VI (CBSGS) BTomed

DEC 2015

QP Code : 6314

(3 Hours) [Total Marks : 80

N. B. : (1) Question No. 1 is compulsory.
(2) Attempt any four questions.
(3) Each question is of 20 marks.
(4) Scientific calculator can be used.
(5) Appropriate statistical tables can be used.

1. (a) The following are the ages of 48 patients admitted to the emergency room of a hospital. 5

32	63	33	57	35	54	38	53
42	51	42	48	43	46	61	53
12	13	16	16	31	30	28	28
23	25	23	22	21	17	13	30
14	29	16	28	17	27	25	24
22	23	61	55	34	42	13	26

For these data construct a frequency distribution. Also construct a cumulative frequency distribution, a relative frequency distribution and a histogram.

(b) Sample variances are computed for the tidal volumes (milliliters) of two groups of patients suffering from artial septal defect. The results and sample sizes were as follows : 5

$n_1 = 31$; $s_1^2 = 35,000$

$n_2 = 41$; $s_2^2 = 20,000$

Construct the 95 percent confidence interval for the ratio of the two population variances. (Given : $F_{.975}(30,40) = 1.94$ and $F_{.025} = .4975$).

(c) First a curve $y = ab^x$ to the following data : 5

x :	2	3	4	5	6
y :	144	172.3	207.4	248.8	298.5

(d) We wish to know if we can conclude that the mean daily coloric intake in the adult rural population of a developing country is less than 2000. A sample of 500 had a mean of 1985 and a standard deviation of 210 - Let $\alpha = 0.05$. 5

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MD-Con.8409-15.

2. (a) During one semester a student received grades in various subjects as shown in the table below. Test at the .01 level whether there is any significant difference in his grades in there subjects. 6

(Given : $F_{.99}(3, 12) = 5.95$)

Mathematics	72	80	83	75
Science	81	74	77	87
English	88	82	90	70
Economics	74	71	77	68

(b) If the mean number of serious accidents per year in a large factory is five, find the probability that in the current year there will be 6

(i) exactly seven accidents
(ii) ten or more accidents
(iii) no accidents
(iv) fewer than five accidents

(c) Cortisol level determinations were made on two samples of women at childbirth. Group 1 subjects underwent emergency cesarean section following induced labour. Group 2 subjects delivered following spontaneous labour. The sample sizes, mean levels and standard deviations were as follows 8

Sample	n	$\bar{x}$	s
1	10	435	65
2	12	645	80

Do there data provide sufficient evidence to indicate a difference in the mean cortisol levels in the populations represented? Let $\alpha = 0.05$. Also find the 95% confidence interval.

3. (a) Find the mean and median of the following data :– 6

Class Interval	Frequency
93-97	3
98-102	5
103-107	12
108-112	17
113-117	14
118-122	16
123-127	3
128-132	1

(b) The sharing of injecting equipment among drug was investigated. As part of their research they collected the following information. 6

Use of needle Exchange

	Regular	Occasional	Never	Not Known
Agency	56	15	20	24
Nonagency	19	06	16	53

May we conclude from these data that use of needie exchange and agency status are related? Let $\alpha = .01$.

(c) Define the following terms :– 8

(i) correlation and regression

(ii) mode

(iii) measurement scales

(iv) Null and alternative hypothesis

4 (a) One hundred people were asked to specify which mode of transport they preferred. The following table shows the responses cross - ciossified by educational level of the respondent 6

Transport	High School (A)	College (B)	Graduate School (C)
Train (T)	15	8	7
Bus (Bu)	3	7	20
Own vehicle (v)	5	5	15
Others (o)	10	3	2

Find the following probabilities :–

(i) P (T)

(ii) P(A/O)

(iii) $P(V \cap C)$

(iv) $P(\bar{B})$

(v) $P(A \cup Bu)$

(b) A continuous random variable x has the following probability density function $f(x) = k\, x^2,\ 0 \le x \le 2$ 6

Determine

(i) k

(ii) $P\{0.2 \le x \le 0.5\}$

(iii) $P\{x \ge 3/4$ given that $x \ge 1/2\}$

(c) Obtain spearman's rank correlation coefficient for the following data 8

x	y
68	62
64	58
75	68
50	45
64	81
80	60
75	68
40	48
55	50
64	70

5. (a) The test assesses knowledge of behaviour modification principles. A higher score indicates greater knowledge. The following are the pre- and post-training scores made by the primary parent on the test. May we conclude, on the basis of these data, that the training program increases knowledge of behaviour modification principles? Let $\alpha = .01$. 10

Pre :	7	6	10	5	8	13
Post :	11	14	16	17	9	15
Pre :	8	14	16	11	12	13
Post :	9	17	20	12	14	15
Pre :	9	10	17	8	5	
Post :	14	15	18	15	9	

(b) A study was conducted to examine those variables thought to be related to the job satisfaction of nonprofessional hospital employees. A random sample of 15 employees gave the following results : 10

y	x_1	x_2
54	15	8
35	13	1
30	15	1
48	15	7
37	10	4
37	14	2
31	8	3
49	12	7

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43	1	9
12	3	1
30	15	1
37	14	2
61	14	10
31	9	1
31	4	5

(i) Find the multiple regression equation of y on x_1 and x_2.

(ii) Find : r_{12}, r_{13} and r_{23}

(iii) Let $x_1 = 10$ and $x_2 = 5$ and find the predicted value of y.

6. (a) Two pain - relieving drugs were compared for effectiveness. Thirteen patients received drug 1 and thirteen patients received drug 2. The sample variances were $s_1^2 = 64$ and $s_2^2 = 16$. Test the null hypothesis that the 2 population variances are equal. Let $\alpha = .05$. (Given $F_{.975}(12, 12) = 3.28$.) 6

(b) A sample of 150 chronic carriers of a certain antigen and a sample of 500 non-carriers revealed the following blood group distributions. Can one conclude from there data that the two populations from which the samples were drawn differ with respect to blood group distribution? Let $\alpha = 0.05$. 6

Blood Group	Carriers	Non-carriers
O	72	230
A	54	192
B	16	63
AB	8	15

(c) Seeds of 4 different types of corn are planted in 5 blocks. Test at .01 level whether the yields in bushels per acre, as shown in the following table, vary significantly with soil differences. (ie; the 5 blocks.) (Given $F_{.99}(4, 12) = 5.41$.) 8

	Types of corn			
Blocks	I	II	III	IV
A	12	15	10	14
B	15	19	12	11
C	14	18	15	12
D	11	16	12	16
E	16	17	11	14