	1	2	3	4	5	6	7	8	9	10
Rank by B	7	9	2	10	1	4	8	5	3	6

z A consignment is inspected by the Quality control team, as the material is brought in by the vendor to the warehouse. The results are given in the table below (there are samples of 100 items chosen every time the inspection is carried out).Draw p-chart, with identification of any out of control lot (beyond the acceptable limit). 7

Lot No.	1	2	3	4	5	6	7	8	9	10	11	12
No. of defectives	10	12	15	10	12	11	12	13	14	20	15	17

Q.3 a Write short note on Stratified Sampling. 3

b Find Karl Pearson's coefficient of correlation for the following data. 6

Income(x)	18	15	16	19	12	4	6
Expenditure(y)	14	12	18	21	13	5	9

c A sample of 100 children have a mean weight of 50.6 kgs.Can it be regarded as random sample from a large population with mean weight of 50 kgs and standard deviation of 5 kgs at 5% level of significance. Also set up 99% confidence limits of the mean weight. 7

Or

QIII x Discuss the advantages of sample survey over complete enumeration. 3

y Find the regression equation for the following data. Finally estimate y when x=15.Also estimate x when y=18 6

x	8	10	11	12	14	17	19
y	16	20	22	24	25	20	21

z (i) Out of 36 students appearing for S.S.C examination, from a school, only 19 passed. Does this mean that the passing percentage from this school, in general is 60% at 1% level of significance. 4

(ii)Find the 95% confidence limit for population mean,if mean is 60,s.d.is 2 and n is 64 3

OR

Q.4 a A Binomial variate X has mean 6 and variance 4,find n and p. 3

b Calculate rank correlation coefficient for the following data. 6

X	69	44	55	69	64	62	56	69
Y	80	82	80	75	77	70	65	67

c Five samples of size 5, are drawn.Their respective mean and range are given below

Samples	S_1	S_2	S_3	S_4	S_5
Mean	4.8	4.6	4.2	4.3	4.4
Range	2	0.55	0.51	0.52	0.56

Draw a control chart for $\bar{X}$ and comment on state of control.
(For sample size 5,A_2=0.577)

QIV x State the important properties of normal curve. 3

y The following table gives the ages and blood pressure of 7 persons. 6

Age(X)	50	42	36	47	62	72	63
B.P.(Y)	147	125	118	128	155	160	149

Find the correlation coefficient between X and Y.

z 1. What is main purpose of control charts? 3
2. Obtain control limits for the range chart for 10 samples of size 5 for the data given below. Can the process is said to be under control with respect to range? 4

Sample No.	1	2	3	4	5	6	7	8	9	10
Range	2.1	3.1	3.9	2.1	1.9	3.0	2.5	2.8	2.5	2.1

(for n=5,D_3=0 and D_4=2.115)

Q.5 a Define the terms: 1. Hypothesis 2. Null Hypothesis,3. Alternative Hypothesis. 3

b The marks obtained in a statistics examination are assumed to have a normal distribution with mean 75 and s.d is 5.Find the probability of a randomly selected student obtain marks: 6
(i) Between 65 and 75
(ii) Below 70
[Given P(0<z<2)=0.4772 and P(0<z<1)=0.4413,where z is standard normal variate]

c 1.A die is thrown. Let X denotes the point on the upper most face. Find E(X) and Var(X) 7

X=x	1	2	3	4	5	6
P(x)	1/6	1/6	1/6	1/6	1/6	1/6

Or

Q.V x Differentiate the following pairs of concepts.
1. Statistic and Parameter. 2.Point estimate and interval estimate. 3

y Assume the mean height of soldiers to be 68.22 inches with a s.d 3.287 inches. 6
How many soldiers in a regiment of 1000 would you expect to be over 6 feet i.e. 72 inches tall?
[Given P(0<z<0.35)=0.1368 and P(0<z<1.15)=0.3749 where z is standard normal variate]

z A random variable X has the following probability distribution 7

X=x	0	1	2	3	4	5	6	7
P(x)	0	2k	3k	k	2k	k^2	$7k^2$	$2k^2+k$

Find the value of k and evaluate P(X<6), P(X≥6), P(2<X<3)