27/11/17

Avinashilingam Institute for Home Science and Higher Education for Women
Coimbatore-641043.

Master's Degree Examination – Month year :2017

I Semester

Class :I PG **Time: 3 hours**
Major : Mathematics **Max. Marks: 60**

17MMAC06 Mathematical Statistics

Part A **10 x 1/2 = 5**

Choose the correct answer

1.Classification of data on the basis of time is called

a. geographical classification b. chronological classification

c. qualitative classification d. quantitative classification

2. Stub in a table refers

a. title of the table b. column heading c. row heading d. body of the table

3. In a sample of 8 observations the sum of squared deviations of items from the mean is 84.4 then the variance of the sample is

a. 12.06 b. 12 c. 12.16 d. 12.75

4. The secondary data from the following is

a. the data collected by an investigator through mail questionnaire

b. the data collected by an investigator through an oral interview

c. census data collected from the Government

d. the data collected by an investigator through the schedule method

5. A person who supplies the required information is called a/an

a. respondent b. witness c. investigator d. commissioner

6. If X and Y are independent random variables with means 5 and 10 and standard deviations 2 and 3 then the variance of 3X+4Y is

a. 36 b. 144 c. 180 d. 170

7. The mean of 100 items is 50. The value of the largest item is 100. It was later found that it is 110. Then the true mean is

a. 50.1 b. 50 c. 51 d. 52

8. If the equations of two regression lines are 4X-5Y+33=0, 20X-9Y=107 then the mean values of X and Y are

a. 13,17 b. 17,13 c. 14,16 d. 16,14

9.The two regression lines will be perpendicular when r=

a. 0 b. 1 c. -1 d. 0.5

10. The most stable measure of central tendency is

a. mean b. mode c. median d. geometric mean

Part B **5 x 4 = 20**

Answer ALL questions

Each answer should not exceed 200 words or one page

11.a. Explain the direct personal interview method of data collection.(Or)

11.b. What are two types of data and explain them with examples?

12.a. Derive the formula for median for a continuous frequency distribution.(Or)

12.b. Explain the merits and demerits of arithmetic mean.

13.a. Prove that correlation coefficient is independent of change of origin and scale. (Or)

13.b. A prognostic test in Mathematics was given to 10 Statistics students who were about to begin a course in Statistics. The scores X in their test were examined in relation to score Y in the final examination in Statistics. The following results were obtained.

$\sum X=71$, $\sum Y=70$, $\sum X^2=555$,

$\sum Y^2=526$, $\sum XY=527$. Find the correlation coefficient between X and Y

14.a. The following results were obtained in the analysis of data on yield of dry bark in ounces Y and age in years X of 200 Cinhona plants.

	X	Y
Average	9.2	16.5
S.D.	2.1	4.2

r(x,Y)=0.84. Find the two lines of regression and estimate the yield of dry bark of plant of age 8 years.

(Or)

14.b. If X=4Y+5 and Y=kX+4 are the lines of regression of X on Y and Y on X respectively show that $0 \leq 4k \leq 1$. If k=1/16, find the means of the variables and coefficient of correlation between them

15.a. Complete the following ANOVA Table.

Sources of variation	**Sum of squares**	**Degrees of freedom**	**Mean squares**	**F**
Between columns	42	-	14	
Between rows	-	2	16	-
Residues	136	6	-	

(Or)

15.b. In a sample of 8 observations the sum of squared deviations of items from the mean was 84.4. In another sample of 10 observations, the value was found to be 102.6. Test whether the difference is significant at 5% level.

Part C

5 x 7 = 35

Answer ALL questions

Each answer should not exceed 600 words or three pages

16.a. Prepare a questionnaire to find the health condition of women in a village.

(Or)

16.b. Prepare a questionnaire to find the reasons for school drop out in a village.

17.a. The Median and Mode of the following wage distribution are known to be Rs.33.50 and Rs. 34 respectively. Find the values of f_3,f_4 and f_5.

Wages in Rs	0-10	10-20	20-30	30-40	40-50	50-60	60-70	Total
Frequency	4	16	f_3	f_4	f_5	6	4	230

(Or)

17.b. Given below is the distribution of 140 candidates obtaining marks X or higher in a certain examination.

x	10	20	30	40	50	60	70	80	90	100
c.f.	140	133	118	100	75	45	25	9	2	0

Calculate the mean, median and mode of the distribution.

18.a. X and Y are two random variables with variances σ^2_x *and* σ^2_y respectively and r is the coefficient of correlation between them. If U=X+kY and V=X+$\frac{\sigma_X}{\sigma_Y}Y$, find the value of k so that U and V are uncorrelated. (Or)

18.b. In two sets of variables X and Y with 50 observations each the following data were observed. $\overline{X}=10, \sigma_X=3, \overline{Y}=6, \sigma_Y=2$ *and* $r(X,Y)=0.3$. But on subsequent verification it was found that one value of X(=10) and one value of Y(=6) were inaccurate and hence weeded out. With the remaining 49 pairs of values, how is the original value of r affected?

19.a. For 50 students of a class the regression equation of marks in Statistics X on marks in Mathematics Y is 3Y-5X+180=0. The mean marks in Mathematics is 44 and variance of narks in Statistics is 9/16th of the variance of marks in Mathematics. Find the mean marks in Statistics and the coefficient of correlation between marks in two subjects. (Or)

19.b. The following table shows the age X and blood pressure of 8 persons.

X: 52 63 45 36 72 65 47 25

Y: 62 53 51 25 79 43 60 33. Obtain the regression equation of Y on X and find the expected blood pressure of a person who is 49 years old.

20.a. The following table gives the yields on 15 sample plots under three varieties of seeds.

A	B	C
20	18	25
21	20	28
23	17	22
16	15	28
20	25	32

Find out if the average yields of land under different variances show significant differences. (Or)

20.b. The following table gives the number of refrigerators sold by 4 salesmen in three months May, June and July.

Month	**Salesmen**			
	A	B	C	D
May	50	40	48	39
June	46	48	50	45
July	39	44	40	39

Is there a significant difference in the sales made by the four salesmen?

&&&&&&&&&&&&&&&