MULTIPLE CHOICE QUESTIONS (MCQ's)

Type : Correlation and Regression :

1. Covariance between two variables x and y is given by

(A) $\frac{1}{n}\sum (x - \bar{x})(y - \bar{y})$ (B) $\frac{1}{n}\sum (x + \bar{x})(y + \bar{y})$

(C) $n\sum (x - \bar{x})(y - \bar{y})$ (D) $\frac{1}{n}\sum [(x - \bar{x}) + (y - \bar{y})]$

2. Correlation coefficient r between two variables x and y is given by

(A) $\frac{cov\,(x, y)}{\sigma_x^2\,\sigma_y^2}$ (B) $\frac{\sigma_y}{\sigma_x}$

(C) $\frac{\sigma_x}{\sigma_y}$ (D) $\frac{cov\,(x, y)}{\sigma_x\,\sigma_y}$

3. Range of coefficient of correlation r is

(A) $-\infty < \frac{1}{r} < \infty$ (B) $-\infty < r < \infty$

(C) $-1 \le r \le 1$ (D) $0 \le r \le 1$

4. Probable error of coefficient of correlation r is

(A) $0.6745\left(\frac{1 + r^2}{\sqrt{N}}\right)$ (B) $0.6745\left(\frac{1 - r^2}{\sqrt{N}}\right)$

(C) $0.6745\left(\frac{1 - r^2}{N}\right)$ (D) $0.6547\left(\frac{1 - r^2}{N}\right)$

5. Line of regression y on x is

(A) $y + \bar{y} = r\frac{\sigma_x}{\sigma_y}(x + \bar{x})$ (B) $x - \bar{x} = r\frac{\sigma_x}{\sigma_y}(y - \bar{y})$

(C) $y - \bar{y} = r\frac{\sigma_y}{\sigma_x}(x - \bar{x})$ (D) $y - \bar{y} = r\frac{\sigma_x}{\sigma_y}(x - \bar{x})$

6. Line of regression x on y is

(A) $y - \bar{y} = r\frac{\sigma_y}{\sigma_x}(x - \bar{x})$ (B) $x + \bar{x} = r\frac{\sigma_x}{\sigma_y}(y + \bar{y})$

(C) $x - \bar{x} = r\frac{\sigma_x}{\sigma_y}(y - \bar{y})$ (D) $x - \bar{x} = r\frac{\sigma_x}{\sigma_y}(y - \bar{y})$

7. Slope of regression line of y on x is (1)

(A) $r(x, y)$ (B) $r\frac{\sigma_y}{\sigma_x}$

(C) $r\frac{\sigma_x}{\sigma_y}$ (D) $\frac{\sigma_y}{\sigma_x}$

8. Slope of regression line of x on y is (1)

(A) $r\frac{\sigma_x}{\sigma_y}$ (B) $r(x, y)$

(C) $\frac{\sigma_x}{\sigma_y}$ (D) $r\frac{\sigma_y}{\sigma_x}$

9. In regression line y on x, b_{yx} is given by (1)

(A) $\text{cov}(x, y)$ (B) $r(x, y)$

(C) $\frac{\text{cov}(x, y)}{\sigma_x^2}$ (D) $\frac{\text{cov}(x, y)}{\sigma_y^2}$

10. In regression line x on y, b_{xy} is given by (1)

(A) $\text{cov}(x, y)$ (B) $r(x, y)$

(C) $\frac{\text{cov}(x, y)}{\sigma_x^2}$ (D) $\frac{\text{cov}(x, y)}{\sigma_y^2}$

11. If b_{xy} and b_{yx} are the regression coefficient x on y and y on x respectively then the coefficient of correlation r(x, y) is given by (1)

(A) $\sqrt{b_{xy} + b_{yx}}$ (B) $b_{xy}\, b_{yx}$

(C) $\sqrt{\frac{b_{xy}}{b_{yx}}}$ (D) $\sqrt{b_{xy}\, b_{yx}}$

12. If θ is the acute angle between the regression line of y on x and the regression line of x on y, then $\tan\theta$ is (1)

(A) $\frac{(1 - r^2)}{|r|}\frac{\sigma_x\sigma_y}{\sigma_x^2 + \sigma_y^2}$ (B) $\frac{|r|}{(1 - r^2)}\frac{\sigma_x\sigma_y}{\sigma_x^2 + \sigma_y^2}$

(C) $|r|\frac{\sigma_x\sigma_y}{\sigma_x^2 + \sigma_y^2}$ (D) $\frac{1}{|r|}\frac{\sigma_x^2 + \sigma_y^2}{\sigma_x\sigma_y}$

13. If $\sum xy = 2638$, $\bar{x} = 14$, $\bar{y} = 17$, $n = 10$ then cov (x, y) is (1)

(A) 24.2 (B) 25.8

(C) 23.9 (D) 20.5

14. If $\sum xy = 1242$, $\bar{x} = -5.1$, $\bar{y} = -10$, $n = 10$, then cov (x, y) is (2)

(A) 67.4 (B) 83.9

(C) 58.5 (D) 73.2

15. If $\sum x^2 = 2291$, $\sum y^2 = 3056$, $\sum (x + y)^2 = 10623$, $n = 10$, $\bar{x} = 14.7$, $\bar{y} = 17$ then cov (x, y) is (2)

(A) 1.39 (B) 13.9

(C) 139 (D) -13.9

16. If the two regression coefficient are 0.16 and 4 then the correlation coefficient is (2)

(A) 0.08 (B) -0.8

(C) 0.8 (D) 0.64

17. If the two regression coefficient are $-\frac{8}{15}$ and $-\frac{5}{6}$ then the correlation coefficient is (2)

(A) -0.667 (B) 0.5

(C) -1.5 (D) 0.537

18. If covariance between x and y is 10 and the variance of x and y are 16 and 9 respectively then coefficient of correlation r(x, y) is (2)

(A) 0.833 (B) 0.633

(C) 0.527 (D) 0.745

19. If cov (x, y) = 25.8 $\sigma_x = 6$, $\sigma_y = 5$ then correlation coefficient r(x, y) is equal to (2)

(A) 0.5 (B) 0.75

(C) 0.91 (D) 0.86

20. If $\sum xy = 90$, $\bar{x} = 4$, $\bar{y} = 4$, $n = 10$, $\sigma_x = 1.732$, $\sigma_y = 2$ then correlation coefficient r(x, y) is equal to (2)

(A) 0.8342 (B) 0.91287

(C) 0.7548 (D) 0.5324

21. If $\sum xy = 2800$, $\bar{x} = 16$, $\bar{y} = 16$, $n = 10$, variance of x is 36 and variance of y is 25 then correlation coefficient r(x, y) is equal to (2)

(A) 0.95 (B) 0.73

(C) 0.8 (D) 0.65

22. The correlation coefficient for the following data

$n = 10, \sum x = 140, \sum y = 150, \sum x^2 = 1980, \sum y^2 = 2465, \sum xy = 2160$ is (2)

(A) 0.753 (B) 0.4325

(C) 0.556 (D) 0.9013

23. You are given the following information related to a distribution comprising 10 observation $\bar{x} = 5.5$, $\bar{y} = 4$, $\sum x^2 = 385$, $\sum y^2 = 192$, $\sum (x + y)^2 = 947$. The correlation coefficient r(x, y) is (2)

(A) – 0.924 (B) – 0.681

(C) – 0.542 (D) – 0.813

24. Given the following data

$r = 0.022, \sum xy = 33799, \sigma_x = 4.5, \sigma_y = 64.605, \bar{x} = 68, \bar{y} = 62.125$. The value of n (number of observation) is (2)

(A) 5 (B) 7

(C) 8 (D) 10

25. Given the following data $r = 0.5, \sum xy = 350, \sigma_x = 1, \sigma_y = 4, \bar{x} = 3, \bar{y} = 4$. The value of n (number of observation) is (2)

(A) 25 (B) 5

(C) 20 (D) 15

26. Coefficient of correlation between the variables x and y is 0.8 and their covariance is 20, the variance of x is 16. Standard deviation of y is (2)

(A) 6.75 (B) 6.25

(C) 7.5 (D) 8.25

27. Line of regression y on x is $8x - 10y + 66 = 0$. Lie of regression x on y is $40x - 18y - 214 = 0$. Mean values of x and y are (2)

(A) $\bar{x} = 12, \bar{y} = 15$ (B) $\bar{x} = 10, \bar{y} = 11$

(C) $\bar{x} = 13, \bar{y} = 17$ (D) $\bar{x} = 9, \bar{y} = 8$

28. If the two lines of regression of $9x + y - \lambda = 0$ and $4x + y = \mu$ and the mean of x and y are 2 and –3 respectively then the values of λ and μ are (2)

(A) $\lambda = 15$ and $\mu = 5$ (B) $\lambda = -15$ and $\mu = -5$

(C) $\lambda = 5$ and $\mu = 15$ (D) $\lambda = 15$ and $\mu = -5$

29. Line of regression y on x is $8x - 10y + 66 = 0$. Line of regression x on y is $40x - 18y - 214 = 0$. Correlation coefficient r(x, y) is given by (2)

(A) 0.6 (B) 0.5

(C) 0.75 (D) 0.45

30. The regression lines are $9x + y = 15$ and $4x + y = 5$. Correlation r(x, y) is given by (2)

(A) 0.444 (B) -0.11

(C) 0.663 (D) 0.7

31. Line of regression y on x is $8x - 10y + 66 = 0$. Line of regression x on y is $40x - 18y - 214 = 0$. The value of variance of x is 9. The standard deviation of y is equal to (2)

(A) 2 (B) 5

(C) 6 (D) 4

32. Line of regression y on x is $8x - 10y + 66 = 0$. Line of regression x on y is $40x - 18y - 214 = 0$. The value of variance of y is 16. The standard deviation of x is equal to (2)

(A) 3 (B) 2

(C) 6 (D) 7

33. Line of regression y on x is $3x + 2y = 26$, line of regression x on y is $6x + y = 31$. The value of variance of x is 25. Then the standard deviation of y is (2)

(A) -15 (B) 15

(C) 1.5 (D) -1.5

34. The correlation coefficient between two variable x and y is 0.6. If $\sigma_x = 1.5$, $\sigma_y = 2.00$, $\bar{x} = 10$, $\bar{y} = 20$ then the lines of regression are (2)

(A) $x = 0.45y + 12$ and $y = 0.8x + 1$ (B) $x = 0.45y + 1$ and $y = 0.8x + 12$

(C) $x = 0.65y + 10$ and $y = 0.4x + 12$ (D) $x = 0.8y + 1$ and $y = 0.45x + 12$

35. The correlation coefficient between two variable x and y is 0.711. If $\sigma_x = 4$, $\sigma_y = 1.8$, $\bar{x} = 5$, $\bar{y} = 4$ then the lines of regression are (2)

(A) $x - 5 = 1.58\,(y - 4)$ and $y - 4 = 0.32\,(x - 5)$

(B) $x + 5 = 1.58\,(y + 4)$ and $y + 4 = 0.32\,(x + 5)$

(C) $x - 5 = 0.32\,(y - 4)$ and $y - 4 = 1.58\,(x - 5)$

(D) $x - 4 = 1.58\,(y - 5)$ and $y - 5 = 0.32\,(x - 4)$

36. Your are given below the following information about advertisement expenditure and sales

	Adv. Expenditure (X) ₹ (Crore)	Sales (Y) ₹ (Crore)
Mean	10	90
Standard Deviation	3	12

Correlation coefficient = 0.8

The two lines of regression are (2)

(A) $x = 58 + 3.2y$ and $y = -8 + 0.2x$ (B) $x = -8 + 2.2y$ and $y = 8 + 1.2x$

(C) $x = -8 + 3.2y$ and $y = 58 + 0.2x$ (D) $x = -8 + 0.2y$ and $y = 58 + 3.2x$

37. You are given below the following information about rainfall and production of rice

	Rainfall (X) in inches	Production of Rice (Y) in Kg
Mean	30	500
Standard Deviation	5	100

Correlation coefficient = 0.8

The two lines of regression are (2)

(A) $x + 30 = 0.04\ (y + 500)$ and $y + 500 = 6\ (x + 30)$

(B) $x - 30 = 0.4\ (y - 500)$ and $y - 500 = 1.6\ (x - 30)$

(C) $x - 30 = 0.04\ (y - 500)$ and $y - 500 = 16\ (x - 30)$

(D) $x - 30 = 16\ (y - 500)$ and $y - 500 = 0.04\ (x - 30)$

38. Given $b_{xy} = 0.85$, $b_{yx} = 0.89$ and the standard deviation of x is 6 then the value of correlation coefficient r(x, y) and standard deviation of y is (2)

(A) $r = 0.87$, $\sigma_y = 6.14$ (B) $r = -0.87$, $\sigma_y = 0.614$

(C) $r = 0.75$, $\sigma_y = 6.14$ (D) $r = 0.89$, $\sigma_y = 4.64$

39. Given $b_{xy} = 0.8411$, $b_{yx} = 0.4821$ and the standard deviation of y is 1.7916 then the value of correlation coefficient r(x, y) and standard deviation of x is (2)

(A) $r = -0.6368$ and $\sigma_x = -2.366$ (B) $r = 0.63678$ and $\sigma_x = 2.366$

(C) $r = 0.40549$ and $\sigma_x = 2.366$ (D) $r = 0.63678$ and $\sigma_x = 5.6$

40. For a given set of Bivariate data $\bar{x} = 53.2$, $\bar{y} = 27.9$ Regression coefficient of y on $x = -1.5$. By using line of regression y on x the most probable value of y when x is 60 is (2)

(A) 157.7 (B) 137.7

(C) 197.7 (D) 217.7

41. Given the following data $\bar{x} = 36$, $\bar{y} = 85$, $\sigma_x = 11$, $\sigma_y = 8$, $r = 0.66$. By using line of regression x on y, the most probable value of x when $y = 75$ is (2)

(A) 29.143 (B) 24.325

(C) 31.453 (D) 26.925

42. For a given set of Bivariate data $\bar{x} = 2$, $\bar{y} = -3$ Regression coefficient of x on $y = -0.11$. By using line of regression x on y the most probable value of x when y is 10 is (2)

(A) 0.77 (B) 0.57

(C) 1.77 (D) 0.87