47 (2) BUST-2·3

# 2015

## 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) The word 'statistics' seems to have been
   derived from the —

   (i) Latin word 'status'

   (ii) Italian word 'statista'

   (iii) German word 'statistik

   (iv) All of the above

   (b) Which is the best measure of central
   tendency ?

   (i) AM        (ii) GM

   (iii) HM       (iv) Mode

*Contd.*

(c) Which of the following is a unitless measure of dispersion ?

    (i)    Quartile Deviation

    (ii)   Mean Deviation

    (iii)  Standard Deviation

    (iv)  Coefficient of variation

(d) 'Sale of woolen cloths' is associated to —

    (i)    Secular trend

    (ii)   Seasonal variation

    (iii)  Cyclical variation

    (iv)  Irregular variation

(e) If A and B are two mutually exclusive events then what is the value of $P(A \cap B)$ ?

    (i)    $P(A).P(B)$    (ii)  0

    (iii)  1    (iv)  Can't say

(f) The number of parameters in binomial distribution is —

    (i)    0    (ii)  1

    (iii)  2    (iv)  3

(g) In case of Poisson distribution —

    (i)    mean > variance

    (ii)   mean < variance

    (iii)  mean = variance

    (iv)  Can't say

(h) In case of normal distribution —

    (i)   $MD = \frac{5}{4}SD$    (ii)  $MD = \frac{4}{5}SD$

    (iii)  $MD = \frac{3}{2}SD$    (iv)  $MD = \frac{2}{3}SD$

(i) If C is any constant then $var(C) = $ ?

    (i)    $C^2$    (ii)  $C$

    (iii)  0    (iv)  1

(j) The correlation coefficient between income and expenditure is considered to be —

    (i)    Negative    (ii)  Zero

    (iii)  Positive    (iv)  None

2. Answer the following : *(any five)* 2×5=10

(a) If AM = 25 and Median = 20 then find Mode

(b) If $E(X) = 5$ ; find $E(3X + 6)$

(c) Bring out the fallacy of the statement —

"The mean of a binomial distribution is 8 and SD is 3"

(d) Under what circumstances, a binomial distribution tends to Poisson distribution ?

(e) Mention *two* sources of secondary data.

(f) If $b_{yx} = 1.6$ and $b_{xy} = 0.4$ ; find $r$

(g) If $P(A) = \dfrac{1}{2}$, $P(B) = \dfrac{1}{3}$ and $P(A \cap B) = \dfrac{1}{4}$

then find the value of $P(A \cup B)$.

3. Answer the following : *(any four)* 4×5=20

(a) The means of two samples of sizes 60 and 90 respectively are 52 and 48, and the standard deviations are 9 and 12. Obtain the mean and S.D. of the sample of size 150 obtained by combining two samples.

(b) Write a short note on skewness and Kurtosis.

(c) Two persons $X$ and $Y$ appear in an interview for two vacancies in the same post. The probability of $X$'s selection is $\dfrac{1}{5}$ and that of $Y$'s selection is $\dfrac{1}{3}$, what is the probability that exactly one of them will be selected ?

(d) The numbers of road accidents on a highway during a month follows a Poisson distribution with mean 6. Find the probability that in a certain month number of accidents will be *(i)* not more than 2 *(ii)* between 2 and 4 (given $e^{-6} = 0.0025$)

(e) Write a short note on scatter diagram

(f) Find the correlation from the following data —

$n = 100$, $\sum X = 280$, $\sum Y = 60$,

$\sum X^2 = 2384$, $\sum Y^2 = 1017$, $\sum XY = 438$

(g) From the following series of observations, calculate 3 yearly weighted moving averages with the weights 1, 2, 1 respectively

| Year | : | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|------|---|---|---|---|---|---|---|---|
| Value | : | 2 | 4 | 5 | 7 | 8 | 10 | 13 |

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

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

| Salary (in '000 Rs) : | 20–25 | 25–30 | 30–35 | 35–40 |
|---|---|---|---|---|
| No. of persons : | 2 | 3 | 11 | 20 |

| | 40–45 | 45–50 | 50–55 |
|---|---|---|---|
| | 32 | 25 | 7 |

(b) Explain the differences between a schedule and a questionnaire

(c) The following results are given

| | x | y |
|---|---|---|
| AM | 36 | 85 |
| SD | 11 | 8 |

co-efficient of correlation = 0·66

Find (i) The *two* regression equations

(ii) Estimate the value of x when y=75

(d) Explain the advantages of sample survey over complete census.

(e) Calculate rank correlation coefficient from the following data —

| Marks in statistics | : | 68 | 64 | 75 | 50 | 64 |
|---|---|---|---|---|---|---|
| Marks in Accountancy | : | 62 | 58 | 68 | 45 | 81 |

| Marks in statistics | : | 80 | 64 | 40 | 75 | 55 |
|---|---|---|---|---|---|---|
| Marks in Accountancy | : | 60 | 70 | 48 | 68 | 50 |

(f) Fit a linear trend to the following data and estimate the trend values by the method of least squares —

| Year | : | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|
| Production | : | 80 | 90 | 92 | 83 | 94 | 99 | 104 |

(g) Explain the various components of time series.

(h) How many male workers in a factory have a daily wage between (i) ₹ 480 and ₹ 680, and (ii) more than ₹ 720 if the mean daily wage is ₹ 500 and S.D. is ₹ 100 and the number of workers is 10,000 if the daily wage of the workers is assumed to be normally distributed

| Given Z : | –1 | 1·8 | 2·2 |
|---|---|---|---|
| Area : | 0·3413 | 0·4641 | 0·4861 |