SATHYABAMA UNIVERSITY

(Established under section 3 of UGC Act,1956)

Course & Branch :B.Arch - ARCH
Title of the Paper :Mathematics II — Max. Marks :80
Sub. Code :621201 — Time : 3 Hours
Date :10/05/2010 — Session :FN

PART - A (8 x 4 = 32)

Answer ALL the Questions

1. Show that the variance of the first 'n' positive integers is $\frac{1}{12}(n^2-1)$

2. The mean and median of a frequency distribution are 23.2 and 25.5 respectively. Find approximately the value of its mode. Calculate Pearson's coefficient of skewness if the standard deviation is 4.5.

3. Show that 95% confidence limits for the mean of the population are $\bar{x} + \frac{\sigma_s}{\sqrt{n}} t_{0.05}$. Deduce that for a random sample of 16 values with mean 41.5 inches and sum of squares of the deviations from the mean 135 inches^2 and drawn from a normal population, 95% confidence limits for mean population are 39.9 and 43.1 inches.

4. Mean of certain normal population is equal to the standard error of the mean of the samples of 100 from that distribution. Find the probability that the mean of the sample of size 25 from the distribution will be negative.

5. Regression lines are y = ax + b and x = cy + d and the two variables have same means. Show that d (1-a) = b (1-c).

6. The ranks of same 10 students in two subjects, A and B are given below. Find rank correlation coefficient. (3,6), (5,4), (8,9), (4,8), (7,1), (10,2), (2,3), (1, 10), (6, 5), (9,7).

7. What is the probability that at least two of 'n' people have same birthdates (n<365)?

8. If a random variable has a Poisson distribution such that P (1) = P (2). Find the mean of the distribution and P(4)

PART – B (4 x 12 = 48)

Answer All the Questions

9. The following are scores of two batsmen A and B in a series of innings.

A:	12	115	6	73	7	19	119	36	84	29
B:	47	12	16	42	4	51	37	48	13	0

Who is the better score getter and who is more consistent?

(or)

10. Calculate various measures of skewness for the data giving age distribution of 250 people in a town

Mid x :	5	15	25	35	45	55	65	75	85
Frequency:	15	20	25	24	12	31	61	12	50

11. Fit a Poisson distribution to the following data and test for its goodness of fit at level of significance 0.05.

x	0	1	2	3	4
f	419	352	154	56	19

(or)

12. The nicotine contents in two random samples of tobacco are given below.

Sample I:	21	24	25	26	27	
Sample II:	22	27	28	30	31	36

Can you say that the two samples came from the same normal populations?

13. Fit a parabola of the type $y = a + bx + cx^2$ to the following data

x :	10	15	20	25	30	35	40
y :	11	13	16	20	27	34	41

(or)

14. In two sets of variables X and Y with 50 observations each the following data was obtained.

$\bar{x} = 10, \sigma_x^n = 3, \bar{y} = 6, \sigma_y = 2, r = 0.3.$

On subsequent verification it was found that one value of x, 10 and corresponding value of y, 6 were inaccurate and were weeded out. With remaining 49 pairs of values correlation coefficient was calculated. Find the value of r.

15. A binary communication channel carries data as one of the two types of signals denoted by 0 and 1. Owing to noise, a transmitted 0 is sometimes received as a 1 and a transmitted 1 is sometimes received as a 0. For a given channel, assume probability of 0.94 that a transmitted 0 is correctly received as a 0 and a probability of 0.91 that a transmitted 1 is received as a 1. Further assume a probability of 0.45 of transmitting a 0. If a signal is sent, determine (i) Probability that a 1 is received (ii) Probability that a 1 was transmitted, given that a 1 was received (iii) Probability of an error.

(or)

16. In an undergraduate examination, a student is considered to have failed, secured second class, first class and distinction, according

as he scores less than 45%, between 45% and 60%, between 60% and 75% and above 70 respectively. In a particular year 10% of the students failed in the examination and 5% of the students got distinction. Find the percentage of students who have got first class and second class. If 20 students are taken at random from this set, what is the probability that 5 have got lesser than 50%?