PREVIOUS YEAR PAPER

SSC CGL 2017 Tier II — Statistics — 22 February 2018

SSC CGL · 22 February 2018 · 10:30 AM - 12:30 PM

86 of the paper's 100 questions · marks per question not printed on the response sheet · 120 minutes

Left out of the original paper: 14 (any question that needs a figure or formatting we cannot show, has no answer in the response sheet, or could not be checked against a second copy of the paper).

Questions from the Staff Selection Commission's paper of 22 February 2018, 10:30 AM - 12:30 PM. Each question is followed by its answer, and the answer key is repeated on the last page.

Take it as a timed practice test: exambharo.com/ssc-cgl/previous-year-papers/ssc-cgl-2017-tier-2-statistics-22-feb/

Statistics

1. For the mid values 30, 39, 48, 57 and 66 the second class of the distribution is _____.

(a) 34 - 44

(b) 34.5 - 43.5

(c) 33.5 - 44.5

(d) 34 - 45

Answer: (b)

4. In a pie chart depicting total expenses of a company for the year 2016, raw material had a central angle of 45o. If total expenses were Rs 504 Lakhs, what were the company's expense on raw materials (in Rs lakhs)?

(a) 45

(b) 112

(c) 63

(d) 72

Answer: (c)

8. Find the harmonic mean of 3, 6 and 10.

(a) 6.33

(b) 5

(c) 5.6

(d) 4.5

Answer: (b)

10. Calculate the median using the following data. Lower class boundary of the median class = 40 Total frequency = 120 Frequency of the median class = 35 Less than cumulative frequency of the post median class = 37 Class width = 20

(a) 48.23

(b) 49.14

(c) 54.23

(d) 53.14

Answer: (d)

13. Compute the standard deviation of the following numbers: 5, 6, 4 and 2

(a) 1.7

(b) 2.7

(c) 1.2

(d) 2.2

Answer: (a)

14. Calculate the standard deviation if the mean of a certain set of observations is 20 and the mean of the squares of the same observations is 500.

(a) 5

(b) 20

(c) 10

(d) 25

Answer: (c)

15. Calculate the coefficient of range for the following set of data. 3, 6, 6, 8, 9 and 12

(a) 22.2

(b) 44.4

(c) 50

(d) 60

Answer: (d)

16. The mean and variance of the marks of Division 1 which has 60 students is 45 and 4 respectively and the mean and variance of the marks of Division 2 which has 40 students is 55 and 9 respectively. What will be the variance of the marks of the two divisions combined?

(a) 30

(b) 20

(c) 10

(d) 40

Answer: (a)

17. If the mean of a certain set of data is 16 and variance is 4 then find the coefficient of variance.

(a) 25

(b) 12.5

(c) 10

(d) 20

Answer: (b)

18. If a set of points represent probability density, then the third central moment is the _____.

(a) skewness

(b) kurtosis

(c) mean

(d) variance

Answer: (a)

19. Which formula represents the 2nd moment around the mean?

(a) $\Sigma(xi - \mu x)2$

(b) $\sqrt{\Sigma(xi - \mu x)2}$

(c) $\Sigma(xi2 - \mu x2)$

(d) $\sqrt{\Sigma(xi2 - \mu x2)}$

Answer: (a)

20. Calculate skewness using Bowley's formula given lower quartile, upper quartile and median values of a data set are 16, 40 and 24.

(a) 0.33

(b) 0.44

(c) 0.55

(d) 0.67

Answer: (a)

21. What is the mean of a data if its Pearson's coefficient of skewness is 0.25, standard deviation is 6 and mode is 18?

(a) 16.5

(b) 10.5

(c) 21.5

(d) 19.5

Answer: (d)

22. Which condition has to be met to say that a series has positive skewness?

(a) Mode > Mean > Median

(b) Median > Mode > Mean

(c) Mode > Median > Mean

(d) Mean > Median > Mode

Answer: (d)

23. The kurtosis of any univariate normal distribution is _____.

(a) 2

(b) 3

(c) 1

(d) 0

Answer: (b)

24. Characteristics of a leptokurtic distribution are _____.

(a) 1)Positive excess kurtosis, 2) Slender in shape and 3)Fatter tails

(b) 1)Negative excess kurtosis, 2) Slender in shape and 3)Fatter tails

(c) 1)Positive excess kurtosis, 2) Thicker in shape and 3)Thinner tails

(d) 1)Negative excess kurtosis, 2) Thicker in shape and 3)Thinner tails

Answer: (a)

25. Coefficient of Kurtosis $\beta 2$ = _____, where $\mu 2$ and $\mu 4$ are the second and fourth moments about mean.

(a) $\mu 2/\mu 42$

(b) $\mu 42/\mu 2$

(c) $\mu 4/\mu 22$

(d) $\mu 22/\mu 4$

Answer: (c)

26. Find the coefficient of correlation if the two regression coefficients are 0.5 and 4.5.

(a) 1.5

(b) 2.5

(c) 3.5

(d) 2.25

Answer: (a)

27. Pearson's correlation coefficient = _____. (S represents standard deviation)

(a) (Sx.Sy)/Covariance(x,y)

(b) Covariance2(x,y)/(Sx.Sy)

(c) (Sx.Sy)2/Covariance(x,y)

(d) Covariance(x,y)/(Sx.Sy)

Answer: (d)

28. The range of values that coefficient of correlation can take are _____.

(a) $0 \leq r \leq +1$

(b) $-1 < r < +1$

(c) $0 < r < +1$

(d) $-1 \leq r \leq +1$

Answer: (d)

29. Spearman's rank correlation coefficient is given by _____.

(a) $1 + 6\sum di2/[n(n2-1)]$

(b) $1 - 6\sum di/[n(n2-1)]$

(c) $1 - 6\sum di2/[n(n2-1)]$

(d) $1 + 6\sum di/[n(n2-1)]$

Answer: (c)

30. If Coefficient of correlation r = 0.5 then coefficient of non-determination is _____.

(a) 0.5

(b) 0.25

(c) 1

(d) 0.75

Answer: (d)

31. If x = 3u + 1 and y = 4v + 2 and the regression coefficient between u and v is 1.2, then find regression coefficient between x and y?

(a) 0.8

(b) 1

(c) 0.9

(d) 1.5

Answer: (c)

32. Calculate the correlation coefficient between the following values : x: 3, 5, 1, 7, 5 y: 4, 3, 0, 8, 2

(a) 0.9

(b) 0.8

(c) 0.7

(d) 0.6

Answer: (b)

33. If the sum of the squares of difference of ranks of 6 candidates in two criteria is 21, the rank correlation coefficient is _____.

(a) 0.5

(b) 0.6

(c) 0.4

(d) 0.7

Answer: (c)

34. If 4y = 15 + 6x is the regression line of y on x, a coefficient of correlation between x and y is 0.9, then regression coefficient of x on y is ual t _____.

(a) 0.54

(b) 0.45

(c) 0.81

(d) 0.72

Answer: (a)

35. Find regression coefficient of y on x (byx) if correlation coefficient between x and y values is 0.75 and standard deviation of x and y are 5 and 6.4 respectively.

(a) 0.96

(b) 0.59

(c) 1.04

(d) 1.7

Answer: (a)

36. If a box contains 4 red balls and 6 blue balls then what is the probability of picking 2 balls of the same colour?

(a) 8/15

(b) 12/25

(c) 13/25

(d) 7/15

Answer: (d)

37. A doctor finds of all patients that visits his clinic the probability that a patient is alcoholic given that the patient has liver disease is 0.08. The probability that a patient is alcoholic is 0.06 and the probability that a patient has liver disease is 0.12. Find the probability that a patient has liver disease given that he or she is alcoholic?

(a) 0.04

(b) 0.09

(c) 0.16

(d) 0.24

Answer: (c)

38. What is the probability that a number selected randomly from 1 to 500 is a multiple of 3 or 7?

(a) 0.428

(b) 0.474

(c) 0.512

(d) 0.576

Answer: (a)

39. If P(A) = 2/3 and P(B) = 5/8 and find probability of only B occurring if probability of only A occurring is 1/6?

(a) 1/8

(b) 1/9

(c) 1/6

(d) 2/9

Answer: (a)

40. Find P(A'/B'), given P(A) = 3/4, P(B) = 9/20 and P(A∩B) = 1/4? P(A'/ B')

(a) 1/20

(b) 1/9

(c) 1/11

(d) 1/12

Answer: (c)

41. A and B are independent events. The odds in favour of A and B are 1:1 and 3:2 respectively. Find the probability that only one of the two events occurs?

(a) 0.6

(b) 0.7

(c) 0.8

(d) 0.5

Answer: (d)

43. If 3 dice are thrown what is the probability of getting same digits on atleast two dices?

(a) 1/36

(b) 7/36

(c) 27/216

(d) 1/6

Answer: (d)

44. In a family of three children what is probability that the third child is a girl given that the other two are also girls?

(a) 1/3

(b) 2/3

(c) 1/4

(d) 1/6

Answer: (c)

45. A, B and C are three mutually exclusive and exhaustive events. P(A) = 2P(B) = 6P[C). Find P(B).

(a) 0.1

(b) 0.3

(c) 0.6

(d) 0.4

Answer: (b)

47. In a box of 100 bulbs 30 are defective. What is the probability of getting more than 2 defective bulbs if 5 are chosen randomly from the box?

(a) 0.124

(b) 0.213

(c) 0.264

(d) 0.163

Answer: (d)

48. The mean and variance of a binomial distribution are 5 and 4 respectively. What is the probability of success?

(a) 0.3

(b) 0.2

(c) 0.4

(d) 0.1

Answer: (b)

49. If the mean of a Poisson distribution is 9 then its variance is equal to _____.

(a) 3

(b) 9

(c) 6

(d) 81

Answer: (b)

50. Find the mean of x if x is a Poisson variate satisfying the condition P(3) = P(4)?

(a) 2

(b) 8

(c) 4

(d) 16

Answer: (c)

51. For a standard normal distribution P(-1 < z < 1) = _____

(a) 0.68

(b) 0.34

(c) 0.99

(d) 0.49

Answer: (a)

52. If x follows normal distribution with mean = 20 an ariance = 25. What is P(x ≥ 25)? Given P(z ≤ 1) = 0.841, P(z ≤ 2) = 0.977

(a) 0.023

(b) 0.16

(c) 0.32

(d) 0.046

Answer: (b)

53. 10% of people in a village are afflicted with a viral disease. What size of sample should be taken to ensure that error of estimation of the proportion is not more than 5% with 95% confidence?

(a) 138

(b) 238

(c) 38

(d) 338

Answer: (a)

54. A random sample of 100 articles from a large batch of articles contains 10 defective articles. What is the standard error of estimation of the sample proportion?

(a) 0.02

(b) 0.01

(c) 0.04

(d) 0.03

Answer: (d)

55. A statistician estimated that the standard deviation of her measurements is 2 cm. What should be the size of the sample in order to be 99% confident that the error of her estimates of mean does not exceed 0.43 cm? (z* = 2.58, for 99% confidence level)

(a) 144

(b) 121

(c) 169

(d) 196

Answer: (a)

57. A random sample of 2 items is picked out from a population of 15 items. The number of all such samples is _____.

(a) 105

(b) 60

(c) 210

(d) 90

Answer: (a)

58. The average length of a sample of 50 leaves measured by a botanist was 40 mm with a standard deviation of 21 mm. Assuming normal deviation find the limits which have a 95% chance of including the expected length of the leaf.

(a) 42.35 - 37.65

(b) 34.12 - 45.88

(c) 43.12 - 36.88

(d) 44.58 - 35.42

Answer: (b)

59. The 95% confidence level limits to a population mean are 94.12 - 105.88. Find population standard deviation if sample size is 100.

(a) 15

(b) 30

(c) 45

(d) 60

Answer: (b)

60. In a particular study if the sample size was 50, then standard error was 8 units. How much would be the standard error if sample size was increased to 200?

(a) 4

(b) 2

(c) 16

(d) 8

Answer: (a)

61. A random sample of 200 articles taken from a large batch of articles contains 15 defective articles. What is the estimate of the sample proportion of defective articles?

(a) 0.186

(b) 0.054

(c) 0.0186

(d) 0.54

Answer: (c)

62. A factory manufactures 10,000 bolts per day. From a sample of 500 bolts, 4% were of unacceptable quality. Estimate the interval of number of bolts that would be of unacceptable quality produced per day at 95% confidence.

(a) (313, 487)

(b) (305, 495)

(c) (328, 472)

(d) (233, 567)

Answer: (d)

63. The mean pay of 15 H1-B visa holders was found to be Rs 65 lakhs/yr with a standard deviation of Rs 6 lakhs. What are the 99% confidence limits (in Rs lakhs) for the mean pay of the population of H1-B visa holders assuming it to be normal? (The upper 0.5% of t-distribution with 14 degrees of freedom is 2.98)

(a) (61.88 , 68.12)

(b) (60.22 , 69.77)

(c) (62.55 , 67.45)

(d) (59.33 , 70.67)

Answer: (b)

64. The standard error of the mean decreases if the population standard deviation _____.

(a) increases or if sample size increases

(b) decreases or if sample size increases

(c) decreases or if sample size decreases

(d) increases or if sample size decreases

Answer: (b)

65. A confidence interval increases in width as the _____.

(a) sample size is increased

(b) degrees of freedom is increased

(c) level of confidence increases

(d) sample standard deviation is decreased

Answer: (c)

66. What is the value of the z-score for x = 125 if population mean and variance are 121 and 4 respectively.

(a) 2

(b) 1

(c) -2

(d) -1

Answer: (a)

67. In statistical hypothesis testing, a type I error is the _____ a false null hypothesis

(a) incorrectly retaining of a true null hypothesis, while a type II error is incorrectly retaining

(b) incorrect rejection of a true null hypothesis, while a type II error is incorrectly retaining

(c) incorrect rejection of a true null hypothesis, while a type II error is incorrect rejection

(d) incorrectly retaining of a true null hypothesis, while a type II error is incorrect rejection

Answer: (b)

68. If, Sample from Population #1: 3,5,8 Sample from Population #2: 2,4,8 Sample from Population #3: 3,6,7 Then what is the number of degrees of freedom of treatment?

(a) 3

(b) 1

(c) 4

(d) 2

Answer: (d)

69. If we have to test if there's a difference between two groups of patients from different hospitals trying two different therapies, then we need to _____.

(a) Two way ANOVA without replication

(b) One way ANOVA with replication

(c) Two way ANOVA with replication

(d) One way ANOVA without replication

Answer: (c)

70. If confidence level is 90% then two tailed alpha would be _____ %.

(a) 10

(b) 45

(c) 2.5

(d) 5

Answer: (d)

71. The smaller the alpha level, the _____ the null hypothesis.

(a) greater the area where you would reject

(b) smaller the area where you would reject

(c) smaller the area where you would accept

(d) greater the area where you would accept

Answer: (b)

72. The mean square of error denoted as MSE = _____. Where SSE is the sum of squares of error, n is number of data points and m is number of samples.

(a) SSE/(n - m - 2)

(b) SSE/(n + m)

(c) SSE/(n + m - 2)

(d) SSE/(n - m)

Answer: (d)

73. The mean square for treatment is 9. The mean square for error is 4. Calculate the F-statistic.

(a) 1.5

(b) 2.25

(c) 0.44

(d) 0.66

Answer: (b)

74. An ANOVA procedure is used for data that was obtained from four sample groups each comprised of five observations. The degrees of freedom dF1 and dF2 for the critical value of F are _____ respectively.

(a) 3 and 16

(b) 3 and 19

(c) 4 and 16

(d) 4 and 19

Answer: (a)

75. When an analysis of variance is perform[illegible] on [illegible]ples drawn from k populations, the mean square between treatments (MSTR) is _____[illegible]___. (Where SSTR is treatment sum of squares and SST is total sum of squares.)

(a) SSTR/(k - 1)

(b) SST/(k - 1)

(c) SSTR/(k+1)

(d) SST/k

Answer: (a)

76. Convert the annual trend equation Y = a + bX into monthly trend equation.

(a) Y = a/12 + (b/12)X

(b) Y = 12a + bX

(c) Y = a/12 + (b/144)X

(d) Y = a + 12bX

Answer: (c)

77. What is the shape of the second degree trend equation?

(a) Hyperbolic

(b) Parabolic

(c) Exponential

(d) Sinusoidal

Answer: (b)

78. If the sales (Y) Vs time (X) trendline with 2010 as origin is Y = 16.25 + 1.25X, then what will be the trendline with 2015 as origin?

(a) Y = 10 + 1.25X

(b) Y = 22.5 + 6.25X

(c) Y = 10 + 6.25X

(d) Y = 22.5 + 1.25X

Answer: (d)

79. If the sales (Y) trend is captured by the equation Y = 500 + 20t - t2 then the maximum sales will be achieved when the time t = _____ years .

(a) 20

(b) 5

(c) 15

(d) 10

Answer: (d)

80. Y = 500 + 0.75 t - 2.5 t2 represents the trend fo utput of a copper mine with 2010 as origin. Unit of Y is tonnes and unit of t is year. Wh vill b e mine's copper output (in tonnes) in the year 2020?

(a) 185.5

(b) 346.5

(c) 257.5

(d) 742.5

Answer: (c)

81. The fitted annual sales trend is Yt = 180 e0.2t. (Where t is in years and Y is in Rs lakhs) On average, sales are _____absolute amount each year.

(a) rising by a declining

(b) falling by a declining

(c) falling by an increasing

(d) rising by an increasing

Answer: (d)

82. A pattern of variation of a time series that repeats every year is called _____.

(a) Cyclical

(b) Trend

(c) Hyperbolic

(d) Seasonal

Answer: (d)

84. The linear trend equation developed for the annual sales Y (in Rs lakhs) of ABC Manufacturing Company is Y = 500 + 6t, where t is in years. By how much are sales increasing per year?

(a) Rs 6,00,000 6,00,000

(b) 6 percent

(c) 6 times the number of years

(d) in multiples of 6

Answer: (a)

85. For the linear trend equation Y = a + bt, which symbol represents the average change in the dependent variable for each unit change in time?

(a) a

(b) t

(c) Y

(d) b

Answer: (d)

86. If the trend equation to forecast demand Y (in R khs) for the required month (t) is Y = 100 + 20t - 5t2. What is the seasonally adjusted demand ecast for month 3 for which the corresponding seasonal index is 1.25?

(a) 143.75

(b) 115

(c) 92

(d) 123.25

Answer: (a)

87. Y = 100 - 0.4 t - t2 represents the trend for sales of movie tickets in a multiplex with day before release as origin. Unit of Y is in Rs thousand and unit of t is days. Sales for day 3 are _____ than sales of day 1.

(a) 8.9% greater

(b) 9.8% lesser

(c) 8.9% lesser

(d) 9.8% greater

Answer: (c)

88. If the quarterly trend equation is given as Y = a + bX, then the annual trend equation will be _____.

(a) Y = 4a + 4bX

(b) Y = 4a + bX

(c) Y = a + 4bX

(d) Y = 4a + 48bX

Answer: (d)

89. The last period's sales forecast was Rs 100 lakhs and demand was Rs 90 lakhs. What is the simple exponential smoothing sales forecast (in Rs lakhs) with alpha of 0.4 for the next period?

(a) 94

(b) 106

(c) 96

(d) 104

Answer: (c)

90. If the trendline with 2016 as origin is Y = 125 - 3t -2t2, then what will be the trendline with 2014 as origin?

(a) Y = 127 + 5t -2t2

(b) Y = 123 + 5t -2t2

(c) Y = 125 + 7t -2t2

(d) Y = 127 + 7t -2t2

Answer: (b)

92. From the prices and quantities of the b[illegible] and [illegible]rrent year Laspeyres and Bowley Price Indices were calculated as 124 and 130 respectively. [illegible]e Paasche price index for the same data.

(a) 127

(b) 136

(c) 118

(d) 121

Answer: (b)

93. Paasche Quantity Index is given by the formula _____.

(a) (∑QnPo)/(∑QoPo)

(b) (∑QnPn)/(∑QoPn)

(c) (∑QoPn)/(∑QoPn)

(d) (∑QnPn)/(∑QnPo)

Answer: (b)

94. The index number for the price of diesel in 2015 was 125 and in 2016, it was 140, on a base year of 2011. What is the percent increase in price of diesel from 2015 to 2016?

(a) 25

(b) 40

(c) 12

(d) 15

Answer: (c)

95. A worker earned Rs 15,000 per month in 2015, when the Consumer Price Index was 250. If the base period is 2000, what are his earnings per month in 2015 in terms of value of Rs. in the year 2000?

(a) Rs 37,500

(b) Rs 6,000

(c) Rs 10,000

(d) Rs 27,500

Answer: (b)

96. The price index in 2016 is 116 using 2011 as base year. What will be 2011 price index if base year is changed to 2016?

(a) 134.5

(b) 86.2

(c) 84

(d) 132

Answer: (b)

97. The Fisher's Index _____.

(a) satisfies neither the Time Reversal Test nor the Factor Reversal Test

(b) satisfies the Time Reversal Test but not the Factor Reversal Test

(c) satisfies both the Time Reversal Test as well as the Factor Reversal Test

(d) satisfies the Factor Reversal Test but not the Time Reversal Test

Answer: (c)

98. Calculate Fisher's Price Index (in %) using the following data: $\sum QoPn = 2700$, $\sum QnPn = 2250$, $\sum QoPo = 2750$ and $\sum QnPo = 2100$ $\Sigma QoPn = 2700$, $\Sigma QnPn = 2250$,
$\Sigma QnPo = 2100$

(a) 157.1

(b) 63.6

(c) 102.5

(d) 95

Answer: (c)

99. Find the Value Index (in %) using the following data: ∑QoPn = 2500, ∑QnPn = 2750, ∑QoPo = 2250 and ∑QnPo = 2000.
ΣQoPn = 2500, ΣQnPn = 2750,
ΣQnPo = 2000

(a) 122.2

(b) 125

(c) 112.5

(d) 137.5

Answer: (a)

Answer key

Answer key as marked in the Staff Selection Commission's response sheet. "—" means the sheet did not show it clearly.

Statistics

1	**(b)**	4	**(c)**	8	**(b)**	10	**(d)**	13	**(a)**	14	**(c)**	15	**(d)**	16	**(a)**
17	**(b)**	18	**(a)**	19	**(a)**	20	**(a)**	21	**(d)**	22	**(d)**	23	**(b)**	24	**(a)**
25	**(c)**	26	**(a)**	27	**(d)**	28	**(d)**	29	**(c)**	30	**(d)**	31	**(c)**	32	**(b)**
33	**(c)**	34	**(a)**	35	**(a)**	36	**(d)**	37	**(c)**	38	**(a)**	39	**(a)**	40	**(c)**
41	**(d)**	43	**(d)**	44	**(c)**	45	**(b)**	47	**(d)**	48	**(b)**	49	**(b)**	50	**(c)**
51	**(a)**	52	**(b)**	53	**(a)**	54	**(d)**	55	**(a)**	57	**(a)**	58	**(b)**	59	**(b)**
60	**(a)**	61	**(c)**	62	**(d)**	63	**(b)**	64	**(b)**	65	**(c)**	66	**(a)**	67	**(b)**
68	**(d)**	69	**(c)**	70	**(d)**	71	**(b)**	72	**(d)**	73	**(b)**	74	**(a)**	75	**(a)**
76	**(c)**	77	**(b)**	78	**(d)**	79	**(d)**	80	**(c)**	81	**(d)**	82	**(d)**	84	**(a)**
85	**(d)**	86	**(a)**	87	**(c)**	88	**(d)**	89	**(c)**	90	**(b)**	92	**(b)**	93	**(b)**
94	**(c)**	95	**(b)**	96	**(b)**	97	**(c)**	98	**(c)**	99	**(a)**				