XZ-136

April-2013

Five Years M.B.A. Integrated (K.S.)

S.Y. MBA

Business Statistics

Time : 3 Hours]   **[Max. Marks : 100**

Instruction :   Statistical tables will be provided on demand.

1.   Attempt any **two** :

     (a)   (i)   Three perfect coins are tossed together. What is the probability of getting at least one head ?   **5**

           (ii)   If a random variable X follows Poisson distribution such that $P(X = 1) = P(X = 2)$, find $P(X > 2)$.   **5**

     (b)   (i)   The following table gives the number of days in a 50 days period during which automobile accidents occurred in a city :

No. of accidents :	0	1	2	3	4
No. of days :	21	18	7	3	1

               Fit a Poisson distribution to the data.   **5**

           (ii)   A company has 15 guest houses all over India. Out of these 15 guest houses, 5 are located in Chhattisgarh. Eight guest houses are selected without replacement from the 15 guest houses. What is the probability that 4 or fewer randomly selected guest houses are located in Chhattisgarh ?   **5**

     (c)   (i)   The probability of a man hitting the target is $\frac{1}{4}$. How many times must he fire so that the probability of his hitting the target at least once is greater than $\frac{2}{3}$.   **5**

           (ii)   If X is distributed as Hypergeometric, determine the $P(X < 5)$, where N = the population size = 22, r = the number of successes in the population = 7 and n = the sample size = 10.   **5**

2. (a) (i) Royal Footwear is a shoe manufacturing company. Royal plus is a newly launched shoe. The retail price of the new brand varies from ₹ 750 to ₹ 800. Assume that these prices are uniformly distributed. If a shoe is randomly selected from a retail store, what is the probability that its price will be between ₹ 770 to ₹ 780 ? Also calculate the average price, standard deviation and the variance of the distribution. **5**

   (ii) In a certain area, 8 percent of the families have their monthly income above ₹ 6,400 and 31 percent have income below ₹ 4,500. Assuming normality for the income distribution, find the percentage of families with monthly income below ₹ 5,000. **5**

   (b) (i) X is a normal variate such that $P(X < 61) = 0.44$ and $P(X > 80) = 0.04$, find its mean and standard deviation. **5**

   (ii) In a rural bus stand, the arrival of buses is Poisson distributed with an average arrival rate of 2.10 buses per hour.

      (a) Compute the average arrival time between buses.

      (b) What is the probability that at least 2 hours will elapse between bus arrivals ?

      (c) What is the probability that at most 5 hours will elapse between bus arrivals ? **5**

3. (a) Find Karl Pearson's coefficient of correlation between age and playing habit of the following students : **10**

Age (years)	:	15	16	17	18	19	20
No. of students	:	250	200	150	120	100	80
Regular Players	:	200	150	90	48	30	12

   Also calculate the probable error and point out if coefficient of correlation is significant.

   (b) (i) From the following set of positive frequencies, obtain all other class frequencies :

   N = 64 ; (AB) = 9; (A) = 23; (B) = 13 **5**

(ii) 1000 candidates appeared in a certain examination. Boys outnumbered girls by 20% of all candidates who appeared in the examination. Number of passed candidates exceeded the number of failed candidates by 166. Girls failing in the examination numbered 58. Compute coefficient of colligation between male and success in the examination and interpret it. **5**

4. Attempt any **two** :

(a) (i) Explain the concept of regression and point out its usefulness in dealing with business problems. **4**

(ii) The lines of regression of a bivariate distribution are as follows :

$5x - 145 = -10y$ and $14y - 208 = -8x$ and variance of $x = 4$. Find out mean values of x and y and standard deviation of y. Also find correlation coefficient between x and y. **5**

(b) (i) In case the two regression lines are identical, prove that the correlation coefficient is either +1 or –1. **3**

(ii) The following data relate to the scores obtained by 9 salesman of a company in an intelligence test and their weekly sales (in ₹ 1000's) **8**

Salesmen	:	A	B	C	D	E	F	G	H	I
Test scores	:	50	60	50	60	80	50	80	40	70
Weekly sales	:	30	60	40	50	60	30	70	50	60

OR

(a) Obtain the regression equation of sales on intelligence tests scores of the salesman. **3**

(b) If the intelligence test score of a salesman is 65, what would be his expected weekly sales. **7**

(c) Obtain the two regression equations from the following bivariate frequency distribution : **10**

Sales Revenue (₹ in lakh)	Advertising Expenditure (₹ in thousand)			
	5 – 15	15 – 25	25 – 35	35 – 45
75 – 125	3	4	4	8
125 – 175	8	6	5	7
175 – 225	2	2	3	4
225 – 275	3	3	2	2

5. (a) Quarterly sales data (₹ in million) in a super bazaar are presented in the following table for a four year period. **10**

Year	Quarters			
	I	**II**	**III**	**IV**
2000	60	80	72	68
2001	68	104	100	88
2002	80	116	108	96
2003	108	152	136	124
2004	160	184	172	164

Calculate the seasonal index for each of the four quarters using ratio-to-trend method.

(b) The production of a commodity during 1993-98 is given below. Fit the second degree parabola to these data and estimate the production for the year 2000 : **10**

Year	**:**	1993	1994	1995	1996	1997	1998
Production ('000 tonnes) :		10	12	13	15	18	20

_____