17P/211/16

INSTRUCTIONS TO CANDIDATES

(Use only *blue/black ball-point pen* in the space above and on both sides of the Answer Sheet)

1. Within 30 minutes of the issue of the Question Booklet, check the Question Booklet to ensure that it contains all the pages in correct sequence and that no page/question is missing. In case of faulty Question Booklet bring it to the notice of the Superintendent/Invigilators immediately to obtain a fresh Question Booklet.

2. Do not bring any loose paper, written or blank, inside the Examination Hall *except the Admit Card without its envelope.*

3. *A separate Answer Sheet is given. It should not be folded or mutilated. A second Answer Sheet shall not be provided. Only the Answer Sheet will be evaluated.*

4. Write your Roll Number and Serial Number of the Answer Sheet by pen in the space provided above.

5. *On the front page of the Answer Sheet, write by pen your Roll Number in the space provided at the top and by darkening the circles at the bottom. Also, wherever applicable, write the Question Booklet Number and the Set Number in appropriate places.*

6. No overwriting is allowed in the entries of Roll No., Question Booklet no. and Set no. (if any) on OMR sheet and Roll No. and OMR sheet no. on the Question Booklet.

7. *Any change in the aforesaid entries is to be verified by the invigilator, otherwise it will be taken as unfairmeans.*

8. *Each question in this Booklet is followed by four alternative answers. For each question, you are to record the correct option on the Answer Sheet by darkening the appropriate circle in the corresponding row of the Answer Sheet, by pen as mentioned in the guidelines given on the first page of the Answer Sheet.*

9. For each question, darken only one circle on the Answer Sheet. If you darken more than one circle or darken a circle partially, the answer will be treated as incorrect.

10. *Note that the answer once filled in ink cannot be changed. If you do not wish to attempt a question, leave all the circles in the corresponding row blank (such question will be awarded zero marks).*

11. For rough work, use the inner back page of the title cover and the blank page at the end of this Booklet.

12. Deposit only **OMR Answer Sheet** at the end of the Test.

13. You are not permitted to leave the Examination Hall until the end of the Test.

14. If a candidate attempts to use any form of unfair means, he/she shall be liable to such punishment as the University may determine and impose on him/her.

Total No. of Printed Pages : 32

[उपर्युक्त निर्देश हिन्दी में अन्तिम आवरण पृष्ठ पर दिये गए हैं]

17P/211/16

ROUGH WORK
रफ़ कार्य

No. of Questions : 120

Time : 2 Hours

Full Marks : 360

Note : (1) Attempt as many questions as you can. Each question carries 3 (Three) marks. *One mark will be deducted for each incorrect answer.* Zero mark will be awarded for each unattempted question.

(2) If more than one alternative answers seem to be approximate to the correct answer, choose the closest one.

01. Which of the following is nominal variable :

(1) Blood sugar level

(2) Blood Group (A,B,O & AB)

(3) Severity of pain

(4) Area of residence (rural, semi-rural & urban)

02. The quantitative variables, such as weight, cholesterol, blood pressure, etc that take numerical values in range, are called :

(1) Ordinal

(2) Nominal

(3) Continuous

(4) Discrete

03. Quantitative data can be best represented by :

(1) Pie chart

(2) Pictogram

(3) Histogram

(4) Bar diagram

04. Mean and standard deviation, can be worked out only if data are on :

(1) Interval/ratio scale

(2) Nominal scale

(3) Ordinal scale

(4) Dichotomous scale

3

P.T.O.

05. Arithmetic mean of 10 observations is 25, but later, it is detected that an observation of 24 was wrongly written as 14. The correct arithmetic mean of the sample, shall be :

(1) 24.5   (2) 25.5   (3) 26.0   (4) 26.5

06. Arithmetic mean (A.M.) and median of 100 items are 50 and 52 respectively. The value of the largest item is 100. It was later detected that the largest item which was actually 110, was wrongly written as 100. The true A.M. and median are :

(1) 50.0 and 52.0   (2) 50.10 and 52.5

(3) 50.10 and 52.0   (4) 50.0 and 52.5

07. Monthly malaria incidence in a village in the year 2011 was 430, 500, 410, 160, 270, 210, 300, 350, 4,000, 430, 480 and 540. The best indicator for the assessment of the malaria incidence in the village will be :

(1) Arithmetic mean   (2) Geometric mean

(3) Harmonic mean   (4) Median

08. Arithmetic mean of the weight of 100 children is 12 kg with standard deviation of 3kg. The coefficient of variation (%) of the weight will be :

(1) 25.0%   (2) 35.0%   (3) 45.0%   (4) 55.0%

09. Root mean square deviation from mean is :

(1) Standard error   (2) Standard deviation

(3) Mean deviation from mean   (4) Variance

10. In a cross sectional study conducted at a clinic, a researcher is interested to know what proportions of patients are having T.B. and HIV. The results are given below :

HIV patients	with T.B.	With out T.B.	Total
Positive	16	4	20
Negative	24	456	480
Total	40	460	500

Point prevalence rate of T.B. is :

(1) 2.0%

(2) 4.0%

(3) 8.0%

(4) Can not be computed

11. The height of men in certain community is distributed with mean 165 cm and SD 13.5 cm. Then 95.0% of these men will have their heights between :

(1) 160 cm and 170 cm

(2) 138 cm and 192 cm

(3) 124.5 cm and 205.5 cm

(4) 155 cm and 175 cm

12. If the two lines of regression coincide, then simple correlation coefficient (r) will be :

(1) $r = +1$ or $r = -1$

(2) $r = 0$

(3) $r = 0.5$

(4) $-1 < r < +1$

5

13. Simple correlation coefficient (r) between two variables X & Y is 0.63. All values of X as well as Y are multiplied by a non zero constant (say, 6). The correlation coefficient between two new variables, will be :

   (1) > 0.63

   (2) < 0.63

   (3) = 0.63

   (4) Can not be calculated

14. When height and weight in a population are perfectly correlated, the coefficient of correlation (r) is :

   (1) = + 1 or -1

   (2) < - 1

   (3) = 0

   (4) > 1

15. Degrees of freedom in a 4x4 Contingency Table for applying Chi-Square test will be :

   (1) 4   (2) 8   (3) 9   (4) 16

16. Mean Systolic BP of a group of persons was determined and after an intervention for one month, mean systolic BP of the same group was again determined. The statistical test to be applied for testing significance of intervention is :

   (1) Chi-Square test

   (2) Unpaired Student's t-test

   (3) Paired t-test

   (4) F-test

17. In one way Analysis of Variance, the underlying group means are declared significantly different :

   (1) If between group variability is small and the within group variability is large

   (2) If between group variability is large and the within group variability is small

   (3) If between group variability is equal to the within group variability

   (4) If between group variability is not equal to the within group variability

18. The mean Hb level in healthy women is 13.5g/dl with SD of 1.5/dl. The Z-Score for a woman with Hb level of 15.0g/dl will be :

    (1) 9.0   (2) 10.0   (3) 2.0   (4) 1.0

19. The equivalent Non Parametric Test for 'paired t-test' is :

    (1) Sign Test   (2) Wilcoxon Signed Rank Test

    (3) Mann Whitney U- Test   (4) Median Test

20. The mean of a sample is 230 and the standard error is 10.0. The 95% confidence limits of the mean would be :

    (1) 210-250   (2) 220-240

    (3) 225-235   (4) 230-210

21. For comparing efficacy of two drugs in a randomized trial, the test statistic has a value of 2.00 (with P > 0.05). Presume, in reality, the two drugs do not differ in efficacy. This is, therefore, an example of :

    (1) Type I error   (2) Type II error

    (3) 1-Type I error   (4) Power of the test

22. For a survey, a village is divided into 3 lanes and then each lane is independently sampled randomly. This is an example of :

    (1) Simple Random Sampling   (2) Stratified Random Sampling

    (3) Systematic Sampling   (4) Cluster Sampling

23. In a population of pregnant females, Hb (mg.%) is estimated on 100 women with a SD of 1 mg %. The standard error will be :

(1) 1.0   (2) 0.1   (3) 0.01   (4) 10.0

24. Which of the following is a parametric test ?

(1) U test   (2) Student's t-test

(3) Sign test   (4) Wilcoxon Rank Sum test

25. Specificity is related to :

(1) True positive   (2) True Negative

(3) False positive   (4) False Negative

26. In a population with 10,000 individuals, Crude Birth Rate is 36/1,000. There are 5 maternal deaths in the population. The Maternal Mortality Rate, will be :

(1) 36.5   (2) 13.9   (3) 20.0   (4) 5.0

27. Denominator of the Crude Birth Rate is :

(1) Mid year population

(2) Total no. of deaths

(3) Women with child bearing age

(4) Total no. of eligible couples

28. The socio-economic status of the community is best reflected by :

(1) Infant mortality rate
(2) Under 5 mortality rate
(3) Maternal mortality rate
(4) Peri-natal mortality rate

29. An investigator wants to select 5% (1 in 20) sample of the households in a village, consisting of 100 households. He decides to select a random number between 1 and 20 and then, every 20 person thereafter. If 13 was the person selected at random, then selected sample would comprise of :

(1) 13, 18, 23, 28, 33 etc
(2) 13, 23, 33, 43, 53 etc
(3) 13, 33, 53, 73, 93 etc
(4) 13, 28, 43, 58, 73 etc

30. An investigator wants to draw a random sample to ensure proper representation of men and women of the population. What sampling method would he use ?

(1) Simple random sampling
(2) Systematic sampling
(3) Cluster sampling
(4) Stratified random sampling

31. A group of public health persons wish to study the prevalence of HIV/AIDS in the State of U.P. As it is impossible to survey every person of the State and so, the State was divided into different geographically regions-districts, talukas, villages and households. The research team wants to have a sampling scheme, representing all above 4 levels-districts, talukas, villages and households. The sampling scheme appropriate for the purpose-ensuring representation of entire State would be :

(1) Simple random sampling
(2) Stratified random sampling
(3) Multi stage sampling
(4) Cluster sampling

32. A person chose to conduct a study in a school, known for its effectiveness as measured by the standardized test scores. For selecting such a school, which type of sampling should he use ?

(1) Quota sampling
(2) Convenience sampling
(3) Random sampling
(4) Purposive sampling

33. Mortality Rate amongst patients suffering from a particular disease was found to be 3/1,000. In studying expected no. of deaths from this disease in a population of 10,000 of such patients, distribution of mortality is likely to be :

(1) Normal
(2) Binomial
(3) Chi-square
(4) Poisson

34. In Binomial distribution :

(1) Always, mean = variance
(2) Always, mean < variance
(3) Always, mean > variance
(4) none

35. In Multiple Regression Analysis, the number of dependant variables should be :

(1) Two
(2) Three
(3) One
(4) Multiple

36. For testing the significance of difference amongst heights of school children in 3 socio-economic groups, the most appropriate statistical test is :

(1) Student's t-test
(2) Chi-square test
(3) paired t-test
(4) One Way Analysis of Vaiance

37. An Investigator chooses to use existing medical records which go back in time to several years, to identify women exposed and not exposed to the assisted reproductive technologies, to find out effect of these technologies on stemming multiple births. This type of study is called :

    (1) Cohort study   (2) Case control study

    (3) Retrospective cohort study   (4) Historical study

38. A cohort study was conducted to find out the relationship between birth-weight and respiratory diseases. A group of 400 low birth-weight babies were compared to another group of 400 healthy babies. Over 15 years of follow-up, 80 out of 400 low birth – weight babies had respiratory diseases. Twenty out of 400 healthy babies had respiratory diseases. The relative risk of respiratory diseases in the low birth – weight babies, is : ·

    (1) 2   (2) 3   (3) 4   (4) 5

39. In a case control study of risk factors for Schizophrenia, genetic factors were present in 15 out of 100 cases and 10 out of 200 controls. The odds ratio (OR) for exposure is :

    (1) 15/100   (2) (15/100)/(10/200)

    (3) (15/85)/(10/190)   (4) (15/100)/85/100)

40. The 95% Confidence Interval (CI) of Relative Risk (RR) or Odds Ratio (OR) is considered statistically significant when :

    (1) CI does not include 0

    (2) CI includes 1

    (3) CI does not include any negative number

    (4) CI does not include 1

41. In an attempt to study the effect of two drugs in reducing the blood sugar, an Investigator administered Drug I to the first half of the patients and Drug II to the other half of patients. After noting the responses, he administered the Drug II to the first half of the patients and drug I to the other half of the patients. Presuming that the gap in the usage of the two drugs was sufficient to was out the effect of the previous drug, the study design used above is known as :

(1) Cross-over design   (2) Cohort study

(3) parallel design   (4) Case control design

42. The screening results of a diagnostic test and the true disease status are given in the following table in which letters a, b, c, d represent numbers.

Screening results of diagnostic test	True disease status		Total
	Diseased	Non-diseased	
Positive	a	b	a + b
Negative	c	d	c + d
Total	a+c	b+d	a+b+c+d

Here, (a+d)/(a+b+c+d) is called :

(1) Precision   (2) Accuracy

(3) Reliability   (4) None of the above

43. The unique feature of the survival analysis is :

(1) Analysis of variable which is time to event

(2) Underlying time to event variable is always non negative

(3) Analysis of censored data

(4) End point is always death

44. The Kaplan-Meier estimates are used :

(1) When the hazard rates have to be estimated

(2) When the survival probabilities are steadily decreasing

(3) To estimate regression coefficients in the Cox's regression

(4) To calculate the survival probabilities when the censorship is present

45. If 78 of 236 patients, followed for mortality after renal transplant, survived after 26 months and 62 patients survived up to 27 months, then the hazard rate at 26th month is :

(1) 0.2051

(2) 0.2627

(3) 0.7949

(4) 0.3305

46. The Logrank test is used when :

(1) Survival functions for two treatment are compared

(2) There is no censorship present

(3) No. of patients in the two treatment groups are unequal

(4) The hazard is not constant over time

13

47. A clinical trial is considered double blind when :

    (1) Patients and investigators are blinded

    (2) Patients and outcome assessors are blinded

    (3) Investigator and outcome assessors are blinded

    (4) Patients, investigator and outcome assessors are blinded

48. For a qualitative dependent variable (say, patients' prognosis : improved/not improved) with several independent variables (e.g., socio-economic status, severity of disease, diet –groups etc), multivariate analysis to be used to identify the role of independent variables, contributing significantly towards the prediction of patients' prognosis, is called as :

    (1) Factor analysis

    (2) Logistic regression analysis

    (3) Multiple linear regression analysis

    (4) Cluster analysis

49. for a quantitative dependent variable (say, diastolic BP after treatment in hypertensive patient) with many independent variables (e.g., age, height, BMI, serum cholesterol etc), the multivariate analysis to be used to indentify the role of significant independent variables, is known as :

    (1) Logistic regression analysis

    (2) Multiple linear regression analysis

    (3) Discriminant analysis

    (4) Survival analysis

50. For lung cancer, if Odds Ratio (OR) amongst smokers is 4.3, compared to non- smokers, it means :

(1) Risk of lung cancer in non-smokers is 4.3 times more than smokers

(2) Risk of lung cancer in smokers is 4.3 times more than non-smokers

(3) Risk of lung cancer in smokers is 4.3 times less than non-smokers

(4) Risk of smoking who did not have lung cancer is 4.3 times more than those who have this disease

51. In a study of ability of rapid antigen test to diagnose strep pharyngitis, 90% of patients with strep pharyngitis have a positive rapid antigen test (true positive), while only 5% of those without strep pharyngitis, have a positive test (false positive). The likelihood ratio for positive (LR+) test for the ability of rapid antigen test to diagnose strep phyaryngitis is :

(1) 5/90   (2) 90/5   (3) 10/95   (4) 95/10

52. The sampling errors are due to :

(1) Inadequate sample size only

(2) Use of incorrect sampling method only

(3) Inadequate size of sample as well as use of incorrect sampling method

(4) Observational and analytical lapses that occur during data collection and analysis

53. A drug company is developing a new pregnancy test-kit for use in an out-patient basis. Company uses pregnancy test on 100 women who are known to be pregnant and out of these 100 women, 99 showed positive values. Upon using the same test on 100 non-pregnant women, 90 showed negative result. The sensitivity of the test is :

(1) 90%   (2) 99%   (3) 10%   (4) 100%

54. In a clinical trial-comparing efficacy of new drug with that of a standard drug, apart from the rough estimates of efficacy with new as well as standard drug from previous studies, estimation of minimum sample size also depends on :

(1) Type I error alone   (2) Type II error alone

(3) Type I & II errors   (4) None of the above

55. The Mann-Whitney U- Test is also called :

(1) Kruskal-Wallis test   (2) Wilcoxon Signed Rank test

(3) Wilcoxon Rank Sum test   (4) Friedman's test

56. Registrar General of India is responsible for :

(1) Census

(2) National Family Health Survey

(3) Medical research

(4) Medical education

57. In statistical literature data are broadly classified as interval scale data, ordinal scale data & categorical data. Blood groups will be an example for :

(1) Interval scale data   (2) Ordinal scale data

(3) Nominal scale data   (4) None of the above

58. For a country a sex ratio more than 1000 means, country is :

(1) Under developed   (2) Developing

(3) Developed   (4) Can't be decided

59. In a normal (Gaussian) curve, the area between 2 SD from mean on either side is :

(1) 68 %   (2) 95%

(3) 99%   (4) None of the above

60. Histogram is made for :

(1) Dichotomous data

(2) Ordinal data

(3) Quantitative discrete data

(4) Quantitative continuous data

61. If Hb level of healthy women has mean 13.5 gm% with SD 1.5gm.%, what would be the Z score for a woman with Hb level 15.0 gm% ?

(1) 1.5   (2) 11.5   (3) 10.5   (4) 1.0

62. For a Gaussian distribution all of the following are true except :

    (1) Mean, median and mode are same

    (2) It can have two modes

    (3) Bell shaped

    (4) Mean ± 2Sd includes nearly 95% observations

63. For 70 smokers, the age at start of smoking was reported ranging from 15 years to 22 years with only one person reporting 22 years. The person starting smoking at age 22 years was removed and was replaced by another person starting smoking at age 24 years. This will change :

    (1) Mean age at start of smoking

    (2) Median age at start of smoking

    (3) Modal age at start of smoking

    (4) None of the above.

64. The range of regression coefficient is :

    (1) Between 0 and + 1   (2) Between -1 to + 1

    (3) Between -1 to 0   (4) Between $-\infty$ to $+\infty$

65. The HDL = a + b (calorie intake) + c (level of physical activity) is an example of :

    (1) Simple linear regression

    (2) Simple curvilinear regression

    (3) Multiple linear regression

    (4) Multiple curvilinear regression

66. In a sample of 50 men who had myocardial infarction, the mean CPK level is 280 u/I and the SD is 18 u/I. The standard error of mean would be :

(1) 280/18

(2) $18/\sqrt{50}$

(3) 18/50

(4) $280/\sqrt{18}$

67. If a 95% confidence interval for prevalence of tuberculosis is 2.4% to 3.7%, the chance that the prevalence could be less than 2.4 is :

(1) 10%

(2) 5%

(3) 2.5%

(4) The information is insufficient

68. Which of the following formula to calculate confidence interval of mean of 500 observations will be used ?

(1) Mean $+Z_a$ SD/$\sqrt{n}$

(2) Mean $\pm Z_{a/2}$ SD/$\sqrt{n}$

(3) Mean $\pm Z_a$ SD^2/$\sqrt{n}$

(4) Mean $\pm Z_{a/2}$ SD/n

69. The probability of committing type II error in the experiment decides :

(1) P value

(2) Level of significance

(3) Power of the test

(4) None of the above

70. If two samples are drawn from two non Gaussian population, to test that the two population's distribution is similar or different, one should apply :

(1) Unpaird t test

(2) Wilcoxon sign rank test

(3) Mann Whitney test

(4) None of the above

P.T.O.

71. If the probability to solve a problem by A is 1/2 and by B is 3/4, what would be probability that the problem will not be solved ?

    (1) 1.0000   (2) 0.3750

    (3) 0.1250   (4) 0.5623

72. In rating the service provided by a waiter/waitress, the following responses are possible : excellent, above average, average, below average, and poor. The responses are coded from 1 to 5 with 5 being excellent. These observations are on the :

    (1) Nominal scale   (2) Ordinal scale

    (3) Interval scale   (4) Ratio scale

73. The relative frequency for a class in a frequency distribution is calculated by :

    (1) Dividing the frequency of the class by the number of classes

    (2) Dividing the frequency of the class width

    (3) Dividing the frequency of the class by the total number of observations in the data set

    (4) Subtracting the lower limit of the class from the upper limit and multiplying the difference by the number of classes

74. Consider these three variables ; (i) whether you are a SA citizen (ii) your marital status (iii) the time it took you to get to UCT this morning. In the order given, these variables are :

    (1) nominal, interval, interval   (2) interval, interval, nominal

    (3) nominal, interval, nominal   (4) nominal, nominal, interval,

75. If three numbers x, y, z are such that $x + y + z = 98$, $x : y :: 2:3$ and $y:z::5:8$. Then the average of x and z are :

(1) 30   (2) 32   (3) 34   (4) 39

76. If average of 5 consecutive numbers is 30, what will be the difference between the smallest and the largest numbers ?

(1) 40

(3) 240

(2) 140

(4) Data is insufficient

77. If both the mean and variance of five given numbers are 10 and 0 respectively. Then the mean and variance of first and last numbers respectively are :

(1) 0 and 0

(3) 10 and 10

(2) 10 and 0

(4) Data is insufficient

78. For any finite distribution, the most justified relation between standard deviation σ and range R is :

(1) $\sigma \le R/2$

(3) $\sigma \doteq R/2$

(2) $\sigma \ge R/2$

(4) $\sigma = R$

79. If $P(A) = 0.7$, $P(B) = 0.6$, then which of the following statements is always true about $P(A/B)$

(1) 0.7

(3) ≤ 0.5

(2) ≥ 0.5

(4) 0.6

80. A die is thrown as long as necessary for a 4 to turn up. Given that the 4 does not turn up at the first throw, find the probability that more than four throws will be necessary :

(1) 125/216

(3) 215/216

(2) 91/216

(4) 1/216

81. The suitable formula for computing the number of classes is :

    (1) 3.322 logN
    (2) 0. 322 logN
    (3) 1+3. 322 logN
    (4) 1-3. 322 logN

82. A source note in a statistical table is given :

    (1) At the end of a table
    (2) In the beginning of a table
    (3) In the middle of a table
    (4) Below the body of a table

83. In a statistical table, column captions are called :

    (1) Box head
    (2) Stub
    (3) Body
    (4) Title

84. The headings of the rows of a table are called :

    (1) Prefatory notes
    (2) Titles
    (3) Stubs
    (4) Captions

85. The suitable diagram to represent the data relating to the monthly expenditure on different items by a family is :

    (1) Historigram
    (2) Historgam
    (3) Multiple bar diagram
    (4) Pie diagram

86. The historigram is the graphical presentation of data which are classified :

    (1) Geographically
    (2) Numerically
    (3) Qualitatively
    (4) According to time

87. Cumulative frequency polygon can be used for the calculation of :

    (1) mean
    (2) Median
    (3) Mode
    (4) Geometric mean

88. Which of the following values of Pearsonian coefficient of correlation r_{xy} depicts weakest linear relationship between x and y variables :

    (1) - 0.9
    (2) 0
    (3) 0.5
    (4) can not say

89. The value we would predict for the dependent variable when the independent variables are all equal to zero is called :

    (1) Slope
    (2) Sum of residual
    (3) Intercept
    (4) can not say

90. The predicted rate of response of the dependent variable to changes in the independent variable is called :

    (1) Slope
    (2) Intercept
    (3) Error
    (4) Regression equation

91. The independent variable is also called :

    (1) Regressor
    (2) Regressand
    (3) Predictand
    (4) Estimated

92. Regression coefficient is independent of :

    (1) Units of measurement
    (2) Scale and origin
    (3) Both (a) and (b)
    (4) None of these

93. If $r_{xy} = 0.75$, then correlation coefficient between $u = 1.5\,X$ and $v = 2Y$ is :

    (1) 0   (2) 0.75   (3) -0.75   (4) 1.543

94. On what is the width of the confidence interval estimate for the predicted value of Y dependent ?

    (1) The standard error of the estimate

    (2) Sample size

    (3) The value of X for which the prediction is being made

    (4) All the options are correct

95. In a study, the data was taken from the RBI reports. What kind of data is this ?

    (1) Primary

    (2) Secondary

    (3) Both

    (4) Neither primary nor secondary

96. For fitting a regression line one uses the method of least squares which minimizes the sum of squared difference between :

    (1) Predicted y and actual y

    (2) Predicted y and mean y

    (3) predicted x and actual x

    (4) predicted (x,y) and(mean x, mean y)

97. Simple linear regression involves the use of a :
    (1) single numerical independent variable to predict the numerical dependent variable
    (2) single categorical independent variable to predict the numerical dependent variable
    (3) single numerical independent variable to predict the categorical dependent variable
    (4) single categorical independent variable to predict the categorical dependent variable

98. When using a simple regression model, extrapolating the linear relationship between X and Y is acceptable under what conditions ?
    (1) Extrapolation is acceptable only when predicting Y using values of X that are "above" the maximum value found in the sample from which the model was derived.
    (2) Extrapolation is acceptable only when predicting Y using values of X that are either "above" the maximum or "below" the minimum value found in the sample from which the model was derived
    (3) Extrapolation is acceptable only when predicting Y using values of X that are "below" the minimum value found in the sample from which the model was derived
    (4) Extrapolation is never acceptable

99. To meet the assumptions for simple linear regression, what type of relationship should be observed between the residual values and values of X ?
    (1) if the linear model is appropriate for the data, there should be no apparent relationship between the residual values and values of X
    (2) a statistically significant positive slope (i.e., positive correlation) should be found between the residual values and values of X.
    (3) A moderately positive slope (ie.e, positive correlation) should be found between the residual values and values of X
    (4) a moderately negative slope (i.e., negative correlation) should be found between the residual values and values of X

100. The Y intercept in a line represents the :

    (1)   predicted y at x = 0

    (2)   predicted y

    (3)   variation over y axis

    (4)   estimated change in y against unit change in x

101. The slpoe represents :

    (1)   predicted y

    (2)   the estimated change in average Y per unit change in X

    (3)   predicted y at x = 0

    (4)   variation around the line of regression

102. 5 cards are selected randomly from a well shuffled deck of 52 cards. What is the probability of these 5 cards to be in sequence and from the same suit ?

    (1) $^{10}C_5/^{52}C_5$ (2) $40/^{52}C_5$

    (3) $^{13}C_5/^{52}C_5$ (4) $^{4}C_1/^{52}C_5$

103. What is the probability that a 5 digit number randomly formed by using 0,1,3,5,7 (without repetition) is divisible by 4

    (1)   0   (2)   1/5   (3)   5/16   (4)   1

104. Which of the following relations is always true for two random variables X and Y with finite means :

    (1) $E[\max(X,Y) \leq \max[E(X), E(Y)]$

    (2) $E[\max(X,Y)+\min(X,Y)] \leq \max[E(X), E(Y)]$

    (3) $E[\max(X,Y)+\min(X,Y)] = [E(X)+ E(Y)]$

    (4) $E[\max(X,Y)+\min(X,Y)] > [E(X)+ E(Y)]$

105. For some data on variate X, Pearson's coefficient of Kurtosis $\beta_2 = 1$ means :

(1) X assumes only one value with certainty

(2) X assumes only equi-probable values

(3) X may take any value but they should be equi-probable

(4) cannot say anything

106. The maximum variance possible for a bino(n.p) population is:

(1) np (1-p)   (2) np

(3) n(1-P)   (4) n/4

107. A Poisson population has a double mode at $x = 1$ and $x = 2$. What is the probability that x will take value either 1 or 2 ?

(1) $2/e^2$ (2) $4/e^2$

(3) $2/e^4$ (4) $4/e^2$

108. For an exponential population :

(1) mean < median   (2) median < mean

(3) mean = median / 2   (4) all the three are possible

109. All of the following options support the probability statement P(AB) = P (A). except :

(1) $B = \Omega$ (2) $A = \phi$

(3) $A = B$ (4) $B \supset A$

110. In analyzing categorical data, the following graphical device is NOT appropriate :

(1) Pie chart   (2) Bar chart

(3) Pareto diagram   (4) Stem and leaf display

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111. Which of the following should be used to represent the previous censuses of India :

   (1) pi chart   (2) circular diagram
   (3) Rectangular diagram   (4) Simple bar diagram

112. Which of the following will be used to identify the average income of an Indian :

   (1) Histogram   (2) Frequency polygon
   (3) Frequency curve   (4) Ogive

113. The mean of two numbers is xy. If one of these number is x then their median is :

   (1) (3xy – x)/2   (2) xy-x
   (3) 2xy-x   (4) xy

114. The mean of first three number and last three numbers of four given numbers is 30 and 40 respectively. If last number is 50, then the mean of first number and last number is :

   (1) 20   (2) 25   (3) 30   (4) 35

115. The algebraic sum of the deviations of 20 observations measured from 30 is 2. If this distribution is symmetric then its median is :

   (1) 15.1   (2) 30.1
   (3) 40.1   (4) Information is insufficient

116. Let a random variable X be normally distributed with a mean and variance both equal to 100. The value of mean deviation about mode is approximately equal to :

   (1) 6   (2) 7
   (3) 8   (4) Information is insufficient

117. A random variable X has a normal distribution with the mean $\mu=4$. If 84% of the area under the curve lies to the left of X = 5, the area below x = 3 is :

(1) 84%   (2) 34%   (3) 16%   (4) Zero

118. Let a random variable X be normally distributed with a mean and variance both equal to 100. Then third and fourth central moments respectively, are :

(1) (10, 30)   (2) (0, 30)   (3) (10, 300)   (4) (0, 300)

119. For a standard normal variate X, P [X > 1.96] is :

(1) 0.95   (2) 0.5   (3) 0.05   (4) 0.025

120. Let the random variable X follows an exponential distribution with mean 10. Then P(X >30/X > 10) equals :

(1) $1 - \exp(-2)$ (2) $\exp(-2)$

(3) $\exp(-3)$ (4) 1/10

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ROUGH WORK
रफ़ कार्य

ROUGH WORK
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अभ्यर्थियों के लिए निर्देश

(इस पुस्तिका के प्रथम आवरण पृष्ठ पर तथा उत्तर-पत्र के दोनों पृष्ठों पर
केवल नीली-काली बाल-प्वाइंट पेन से ही लिखें)

1. प्रश्न पुस्तिका मिलने के 30 मिनट के अन्दर ही देख लें कि प्रश्नपत्र में सभी पृष्ठ मौजूद हैं और कोई प्रश्न छूटा नहीं है। पुस्तिका दोषयुक्त पाये जाने पर इसकी सूचना तत्काल कक्ष-निरीक्षक को देकर सम्पूर्ण प्रश्नपत्र की दूसरी पुस्तिका प्राप्त कर लें।

2. परीक्षा भवन में *लिफाफा रहित प्रवेश-पत्र के अतिरिक्त,* लिखा या सादा कोई भी खुला कागज साथ में न लायें।

3. *उत्तर-पत्र अलग से दिया गया है। इसे न तो मोड़ें और न ही विकृत करें। दूसरा उत्तर-पत्र नहीं दिया जायेगा। केवल उत्तर-पत्र का ही मूल्यांकन किया जायेगा।*

4. अपना अनुक्रमांक तथा उत्तर-पत्र का क्रमांक प्रथम आवरण-पृष्ठ पर पेन से निर्धारित स्थान पर लिखें।

5. *उत्तर-पत्र के प्रथम पृष्ठ पर पेन से अपना अनुक्रमांक निर्धारित स्थान पर लिखें तथा नीचे दिये वृत्तों को गाढ़ा कर दें। जहाँ-जहाँ आवश्यक हो वहाँ प्रश्न-पुस्तिका का क्रमांक तथा सेट का नम्बर उचित स्थानों पर लिखें।*

6. ओ० एम० आर० पत्र पर अनुक्रमांक संख्या, प्रश्नपुस्तिका संख्या व सेट संख्या *(यदि कोई हो)* तथा प्रश्नपुस्तिका पर अनुक्रमांक और ओ० एम० आर० पत्र संख्या की प्रविष्टियों में उपरिलेखन की अनुमति नहीं है।

7. *उपर्युक्त प्रविष्टियों में कोई भी परिवर्तन कक्ष निरीक्षक द्वारा प्रमाणित होना चाहिये अन्यथा वह एक अनुचित साधन का प्रयोग माना जायेगा।*

8. *प्रश्न-पुस्तिका में प्रत्येक प्रश्न के चार वैकल्पिक उत्तर दिये गये हैं। प्रत्येक प्रश्न के वैकल्पिक उत्तर के लिए आपको उत्तर-पत्र की सम्बन्धित पंक्ति के सामने दिये गये वृत्त को उत्तर-पत्र के प्रथम पृष्ठ पर दिये गये निर्देशों के अनुसार पेन से गाढ़ा करना है।*

9. प्रत्येक प्रश्न के उत्तर के लिए केवल एक ही वृत्त को गाढ़ा करें। एक से अधिक वृत्तों को गाढ़ा करने पर अथवा एक वृत्त को अपूर्ण भरने पर वह उत्तर गलत माना जायेगा।

10. *ध्यान दें कि एक बार स्याही द्वारा अंकित उत्तर बदला नहीं जा सकता है। यदि आप किसी प्रश्न का उत्तर नहीं देना चाहते हैं, तो संबंधित पंक्ति के सामने दिये गये सभी वृत्तों को खाली छोड़ दें। ऐसे प्रश्नों पर शून्य अंक दिये जायेंगे।*

11. रफ कार्य के लिए प्रश्न-पुस्तिका के मुखपृष्ठ के अंदर वाला पृष्ठ तथा उत्तर-पुस्तिका के अंतिम पृष्ठ का प्रयोग करें।

12. परीक्षा के उपरान्त केवल *ओ एम आर उत्तर-पत्र* परीक्षा भवन में जमा कर दें।

13. परीक्षा समाप्त होने से पहले परीक्षा भवन से बाहर जाने की अनुमति नहीं होगी।

14. यदि कोई अभ्यर्थी परीक्षा में अनुचित साधनों का प्रयोग करता है, तो वह विश्वविद्यालय द्वारा निर्धारित दंड का/की, भागी होगा/होगी।