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K-0694

Third Year B. Com. (Honours) Examination

October / November – 2012

BC-3.1 : Advanced Statistics

Time : **3** Hours] [Total Marks : **70**

Instructions :

(1)

નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fillup strictly the details of ☛ signs on your answer book.

Name of the Examination :
☛ THIRD YEAR B. COM. (HONOURS)

Name of the Subject :
☛ BC-3.1 : ADVANCED STATISTICS

☛ Subject Code No. : 0 6 9 4 ☛ Section No. (1, 2,.....) : NIL

Seat No. :

Student's Signature

(2) Attempt all questions.

(3) The figures to the right indicate full marks of the question.

(4) Statistical tables and graph papers would be supplied on request.

1 (a) Compare the advantages and disadvantages of 'Census method' and 'Sample method' of collecting statistics. **5**

(b) Before an increase in excise duty on coffee, 400 people out of a sample of 500 persons were found to be coffee drinkers. After an increase in duty, 400 people were coffee drinkers in a sample of 600 people. Do you think that there is a significant decrease in a consumption of coffee after the increase in the excise duty ? **5**

2 (a) An assumed population has three values viz 2, 4 and 7. Obtain all possible random sample with replacement of size 2. Show that mean of sample mean is an unbiased estimator of population mean, also show that variance of sample mean is equal to $\frac{\sigma^2}{n}$. **6**

(b) The following are the data regarding the production of rice in two districts of a state. If 10% random sample without replacement is taken from each district, find the population mean. Also find standard deviation of stratified sample mean. 4

District	No. of farms	Average production (in metric tonne)	S.D. (in metric tonnes)
1	$N_1 = 110$	$\bar{y}_1 = 30$	$S_1 = 5$
2	$N_2 = 40$	$\bar{y}_2 = 60$	$S_2 = 10$

3 (a) Explain following terms : 6

(i) Two types of error

(ii) Critical region

(iii) Critical value

(b) A random sample of 729 pairs has the correlation coefficient 0.5. Test the significance of correlation coefficient. Also find 95% confidence limits for the population correlation coefficient. 4

4 (a) Define Decision theory. State the structure of Statistical decision theory. 4

(b) Calculate EMV, EOL and EVPI value for the following information : 6

Events \ Acts	A_1	A_2	A_3	Probability
E_1	25	−10	−125	0.10
E_2	400	440	400	0.70
E_3	650	740	750	0.20

5 (a) Explain decision tree in detail. **4**

(b) Find the best action from the following pay-off matrix applying **6**

(i) Maxi-max

(ii) Maxi-min

(iii) Laplace

(iv) Hurwicz $(\alpha = 0.7)$

(v) Minimax regret rule.

Events \ Acts	A	B	C	D
S_1	8	0	–10	6
S_2	–4	12	18	–2
S_3	14	6	0	8

6 (a) Explain how ATI and AOQ are obtained for a single sampling plan. **4**

(b) For double sampling plan (1000, 40, 0, 60, 3), If fraction defective is 3% then find ATI, ASN and AOQ for it. **6**

7 (a) When poisson distribution can be used in statistical quality control chart ? Obtain the control limits of that control chart. Also state its uses. **4**

(b) The following table gives mean and range of 10 samples each of size 5. draw $\bar{X}$ and R charts and state your conclusions. **6**

$\bar{X}$	711	586	651	641	680	689	665	603	569	629
R	219	167	134	171	460	230	176	188	309	251

(where $n = 6,\ A_2 = 0.48,\ D_3 = 0,\ D_4 = 2$)