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47 (2) BUST 2.3

2019

BUSINESS STATISTICS

Paper : 2.3

Full Marks : 80

Time : Three hours

The figures in the margin indicate full marks for the questions.

1. Choose the correct alternative :

1×10=10

(a) What is the probability of a sure event?

(i) 0

(ii) $1/2$

(iii) 1

(iv) -1.

Contd.

(b) The range of simple correlation coefficient (r) is —

- (i) 0 to ∞
- (ii) $-\infty$ to $+\infty$
- (iii) 0 to 1
- (iv) -1 to 1.

(c) Which is true for negatively skewed distribution ?

- (i) $AM < Median < Mode$
- (ii) $AM > Median > Mode$
- (iii) $AM = Median = Mode$
- (iv) None of the above.

(d) Relationship between AM, GM and HM is —

- (i) $AM + HM = GM$
- (ii) $AM \times HM = (GM)^2$
- (iii) $AM + HM = (GM)^2$
- (iv) $\frac{AM}{HM} = GM$

(e) Fluctuations due to earthquake is attached to the component of the time series :

- (i) Secular trend
- (ii) Seasonal trend
- (iii) Cyclical trend
- (iv) Irregular trend.

(f) When x and y are independent then —

(i) $r_{xy} = 1$

(ii) $r_{xy} = 0$

(iii) $r_{xy} = -1$

(iv) $r_{xy} = \infty$

(g) If ' a ' is any constant then $E(a) = ?$

(i) a

(ii) 0

(iii) 1

(iv) 2 .

(h) The relationship between mean deviation (M.D.) and standard deviation (S.D.) is —

(i) $3MD = 2SD$

(ii) $6MD = 5SD$

(iii) $5MD = 4SD$

(iv) $MD = SD$.

(i) If $r = \pm 1$, the two lines of regression are :

(i) Coincident

(ii) Parallel

(iii) Perpendicular to each other

(iv) None of the above.

(j) If each observation of a series is divided by 10, the SD of the new observation is :

(i) $\frac{1}{5}$ th of the SD of the original observations

(ii) 10 times the SD of original observations

(iii) $\frac{1}{10}$ th of the SD of the original observations

(iv) 5 times the SD of original observations.

2. Answer the following : **(any five)**

$$2 \times 5 = 10$$

(a) Write down *two* properties of correlation coefficient.

(b) If $b_{xy} = 0.2$ and $b_{yx} = 0.8$, then find the value of r .

(c) For any two events A and B , if $P(A) = \frac{1}{3}$, $P(B) = \frac{1}{5}$ and $P(A \cap B) = \frac{2}{15}$ find $P(A \cup B)$.

(d) If $E(X) = 10$ find $E(10X)$.

(e) Write down *two* methods of collecting primary data.

- (f) Bring out the fallacy of the statement, "The mean of a binomial distribution is 13 and standard deviation is 3".
- (g) Write down *two* properties of regression coefficient.
- (h) Write down *two* limitations of statistics.

3. Answer the following : **(any four)**

5×4=20

- (a) Explain the functions of statistics.
- (b) The average daily wage of 100 workers in a factory is Rs. 72. The average daily wage of 70 male workers is Rs. 75. Find the average daily wages of female workers.
- (c) There are 50 balls which are numbered from 1 to 50. A ball is drawn at random. Find the probability that the number on the ball is multiple of either 2 or 5.
- (d) X is a discrete random variable having the following probability distribution :

$X(=x)$	0	1	2	3	4	5	6	7
$P(X)$	0	K	$2K$	$2K$	$3K$	K^2	$2K^2$	$(7K^2 + K)$

Determine the values of K .

- (e) Write a short note on Skewness and Kurtosis.

- (f) Find the mode of the following distribution :

Daily Wages	No. of Persons
100-110	20
110-120	42
120-130	50
130-140	55
140-150	67
150-160	80
160-170	72
170-180	60
180-190	52
190-200	40

4. Answer the following questions : *(any five)*
8×5=40

- (a) Calculate mean and standard deviation from the following data :

Daily Wages	No. of Workers
10-20	4
20-30	10
30-40	15
40-50	7
50-60	20
60-70	30
70-80	12
80-90	25
90-100	22

- (b) Explain the different components of time series.
- (c) Explain the different methods of collecting primary data.
- (d) In a bolt factory, machines, M_1 , M_2 and M_3 manufacture 25, 35, and 40 per cent of the total respectively. Out of their output 5, 4 and 2 per cent respectively are defective bolts. One bolt is drawn at random from the product and is found defective. What is the probability that it was manufactured in the machine M_1 ?
- (e) Calculate Karl Pearson's correlation coefficient :
- X : 9 8 7 6 5 4 3 2 1
- Y : 15 16 14 12 10 13 11 8 9
- (f) Production in a shoe factory is given below. Fit a linear trend by the method of least square and estimate the production for the year.

Year	Production ('000 quintals)
1990	40
1991	46
1992	47
1993	50
1994	52
1995	60
1996	30
1997	35
1998	42

- (g) Find mean deviation (M.D.) from mean and the coefficient of mean deviation from mean :

Age (in year)	No. of people
0-5	15
5-10	20
10-15	60
15-20	50
20-25	40
25-30	45
30-35	70
35-40	55
40-45	35
45-50	42
