PREVIOUS YEAR PAPER

SSC CGL 2016 Tier II — Statistics — 2 December 2016

SSC CGL · 2 December 2016 · 10:00 AM - 12:00 PM

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

Left out of the original paper: 29 (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 2 December 2016, 10:00 AM - 12:00 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-2016-tier-2-statistics-2-dec/

Statistics

3. In the construction of cost of living index, commodities are selected by :
   (a) simple random sampling
   (b) stratified random sampling
   (c) systematic sampling
   (d) judgement/ purposive sampling.

   Answer: (d)

4. If x and y are uncorrelated variables then this implies :
   (a) the absence of any linear relationship between them
   (b) the absence of any quadratic relationship between them
   (c) the absence of any logarithmic relationship between them
   (d) the absence of any trigonometric relationship between them

   Answer: (a)

5. In simple random sampling of n units from a population of N units the quantity [1 - (n/N)] is called the
   (a) sampling fraction
   (b) expansion factor
   (c) finite population correction factor
   (d) degrees of freedom

   Answer: (c)

6. The coefficient of range of the weights of 10 students from the following data: 41,20,15,65,73,84,53,35,71,55 is
   (a) 1.433
   (b) 0.696
   (c) 0.675
   (d) 1

   Answer: (b)

7. Consider simple random sampling with replacement from a population of size N. The number of samples of size n is

(a) NPn

(b) NCn

(c) Nn

(d) None of the options

Answer: (c)

9. If a population consists of 10 units and SRSWOR is adopted, the probability of selecting a specified sample of 2 units is :

(a) 1/10

(b) 1/45

(c) 1/90

(d) 1/100

Answer: (b)

11. Suppose a person would earn Rs. 10,000 in base period. Suppose the cost of living index increases by 20% over base period. Then the employers of that person increase his salary by Rs. 1500. Which of the following option is TRUE?

(a) He is just able to maintain the same standard of living as in base period.

(b) He should claim Rs 500/- as Dearness Allowance.

(c) He can improve his standard of living as compared to base period.

(d) He should claim Rs 2,000 as Dearness Allowance.

Answer: (b)

12. The correlation coefficient between two variables X and Y is 0.4. The correlation coefficient between 2X and (-Y) will be :

(a) 0.4

(b) -0.8

(c) -0.4

(d) 0.8

Answer: (c)

13. Trace out the WRONG option from the following: (CLI= Cost of living index numbers)

(a) If group indices increase k times, so also CLI does.

(b) CLI remains unchanged if all the group indices increase by a constant amount.

(c) CLI helps determining Purchasing Power of Money.

(d) Dearness Allowance is fixed by considering CLI.

Answer: (b)

16. When the collected data is grouped with reference to time, we have

(a) Quantitative classification

(b) Qualitative classification

(c) Geographical classification

(d) Chronological classifications

Answer: (d)

19. Which type of sampling is one where only the first sample unit is selected at random and the remaining units are automatically selected in a definite sequence at equal spacing from one another. It is :

(a) Multi stage sampling

(b) Quota sampling

(c) Systematic sampling

(d) Area sampling

Answer: (c)

21. A random sample of size n is drawn from a population of size N by SRSWOR method. Then the standard error of sample mean will be zero if n is

(a) N - 1

(b) N

(c) tending to infinity

(d) none of the options

Answer: (b)

22. The coefficient of correlation between two variables X and Y is 0.48. The covariance is 36. The variance of X is 16. The standard deviation of

(a) 10.15

(b) 13.32

(c) 16.5

(d) 18.75

Answer: (d)

23. If 4,5,6,6,6,6,6,6,6,7 be a random sample from a Poisson population with parameter λ, then an unbiased estimate of λ is :

(a) 4.2

(b) 5

(c) 5.8

(d) 6

Answer: (c)

24. There are 35 students in a hostel. If the number of students increases by 7, the expenses of the hostel increases by Rs. 42 per day while the average expenditure per head diminishes by Re. 1. The original expenditure of the hostel is:

(a) Rs. 380

(b) Rs. 420

(c) Rs. 490

(d) Rs. 510

Answer: (b)

28. Which of the following is a method of collection of primary data?

(a) Direct personal interview

(b) Indirect personal interview

(c) Schedules through enumerators

(d) All of the options

Answer: (d)

30. If the regression line of Y on X is Y =30 - 0.9X and the standard deviations are Sx = 2 and Sy = 9, then the value of the correlation coefficient rxy is :

(a) -0.3

(b) -0.2

(c) 0.2

(d) 0.3

Answer: (b)

31. A coin is tossed repeatedly until a head appears. If 'p' be the probability of getting a head in any toss and x be the number of tosses required to get the first head then which of the following statement is true:

(a) x is an unbiased estimator of p

(b) 1/x is an unbiased estimator of 1/p

(c) x is an unbiased estimator of 1/p

(d) 1/x is an unbiased estimator of p

Answer: (c)

34. For a trivariate distribution, if the correlation coefficients are r12 = r13 = r23 = r, -1 < r < 1, then r12.3 is:

(a) (1-r)/r

(b) (1+ r)/r

(c) r / (1+r)

(d) r / (1-r)

Answer: (c)

35. An observation is drawn from an experimental distribution with mean θ, if the observation is found to be 2, and we test H0: θ>1 against H1: θ>1 with level e-3 then

(a) H0 will be rejected

(b) H0 will be accepted
H0

(c) test will be of power 0.5

(d) test will be of power 0.9

Answer: (b)

36. The average of 25 numbers is 36. If the average of first 13 numbers is 32 and that of the last 13 numbers is 39, then the 13th number is

(a) 27

(b) 33

(c) 23

(d) 21

Answer: (c)

37. In an analysis of variance problem involving 3 treatments and 10 observations per treatment, SSE= 399.6 The MSE for the analysis would be :

(a) 14.8

(b) 133.2

(c) 44.4

(d) 39.9

Answer: (a)

39. In an ANOVA problem for one-way classi[illegible]a, with three classes and three observations per class, if the F- value is 1.5 and the total sum of squares is 18, then the mean square between classes is :

(a) 2

(b) 3

(c) 4

(d) 5

Answer: (b)

42. If a data set contains n paired values on two variables x(independent) and y(dependent), then their plot is called :

(a) Dendogram

(b) Point diagram

(c) Scatter diagram

(d) Correlogram

Answer: (c)

43. An ANOVA procedure is used for data obtained from five populations. Five samples were taken from the 5 populations each comprising of 20 observations. The degree of freedom associated with F is :

(a) 5, 95

(b) 5, 99

(c) 4, 99

(d) 4, 95

Answer: (d)

44. The data taken from the publication "sankhya" will be considered as :

(a) primary data

(b) secondary data

(c) Either (A) or (B)

(d) None of the options

Answer: (b)

46. Which of these statements on variation is INCORRECT?

(a) Chance causes variations are preventable.

(b) Chance causes are beyond the control of human hand.

(c) Assignable causes of variation are preventable.

(d) Assignable causes can be detected and measured.

Answer: (a)

47. In the one-way analysis of variance model with [illegible] factors, let MSE denote the mean sum of squares due to error, MST denote the mean sum of squares due to factors, MTS denote the mean total sum of squares. For testing and homogeneity of the factor means, the test statistic is

(a) MSE / MST

(b) MSE / MTS

(c) MST / MTS

(d) MST / MSE

Answer: (d)

48. Suppose two distributions have the same mean, same standard deviation and are equally skewed, but the first distribution is more peaked than the other. This feature of the frequency distributions in which they are different are called :

(a) Central Tendency

(b) Dispersion

(c) Symmetry

(d) Kurtosis

Answer: (d)

49. In ANOVA for testing the equality of group means, one conducts
(a) standard normal test
(b) chi-square test
(c) T-test
(d) F-test
Answer: (d)

50. If $P(A \cap B) = 1/2$, $P(Ac \cap Bc) = 1/2$ and $2P(A) = P(B) = p$, then the value of p is :
(a) 1/4
(b) 1/2
(c) 1/3
(d) 2/3
Answer: (d)

51. Ratio to trend method for seasonal indices provide good results if:
(a) the periods are given six monthly
(b) the periods are of short duration
(c) the periods are of long duration
(d) All of the options
Answer: (b)

52. In a class, there are 25 students whose average a decreases by 3 months when one student aged 22 years is replaced by a new student. The ag the new student is :
(a) 16 Yrs 2 months
(b) 20 Yrs 5 months
(c) 15 Yrs 9 months
(d) 18 Yrs 3 months
Answer: (c)

53. Based on results of 2 way ANOVA, the SSE was computed to be 139.4. If we ignore one of the factors and perform one way ANOVA using the same data, SSE will :
(a) increase
(b) decrease
(c) remain same
(d) Either (A) or (B)
Answer: (a)

54. If the annual trend of production (Y) of a certain commodity in a factory with origin 2,000 and X unit = one year is Y= 148.8 + 7.2X Then the monthly trend equation is :
(a) Y = 12.4 + 0.05X
(b) Y = 12.4 + 0.6X
(c) Y = 148.8 + 0.6X
(d) None of the options
Answer: (a)

55. If A1, A2 and A3 are three independent events with P(A1) = 1/3, P(A2) = 1/4 and P(A3) = 2/5, then the probability that exactly one of the events occurs is :

(a) 3/20

(b) 1/10

(c) 9/20

(d) 3/10

Answer: (c)

56. If the trend line with 2008 as origin is Y= 20.6 + 1.68X, then the trend line with 2004 as origin is :

(a) Y = 34.61 + 1.68X

(b) Y = 20.6 + 6.72X

(c) Y = 13.88 + 1.68X

(d) None of the options

Answer: (c)

57. Moments are statistical constants from which we can find the different features of a distribution. Which one of the following is INCORRECT ?

(a) First Central Moment is the mean.

(b) Second Central moment is the variance.

(c) Second and Central Moments are needed to find skewness.

(d) Second and fourth central moments are needed to find the kurtosis.

Answer: (a)

58. If the equation of exponential trend with 2004 as origin is Y= 20(1.5)x , Then equation of the exponential trend with 2006 as origin is :

(a) Y = 20(1.5)x

(b) Y = 45(1.5)x

(c) Y = 8.89(1.5)x

(d) Y = 20/(1.5)x

Answer: (b)

59. A closet contains 8 pairs of shoes. If 4 shoes are chosen at random, then the probability that all the four shoes are of the same type (left or right) is :

(a) 1/13

(b) 2/13

(c) 3/13

(d) 4/13

Answer: (a)

60. Demand for seats in a university is at its highest in the fall; demand also trends to grow and fall off in 25 year waves. In time service forecasting, the former demand characteristic would be called_____ and the latter would be called _____.

(a) seasonality; cyclicality

(b) cyclicality; seasonality

(c) randomality; seasonality

(d) seasonality; variability

Answer: (a)

61. Fill up the blank: The secular trend is the part of time points where more or less regular and _____ is observed showing either the tendency of growth or decline.

(a) long-term movement

(b) short-term movement

(c) oscillatory movement

(d) None of the options

Answer: (a)

63. In a multiplicative time series model, the seasonal indices computed by the ratio-to-trend method

(a) are alternate in sign

(b) add to 0

(c) add to 1

(d) multiply to 1

Answer: (d)

64. For two equally likely, exhaustive and independent events A and B, $P(A \cap B)$ is :

(a) 0

(b) 1

(c) 0.5

(d) 0.25

Answer: (d)

65. To remove quadratic trend from an additive time series, differencing :

(a) cannot be used.

(b) should be used once.

(c) should be used twice.

(d) should be used at least three times.

Answer: (c)

66. For four observations -1, 0, 1, 4, the measure of kurtosis equals

(a) 1

(b) 2

(c) 3

(d) 4

Answer: (b)

67. In multiplicative model of time series: Xt= Tt x St x Ct x It, where Tt , St , Ct , It are trend, seasonal, cyclical and irregular components, what can be said about the values of It?

(a) It is a random positive quantity

(b) It is a random negative quantity

(c) It is non-random positive real quantity

(d) It is a non-random negative quantity

Answer: (a)

68. Let A and B be the two possible outcomes of an experiment and suppose P(A) = 0.4, P(A U B) = 0.7 and P(B) = p, for what choice of p, A and B independent?

(a) 0.2

(b) 0.3

(c) 0.4

(d) 0.5

Answer: (d)

70. If the arithmetic mean is 26.8 and the median is 27.9, then the mode is :

(a) 27.3

(b) 29.3

(c) 30.1

(d) 27.4

Answer: (c)

71. In time series analysis which source of variation can be estimated by the ratio-to-trend method:

(a) trend

(b) seasonal variation

(c) seasonal index

(d) cyclical fluctuations

Answer: (c)

72. The probability that a contractor gets a plumbing contract is 2/3 and the probability that he will not get an electric contract is 5/9. If the probability of getting at least one contract is 4/5, then the probability that he will get both the contracts is :

(a) 13/45

(b) 14/45

(c) 16/45

(d) 17/45

Answer: (b)

74. If the actual values in time series from 2000 to 2006 are 77, 88, 94, 85, 91, 98 and 90 and the equation of the trend line with 2003 as origin is Y = 89 + 2X , then in case of multiplicative model, the trend eliminated values are :

(a) 0.93, 1.04, 1.08, 0.96, 1.0, 1.05, 0.95

(b) 1.08, 0.96, 0.92, 1.04, 1.0, 0.95, 1.05

(c) 0.93, 0.96, 1.08, 1.04, 1.0, 0.95, 1.05

(d) None of the options

Answer: (a)

75. A and B are two independent events in a given sample space and the probability that both A and B occur is 0.16 while the probability that neither occurs is 0.36, then P(A) and P(B), respectively are :

(a) 0.6, 0.6

(b) 0.8, 0.2

(c) 0.4, 0.4

(d) 0.9, 0.4

Answer: (c)

76. Link relatives in a time series remove the influence of :

(a) trend

(b) cyclic variation

(c) irregular variation

(d) All of the options

Answer: (a)

78. Let E and F be two events with P(E) > 0, P(F|E) = 0.3 and P(E ∩ Fc) = 0.2. Then P(E) equals:

(a) 1/7

(b) 2/7

(c) 4/7

(d) 5/7

Answer: (b)

79. If the trend equation fitted from a data on production (y in kg) of a fertilizer factory is 26y = 5335 + 624t, where time(t) has unit 1 year. Then monthly increase in production of fertilisers (in kg) is:

(a) 5335

(b) 5335/26

(c) 624

(d) 2

Answer: (d)

80. The probability that an urn containing 5 balls contains only white balls if the first two balls drawn from it were found to be white is :

(a) 1/20

(b) 1/10

(c) 1/2

(d) 1/4

Answer: (c)

81. Suppose owing to increased prices, a consumer reduces consumption of all commodities by 10% compared to the previous year. If IL and IP are the Laspeyres' and Paasche's price indices for the current year with the previous year as base, then

(a) IP= 0.9 X IL

(b) IL= 0.9 X IP

(c) IP X IL = 0.9 X (100)2

(d) IP = IL

Answer: (d)

82. The standard deviation of a distribution is 5. The value of the fourth central moment, in order that the distribution be mesokurtic, should be :

(a) equal to 3

(b) greater than 1875

(c) equal to 1875

(d) less than 1875

Answer: (c)

83. If 'I' represents a cost of living index, the[illegible]rchasing power of money is proportional to

(a) I

(b) I2

(c) √I

(d) 1/ I

Answer: (d)

84. The system of combining two or more overlapping series of index numbers to obtain a single continuous series is called

(a) Base shifting

(b) Splicing

(c) Deflating

(d) None of the options

Answer: (b)

85. The formula for calculating an index number should be such that it gives the same ratio between one point of comparison and the other, no matter which of the two is taken as the base or putting it another way, the index number reckoned forward should be reciprocal of the one reckoned backwards'- which test of consistency of index number is this ?

(a) Unit Test

(b) Time Reversal Test

(c) Circular Test

(d) Factor Reversal Test

Answer: (b)

86. Event S and T are independent with $P(S) < P(T)$, $P(S \cap T) = 6/25$ and $P(S|T) + P(T|S) = 1$. Then $P(S)$ is :

(a) 6/25

(b) 3/5

(c) 1/5

(d) 2/5

Answer: (d)

87. Initially there are 9 workers, all being paid a uniform wage. Later a 10th worker is added whose wage rate is Rs 20 less than for the others. The average wage gets :

(a) decreased by Rs 20 20

(b) decreased by Rs 10 10

(c) remains unchanged

(d) decreased by Rs 2 2

Answer: (d)

90. For a frequency distribution of a variable x, mean = 32, median = 30. The distribution is :

(a) Positively skewed

(b) Negatively skewed

(c) Mesokurtic

(d) Platykurtic

Answer: (a)

91. It is known from past experience that in a certain plant there are on the average 4 industrial accidents per month. The probability that in a given month there will be less than 4 accidents is : (e-4 = 0.0183)

(a) 0.398

(b) 0.433

(c) 0.442

(d) 0.465

Answer: (b)

94. In a negatively skewed distribution

(a) Mean > Mode > Median

(b) Mode > Median > Mean

(c) Mean > Median > Mode

(d) Mode < Median > Mean

Answer: (b)

95. Let x ~ Binomial (5,0.6) and Y ~ Poisson (2) be independent. Then P(xy = 0) equals :

(a) e-2. (0.4)5

(b) e-2 + (0.4)5

(c) e-2 + (0.4)5- e-2. (0.4)5

(d) e-2. (0.6)5 + (1-e-2)(0.4)5

Answer: (b)

96. The mean and standard deviation of a variable x are 36 and 4 respectively. Then the mean and standard deviation of [50 - (x/4)], respectively are :

(a) 41, 1

(b) 29, 2

(c) 40, 1

(d) 39, 4

Answer: (a)

98. If a variable has three values -k, 0 and 3k with corresponding frequencies as 3k, 2k and k respectively, then the value of coefficient of skewness b1 is :

(a) 2K

(b) 2

(c) 1/2

(d) K/2

Answer: (b)

100. If μr be the rth order central-moment of a population μ0, μ1 and μ2 are : (where, σ = standard deviation)

(a) 0, 1, σ2

(b) 1, 0, σ2

(c) 1, 1, σ

(d) 1, 0, σ

Answer: (b)

Answer key

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

Statistics

3	**(d)**	4	**(a)**	5	**(c)**	6	**(b)**	7	**(c)**	9	**(b)**	11	**(b)**	12	**(c)**
13	**(b)**	16	**(d)**	19	**(c)**	21	**(b)**	22	**(d)**	23	**(c)**	24	**(b)**	28	**(d)**
30	**(b)**	31	**(c)**	34	**(c)**	35	**(b)**	36	**(c)**	37	**(a)**	39	**(b)**	42	**(c)**
43	**(d)**	44	**(b)**	46	**(a)**	47	**(d)**	48	**(d)**	49	**(d)**	50	**(d)**	51	**(b)**
52	**(c)**	53	**(a)**	54	**(a)**	55	**(c)**	56	**(c)**	57	**(a)**	58	**(b)**	59	**(a)**
60	**(a)**	61	**(a)**	63	**(d)**	64	**(d)**	65	**(c)**	66	**(b)**	67	**(a)**	68	**(d)**
70	**(c)**	71	**(c)**	72	**(b)**	74	**(a)**	75	**(c)**	76	**(a)**	78	**(b)**	79	**(d)**
80	**(c)**	81	**(d)**	82	**(c)**	83	**(d)**	84	**(b)**	85	**(b)**	86	**(d)**	87	**(d)**
90	**(a)**	91	**(b)**	94	**(b)**	95	**(b)**	96	**(a)**	98	**(b)**	100	**(b)**		