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SATHYABAMA UNIVERSITY

(Established under section 3 of UGC Act, 1956)

Course & Branch: B.Arch
Title of the Paper: Mathematics II — Max. Marks: 80
Sub. Code: 621201 (2006/07/08/09) — Time: 3 Hours
Date: 03/12/2010 — Session: AN

PART - A (8 X 4 = 32)

Answer ALL the Questions

1. Calculate Median of the data given below.

Class Interval	0-10	10-20	20-30	30-40	40-50
Frequency	8	15	22	20	10

2. Calculate the coefficient of range from the following data:

Marks:	10-20	20-30	30-40	40-50	50-60
Number of students	8	10	12	8	15

3. A coin is tossed 256 times and 132 heads are obtained. Would you conclude that the coin is a biased one?

4. A sample of 20 items has mean 42 units and standard deviation 5 units. Test the hypothesis that it is a random sample from a normal population with mean 45 units.

5. In a partially destroyed record, the following data are legible: Variance of X = 25. Regression equation of X on Y is $5X - Y = 22$ and regression equation of Y on X is $64X - 45Y = 24$. Find
   (a) Mean values of X and Y
   (b) Coefficient of correlation between X and Y

6. By the method of least squares, fit a straight line of the form $y = a + bx$ to the following data.

X	5	10	15	20	25
Y	15	19	23	26	30

7. State and prove addition theorem of probability.

8. (a) For a binomial distribution mean is 6 and variance is 2. Find the first two terms of the distribution.
   (b) State any two properties of Normal distribution.

PART – B (4 x 12 = 48)

Answer All the Questions

9. Calculate the coefficient of skewness from the following data:

Mid point	15	20	25	30	35	40
Frequency	12	18	25	24	20	21

(or)

10. Calculate coefficient of quartile deviation and coefficient of variation from the following data:

Marks	0-20	20-40	40-60	60-80	80-100
Number of Students	8	12	30	20	10

11. Two independent sample of sizes 9 and 7 from a normal population had the following values of the variables.

Sample I	18	13	12	15	12	14	16	14	15
Sample II	16	19	13	16	18	13	15		

Do the estimates of the population variance differ significantly at 5% level.

(or)

12. The following table gives a classification of a sample of 160 plants of their flower colour and flatness of leaf

	Flat leaves	Curled leaves
White flower	99	36
Red flower	20	5

Test whether the flower colours is independent of the flatness of leaf.

13. Ten competitors in a beauty contest are ranked by three judges in the following order.

1st judge	1	6	5	10	3	2	4	9	7	8
2nd judge	3	5	8	4	7	10	2	1	6	9
3rd judge	6	4	9	8	1	2	3	10	5	7

Use the rank correlation coefficient to determine which pair of judges has the nearest approach to common tastes in beauty.

(or)

14. Calculate the regression equations of X on Y and Y on X from the following data and estimate X when Y = 26.

X	10	12	13	17	18	20	24	30
Y	5	6	7	9	13	15	20	21

15. The probability of X,Y and Z becoming managers are 4/9, 2/9 and 1/3 respectively. The probabilities that the Bonus Scheme will be introduced if X,Y and Z becomes managers are 3/10, ½ and 4/5 respectively.

(a) What is the probability that Bonus Scheme will be introduced, and

(b) If the Bonus Scheme has been introduced, what is the probability that the manager appointed was X.

(or)

16. (a) A random variable X has the following probability distribution.

x	0	1	2	3	4	5	6	7
p(x)	0	K	2K	2K	3K	K^2	$2K^2$	$7K^2 + K$

Find (i) the value of K,

(ii) $P(1.5 < X < 4.5/X>2)$ and

(iii) the smallest value of λ for which $P(X \leq \lambda)$? ½

(b) The customer accounts at a certain departmental store have an average balance of Rs.480 and a standard deviation of Rs.160. Assuming that the account balances are normally distributed.
(i)What proportion of the accounts is over Rs.600?
(ii) What proportion of the accounts is between Rs. 40 and Rs.600?