* U A - 3 5 2 8 *

UA-3528

Second Year B. B. A. (Sem. III) Examination

March/April – 2012

Quantitative Methods - II

(New Course)

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 :

☛ **S. Y. B. B. A. (Sem. 3)**

Name of the Subject :

☛ **Quantitative Methods - 2 (New Course)**

☛ Subject Code No. : **3 5 2 8** ☛ Section No. (1, 2,.....) : **NIL**

Seat No. :

Student's Signature

(2) All questions carry equal marks.

(3) Graph papers and statistical tables will be provided on request.

(4) Use of simple calculators is allowed.

(5) Indicate your options clearly.

1 Answer the following questions : **14**

(i) If $P(A \cup B) = \frac{5}{6}, P(A \cap B) = \frac{1}{3}$ and $P(B') = \frac{1}{2}$ find P(A) and P(B). Are A and B independent ?

(ii) If $E(x) = 4$ and $V(x) = 30$ then find $E(5x+9)$ and $V(2x+5)$.

(iii) Coefficient of correlation between two variables is 0.917 and probable error is 0.034 find the value of n ?

(iv) Criticise the following statement. Regression coefficient of y on x is 0.80 and that of x on y is 0.35 and r = –0.529.

(v) Convert the following annual trend equation for total sales of a company to a monthly trend equation $y = 162 + 15.8X$ origin : 1975; X unit = 1 year.

(vi) Given $\sum \bar{X} = 384.8, N = 10, \sum R = 37, n = 5$. Obtain control limits for $\bar{X}$ and R charts.

(vii) Explain causes of variations.

2 (a) Give Mathematical definition of probability. **2**

(b) Vidhi and Nidhi appear for an interview for the same post. Probability of selection of Vidhi is $\frac{1}{3}$ and that of Nidhi is $\frac{3}{5}$. What is the probability that only one of them will be selected ? **4**

(c) A merchant's file of 20 accounts contain 6 delinquent and 14 non-delinquent accounts. An auditor randomly selects 5 of these accounts for examination. What is the probability that the auditor finds exactly 2 delinquent accounts ? **4**

(d) The I.Q.'s of army volunteers in a given year are normally distributed with meau (μ) 110 and standard deviation (σ) 10. The army wants to give advanced training to 20% of those recruits with the highest score. What is the lowest I.Q. score acceptable for the advanced training ? **4**

OR

2 (a) Define Conditional Probability. **2**

(b) A player tosses two pair coins. He wins Rs. 5 if 2 heads occur, Rs. 2 if 1 head occurs and Re. 1 if no head appears. Find his expected gain. **4**

(c) If 2 percent of electric bulbs manufactured by a certain company are defective, find the probability that is a sample of 200 bulbs more than 3 bulbs are defective. **4**

(d) A set of examination marks is approximately normally distributed with a mean of 75 and standard deviation of 5. If the top 5% of students get grade A and the bottom 25% get grade F, what mark is the Lowest A and what marks is the highest F ? **4**

3 (a) Give properties of correlation coefficient. **2**

(b) Calculate product moment coefficient of correlation for the following data : **4**

x :	129	137	138	134	138	136	140
y :	97	95	93	92	96	94	98

(c) The coefficient of rank correlation of the marks obtained by 10 students in Statistics and Accountancy was found to be 0.2. Is was later discovered that the difference in ranks in the two subjects obtained by one of the students was wrongly taken as 9 instead of 7. Find the correct value of coefficient of rank correlation. **4**

(d) The following table gives the ages and blood pressure of 10 women : 4

Age (X) :	56	42	36	47	49	42	60	72	63	55
Blood Pressure (Y):	147	125	118	128	145	140	155	160	149	150

Estimate the blood pressure of a woman whose age is 45 years.

OR

3 (a) Prove that correlation coefficient is Geometric mean of regression coefficients. 2

(b) Find the number of pairs from the data given : 4

$r = 0.5, \sum x^2 = 90, \sum xy = 120, \sigma_y = 8$, where x and y are deviations from mean.

(c) In a health competition the two judges have given the following ranks to 10 competitors. Find the rank correlation coefficient of correlation. 4

Competitor :	A	B	C	D	E	F	G	H	I	J
Ranks by Judge 1:	2	3	1	6	4	5	8	7	10	9
Ranks by Judge 2:	1	2	3	4	5	6	7	8	9	10

(d) The equations of lines of regression for two variables x and y are $3x + 2y - 26 = 0$ and $6x + y - 31 = 0$, and the variance of x is 25. Find $\bar{x}, \bar{y}, r$ and S_y. 4

4 (a) Define Statistical Hypothesis. **2**

(b) In sample of 400 parts manufactured by a factory, the members of defective parts was found to be 4

30. The company however, claimed that at most 5% of their product is defective. Is the claim tenable ?

(c) Sample means of two samples of sizes 9 and 7 are 4

respectively 196.4 and 198.8. The sum of squares of deviations from their respective means are respectively 26.94 and 18.73. Can we consider these two samples as drawn from the same normal population ?

(d) Three varieties of wheat are grown in four types of 4

plots give the yield as shown below. State whether there is any significant difference between varieties and plots.

	A	B	C	D
I	560	540	580	560
II	580	550	600	590
III	570	560	560	590

OR

4 (a) Explain types of error. **2**

(b) The result in the last examination of a sample of 500 4

students is given below. Can it be said that the performance in the examination depend upon gender ?

Class / Gender	I	II	III
Boys	200	40	60
Girls	120	30	50

(c) The sales data of an item in five shops before and after a special promotion campaign are as under. Can the campain be judge as success ? 4

Sale before Adv.	110	120	123	132	125
Sale after Adv.	120	118	125	136	121

(d) The following samples are drawn from two normal populations. Test the hypothesis that population variances are equal : 4

Sample I	22	15	18	20	25	24	16	20		
Sample II	27	33	40	35	32	35	37	29	41	31

5 (a) Explain EMV and EOL. 4

(b) Fit second degree parabola to the following data : 5

Year	2004	2005	2006	2007	2008	2009	2010
Output	100	107	128	140	181	192	200

(c) A machine is set to deliver Packets of a given weight 10 samples each of size 5 were recorded. Below are given relevant data. Calculate the control limits for mean chart and state your conclusion regarding state of process by using the control charts : 5

Sample No.	1	2	3	4	5	6	7	8	9	10
Mean $(\bar{X}_i)$	15	17	15	18	17	14	18	15	17	16
Range (R)	07	07	04	09	08	07	12	04	11	05

OR

5 (a) Explain Decision Tree. **4**

(b) Calculate seasonal variations from the following data : **5**

Year	Q_1	Q_2	Q_3	Q_4
2005	68	62	61	63
2006	65	58	66	61
2007	68	63	63	67

(c) 10 observations of a population are divided into two strata as follows. Sample of size 3 is taken from the first stratum and that of size 2 is taken from the second stratum, find $V(\bar{y}_{st})$. **5**

Stratum 1	1	3	5	8	10	15
Stratum 2	16	22	24	26		