* K A - 3 5 3 2 *

KA-3532

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

October / November – 2012

Quantitative Methods - II

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) (ATKT)**

Name of the Subject :

☛ **QUANTITATIVE METHODS - 2**

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

Seat No. :

Student's Signature

(2) All questions carry equal marks.

(3) Use of Simple calculators is allowed.

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

(5) Indicate your options clearly.

1 Answer the following questions : **14**

(i) If A and B are mutually exclusive events and $P(A) = 0.43$, $P(A \cup B) = 0.7$ then find $P(B)$.

(ii) If two variables are perfectly correlated and one regression coefficient is 0.5 then find other regression coefficient.

(iii) If $x = 0.85y$ and $y = 0.89x$ are the equatgions of regression lines and if $\delta_y = 3$ then find S_x.

(iv) The probability function of a binomial distribution is $P(x) = 10_{cx}\ (0.8)^x\ (0.2)^{10-x}$, then find its variance.

(v) If in $\bar{x}$-chart, $\overline{\overline{X}}$ =75.8, $\overline{R}$ = 3.8 and A_2 = 0.58 find the UCL of chart.

(vi) If the yearly trend equation is $y = 20 + 10x$ with origin 1st July 1985 then convert into monthly trend equation and shift the origin to 1st July 1990.

(vii) Give definition of Hypothesis.

2 (a) Define Independent events. **2**

(b) A Research team of four has to be formed from 3 economist, 4 managers, 2 statisticians and 1 sociologist. What is the probability that the team consists of the sociologist and atleast one economist ? **4**

(c) From a ticket-window of a theater having 4 ticket of marvel class and 6 ticket of Royal class, three tickets are drawn at random to give three regular customers as a marketing strategy. If each marvel class ticket drawn carries a price Rs. 200 and each royal class ticket drawn carries a price Rs. 100 then find the expected value of the ticket. **4**

(d) The income distribution of officers of a company was found to follow normal distribution. The average income of an officer was Rs. 15,000.00. The standard deviation of the income of officer was Rs. 5,000.00. If there were 242 officers drawing salary above Rs. 1,85,000.00. How many officers were there in the company ? **4**

OR

2 (a) Explain probability. 2

(b) A fresh MBA applies for a job in two MNC 'X' and 'Y'. He estimates that the probability of his being selected in MNC 'X' is 0.7 and being rejected at 'Y' is 0.5 and the probability of atleast one of his applications being rejected is 0.6, what is the probability that he will be selected in one of the MNC ? 4

(c) An accountant is to audit 24 accounts of a firm. Sixteen of these are of highly valued customer. If the accountant selects 4 of the accounts of random, what is the probability that he chooses at least one highly valued account. 4

(d) A normal distribution has 77 as mean. Find its standard deviation if 20% of the area under the curve lies to the right of 90. 4

3 (a) Define Correlation Coefficient. 2

(b) Calculate Karl Pearson's coefficient of correlation from the following data. 4

Share X	6	8	12	15	18	20	24	28	31
Share Y	10	12	15	15	18	25	22	26	28

(c) The data about the sales and advertisement expenditure of a firm is given below. 4

	Sales in crores of Rs.	Advertisement Exp. (in crores of Rs.)
Means	40	6
Standard deviation	10	1.5

Coefficient of correlation r = 0.9
Estimate the likely sales for a proposed advertisement expenditure of Rs. 10 crores.

(d) The observations of the population are 10, 14, 20,36. Take all possible samples of size 2 with replacement from the population and verify the following result 4

(i) $E(\bar{y}) = \bar{y}$

(ii) $V(\bar{y}) = \sigma^2/n$

OR

3 (a) Give properties of regression coefficients. 2

(b) You are given the following information relating to a frequency distribution comprising of 10 observations 4

$\bar{X} = 5.5$, $\bar{Y} = 4.0$, $\sum x^2 = 385$, $\sum y^2 = 192$,

$\sum (x+y)^2 = 947$. Find r_{xy}.

(c) If the two lines of regression are $4x - 5x + 30 = 0$ and $20x - 9y - 107 = 0$. Find r_{xy} and σ_y when $\sigma_x = 3$. 4

(d) A group is divided into two strata. The information regarding these strata is as follows. Find the mean of the entire group. If 10% sample is taken from each stratum. Find the variance of stratified mean. 4

Stratum	No. of Obs.	Stratum mean	Stratum Variance
1	40	52	16
2	60	48	40

4 (a) Define Parameter 2

(b) In a large city A, 20% of a random sample of 900 school boys had defective eye-sight. In another large city B, 15.5% of a random sample of 1600 school boys had the same defect. Is the difference between two proportions significant ? 4

(c) The income of a random sample of engineers in IT industry are Rs. 630, 650, 680, 690, 710 and 720 per annum (in lac). The income of engineers in steel industry are Rs. 610, 620, 650, 660, 690, 710, 720 and 730 per annum (in lac). Discuss the validity of the statement that IT industry pays its engineers much better than steel industry. 4

(d) Genetic theory states that children having one parent of blood group A and other of blood group B, will always be one of the three types A, AB , B and that the proportion of these types will be on an average 1:2:1. A report states that out of 300 children having one A parent and one B parent, 30% were found to be type A, 45% type AB and remaining type B. Test the hypothesis. 4

OR

4 (a) Define critical region. 2

(b) Two random samples are drawn from two different machines. Test the hypothesis that variability in production are equal in both machines. 4

Machine I	20	16	26	27	23	22	18	24	25	19		
Machine II	27	33	42	35	32	34	38	28	41	43	30	37

(c) The production of 5 machine before they repaired was noted and after repairement again the production was noted. From the result test whether is there any effect of repairement of machine on production. 4

Machine	1	2	3	4	5
Before repair	110	120	123	132	125
After repair	120	118	125	136	121

(d) Is there any significant difference in the production of the three different machine. The figures of the following table gives production. 4

Machine I	20	24	28	35
Machine II	25	28	33	26
Machine III	38	39	31	33

5 (a) Explain payoff matrix. 4

(b) Fit a straight line to the following data. 5

Year	2001	2002	2003	2004	2005
Production	10	12	8	10	14

(c) In 10 pieces of sarees, the number of defects observed are 2,3,4,0,5,6,7,4,3,2. Draw the suitable chart and state whether the process is under control or not. 5

OR

5 (a) Explain EVPI, 4

(b) Given below are the figures of production of a sugar factory. Fit second degree parabola to the following data. 5

Year	2001	2002	2003	2004	2005	2006
Production	26	31	40	51	66	86

(c) From a factory producing certain units, samples of 50 units are drawn daily. The number of defective units in each sample is given below. Draw P-chart and also obtain revised limits for future production of process is not under control. **5**

Sample No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Defective units	4	10	2	5	7	16	12	5	2	8	9	15	0	2	8