Msc. Health Stats

C-275

14P/211/5 Question Booklet No.....

(To be filled up by the candidate by blue/black ball-point pen)

Roll No. | | | | | | | | | |

Roll No.
(Write the digits in words) .....

Serial No. of OMR Answer Sheet .....

Day and Date ....
(Signature of Invigilator)

INSTRUCTIONS TO CANDIDATES

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

1. Within 10 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 also 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 unfair means.
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 ball-point 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 mark).
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 the 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.

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

[No. of Printed Pages : 32+2

No. of Questions/प्रश्नों की संख्या : 150

Time/समय : 2½ Hours/घण्टे **Full Marks/पूर्णांक :** 450

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

अधिकाधिक प्रश्नों को हल करने का प्रयत्न करें। प्रत्येक प्रश्न **3** अंक का है। प्रत्येक गलत उत्तर के लिए **एक** अंक काटा जाएगा। प्रत्येक अनुत्तरित प्रश्न का प्राप्तांक शून्य होगा।

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

यदि एकाधिक वैकल्पिक उत्तर सही उत्तर के निकट प्रतीत हों, तो निकटतम सही उत्तर दें।

1. Which of the following variables is ordinal?

(1) Age in years (0-4, 5-14, 15-49, etc.,)

(2) Type of carcinoma (breast, lung, cervix, etc.,)

(3) Likert scale (strongly agree, agree, disagree, strongly disagree)

(4) Sex (male, female)

2. Which of the following is not a discrete variable?

(1) Number of children in the family

(2) Number of relapses of a particular disease during hospital stay

(3) Number of ICU deaths in the hospital

(4) Serum albumin level

3. Which of the following is not a continuous variable?

(1) Body mass index

(2) Serum creatinine level

(3) Number of lymph nodes in a patient with breast cancer

(4) Systolic blood pressure

4. The gender of new born babies, born in a year is said to follow a binomial distribution because :

(i) Gender is dichotomous (male, female)

(ii) The occurrence of gender in each birth is independent of the other

(iii) The sex ratio remains approximately the same throughout the year

Indicate the correct option

(1) (i) and (ii) (2) (i) and (iii) (3) (ii) and (iii) (4) Only (i)

5. Which of the following does not follow a Poisson distribution?

(1) Number of children in the family

(2) Number of hospital infection in a month

(3) Number of deaths due to electric accidents

(4) Number of triplets births in a hospital in year

6. The diastolic BP of normal adults in a population is normally distributed with mean 76·5 mm Hg and SD 12·2 mm Hg. Then what proportion of the population will have their diastolic BP between 64·3 mm Hg and 88·7 mm Hg?

(1) About quarter
(2) About three quarter
(3) About two-third
(4) About half

7. Scatter diagram shows

(1) trend with the passage of time
(2) frequency distribution of a continuous variable
(3) relation between minimum and maximum values
(4) relation between two variables

8. Cumulative frequencies are represented by

(1) Histogram (2) Line diagram (3) Pictogram (4) Ogive

9. The best way to show relationship between height and weight of children in a class is

(1) Bar diagram
(2) Line diagram
(3) Scatter diagram
(4) Histogram

10. A cohort study is not a

(1) case control study
(2) follow-up study
(3) prospective study
(4) longitudinal study

11. Incidence is the number of new cases occurring in the target population in a specified period. For finding out incidence rate of diabetes in a population of age 60 years or more, we will plan

(1) prospective study
(2) [illegible]
(3) retrospective study
(4) [illegible]

12. Matching in case control studies is done to control uncertainties due to

(1) sampling fluctuation
(2) lack of statistical power
(3) loss of patients in follow-up
(4) bias due to confounders

13. Longitudinal studies

(1) are easy to conduct
(2) provide incidence of a disease
(3) are good for studying single outcome
(4) are economical

14. A case control study

(1) is done to generate a hypothesis
(2) requires large number of subjects in study and control groups
(3) cannot be retrospective
(4) is an analytical study

15. Which of the following is non-random sampling procedure?

(1) Stratified sampling
(2) Quota sampling
(3) Cluster sampling
(4) Multi-stage sampling

16. The major advantage in a probability sample compared to a non-probability sample, is that

(1) it saves time
(2) it costs less
(3) it enables to compare average value
(4) sampling error can be estimated

17. In a survey of household expenditure on health, every 4th household in each block is studied. The sampling plan will be called as

(1) simple random sampling
(2) stratified random sampling
(3) cluster sampling
(4) systematic sampling

18. The sampling plan to economize the cost in large national studies, is

(1) quota sampling
(2) multi-stage sampling
(3) simple random sampling
(4) stratified random sampling

19. The population about which we want to make inferences from sample is called :

(i) Reference population
(ii) Study population
(iii) Ideal population
(iv) Target population

Indicate the correct option

(1) (i) and (iii) (2) (ii) and (iv) (3) (i) and (iv) (4) (i), (ii) and (iii)

20. A Paediatrician wanted to estimate prevalence rate of a disease in a sample of schools, selected at random in a large city. She wanted to give effective treatment to those found ill and so, it was preferable to examine all pupils in the selected schools, rather than just a sample of them in each selected school. Which sampling method, Paediatrician should use?

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

21. A study was conducted in a sample of 106 patients to estimate the mean blood cell folate level in a community. Which of the following measures gives an idea of how precise is the estimate, i.e., the variability in estimating the actual mean folate level in community, using a sample?

(1) Standard deviation
(2) Variance
(3) Range
(4) Standard error of mean

22. The accuracy in estimating the parameter increases with

(1) decreasing sample size
(2) increasing variability
(3) increasing sample size and decreasing variability
(4) decreasing precision

23. Ten babies were born in a hospital—5 babies were $< 2 \cdot 5$ kg and 5 babies were $> 2 \cdot 5$ kg. The suitable method for computing average here is

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

24. Mean height of 10 female students of a class is 150 cm and mean height of 20 male students is 175 cm. The mean height of all 30 students of the class will be

(1) 166 (2) 168 (3) 166·6 (4) 166·8

25. Which measure of the central tendency is most suitable to determine rate of population growth?

(1) Arithmetic mean
(2) Geometric mean
(3) Harmonic mean
(4) Median

26. The geometric mean of the following set of data is

Data : 15, 23, 45, 0, 34, 10, 9

(1) 19·4 (2) 0 (3) 45 (4) 17

27. The yearly incidence of malaria cases during past 7 years has been as 250, 300, 320, 300, 5800, 290, 350. The appropriate method for computation of average yearly malaria incidence in past 7 years will be

(1) Median (2) Mode

(3) Arithmetic mean (4) Geometric mean

28. When an instrument gives same reading every time in same conditions, it is

(1) sensitive (2) accurate (3) valid (4) reliable

29. Reliability of a test does not imply

(1) reproducibility (2) validity

(3) consistency (4) repeatability

30. For confirming a disease in a patient, we will use

(1) highly sensitive test

(2) highly specific test

(3) test with high positive predictivity

(4) test with high negative predictivity

31. For comparing relative variation in Ht and Wt of children, the statistics to be calculated is called

(1) mean (2) range

(3) standard error (4) coefficient of variation

32. Mean and standard deviation of haemoglobin level in 25 sick children are 8 mg% and 2 mg% respectively. Coefficient of variation in this sample will be

(1) 16% (2) 25% (3) 4% (4) 2%

33. The proportion of children under the age of 3 years who were underweight, was 52% in the year 1988–89 in India. When the similar survey was repeated in 1992–93 the proportion had apparently decreased. What appropriate method can be used to test whether the proportion obtained later was significantly different from the former?

(1) Test for two proportions (2) Paired *t*-test

(3) Single proportion test (4) Independent samples *t*-test

34. A study on the influence of excess fruit juice was carried-out in children between 6-8 years of age to see whether their average height is increased by supplementation of reported from other studies from the same population. What appropriate method should be applied to test the influence of supplementation?

(1) Independent samples *t*-test (2) Paired *t*-test

(3) Test for difference in proportion (4) One sample *t*-test

35. To assess a new weight loss diet program, a group of 28 subjects, were weighed at the entry of study and were advised to follow a prescribed Diet Chart. At the end of 3 months, subjects who underwent weight loss diet program, were weighed again to study the effectiveness of the program. What statistical test shall be appropriate to test the above hypothesis?

(1) Two sample *t*-test (unpaired) (2) Single proportion test

(3) One sample *t*-test (4) Paired *t*-test

36. The fixed cut-off based on sample size, for applying *t*-test, is that the sample size is less than

(1) 60 (2) 2 (3) 15 (4) 30

37. The root mean square deviation is a

(1) mean deviation from median

(2) mean deviation from mean

(3) standard deviation

(4) mean deviation from any arbitrary constant

38. If each value of a variable is multiplied by a constant (which is non-zero), the standard deviation of the resultant variable will

(1) not change (2) increase (3) decrease (4) be unknown

39. Which quartile divides total frequencies in 3 : 1 ratio?

(1) First quartile (2) Second quartile

(3) Third quartile (4) Inter-quartile range

40. In a frequency curve of scores, if mode is found to be lower than mean, the distribution shall be

(1) symmetrical (2) negatively skewed

(3) positively skewed (4) normal

41. Right-sided skewed deviation causes when

(1) median is more than mean

(2) SD is more than variance

(3) frequency curve to have longer tail on right

(4) not affected at all

42. If each value of a given group of observation is multiplied by 10, then SD of the resulting observation will be

(1) original SD × 10
(2) original SD/10
(3) original SD − 10
(4) original SD as such

43. Incidence rate refers to

(1) old cases
(2) new cases
(3) existing cases
(4) Both old and new cases

44. Which of the following is not true for the Maternal Mortality Ratio?

(1) It is based on deaths of women of any age
(2) It requires no. of live births
(3) It is based on deaths of women within 6 weeks of delivery
(4) It requires an assessment of cause of death

45. Probability ranges between

(1) 1 and 2 (2) −1 and +1 (3) 0 and infinity (4) 0 and 1

46. The systolic BP in patients attending clinic was observed to have a mean of 160 mm Hg with a SD of 20 mm Hg. Assuming distribution to be normal, what proportion of patients is expected to have a systolic BP more than 140 mm Hg?

(1) 50% (2) 84% (3) 68% (4) 16%

47. It has been observed that probability of getting a boy is 0·6 and that of a girl is 0·4. For a couple who is going to have two children, the probability of getting two boys, will be

(1) 0·16 (2) 0·24 (3) 0·48 (4) 0·36

48. One-way analysis of variance is done to

(1) compare means of two groups

(2) compare means of several groups

(3) compare means of several variances

(4) compare several proportions

49. In one-way analysis of variance, underlying group means are declared significantly different if,

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

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

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

(4) between group variability is unequal to the within group variability

50. An investigator randomly assigned 10 patients to each of 4 different treatments to study their effects on diastolic BP. The F-test was used to assess the mean response between treatment groups. The degrees of freedom, attached to numerator and denominator, for the F-test, will be

(1) 3, 10 (2) 4, 9 (3) 3, 36 (4) 10, 40

51. In a standard normal curve, the area between 1 SD on either side of the mean, will be

(1) 68% (2) 85% (3) 99·7% (4) None of the above

52. In estimation of standard probability, the Z-score is applicable to

(1) normal distribution (2) skewed distribution

(3) binomial distribution (4) Poisson distribution

53. A population study showed a mean glucose of 86 mg/dl. In a sample of 100 showing normal curve, what % of people will have glucose above 86?

(1) 25 (2) 75 (3) 50 (4) 100

54. The standard normal distribution

(1) skewed to the left
(2) has mean 1·0
(3) has zero SD
(4) has variance = 1

55. The correlation coefficient between X and Y will have + sign if

(1) X increases and Y decreases
(2) Both X and Y increase
(3) X decreases and Y increases
(4) there is no change in X as well as Y

56. Correlation coefficient

(1) can take any value between -1 and $+1$
(2) is always < -1
(3) is always $> +1$
(4) can never be 0

57. Correlation coefficient (r) between X and Y is 0·63. If X and Y both are multiplied by a constant 6, then correlation coefficient between two new variables, will be

(1) $> 0 \cdot 63$
(2) $< 0 \cdot 63$
(3) $= 0 \cdot 63$
(4) cannot be calculated

58. If the two regression lines, Y on X and X on Y coincide, then their correlation coefficient (r) will be

(1) $r = +1$ or -1
(2) $r = 0$
(3) $r = +0 \cdot 50$ or $-0 \cdot 50$
(4) $-1 < r < +1$

59. When Ht (X) and Wt (Y) in children are perfectly correlated, correlation coefficient (r) between X and Y will be

(1) $r = +1$ (2) $r = -1$ (3) $r = 0$ (4) $> +1$

60. If correlation coefficient (r) between Ht and Wt is 2·6 true about r is

(1) there is positive correlation

(2) there is negative correlation

(3) no correlation exists between Ht and Wt

(4) calculation of r is incorrect

61. The correlation coefficient between variables X and Y in a study was found to be 1·1. This indicates,

(1) strong positive correlation

(2) moderately strong positive correlation

(3) weak correlation

(4) computational mistake in calculating correlation

62. Central value of a set of 160 values can be obtained by

(1) 2nd tertile (2) 80th percentile

(3) 8th decile (4) 2nd quartile

63. For 70 smokers, age at start of smoking was reported as ranging from 11 years to 22 years, with only one person reporting 22 years. Later on, he changed it to 32 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) 2nd quartile of age at start of smoking

64. An investigator wants to know similarity of peak flow expiry rates, on an average, amongst 4 groups—smokers, light smokers, moderate smokers and heavy smokers. Which statistical test of significance, he should use?

(1) Two-way analysis of variance
(2) One-way analysis of variance
(3) Pearson's correlation coefficient
(4) Chi-square test

65. A drug was given to 50 hypertensive patients. And diastolic BP was noted down before and after giving the drug. To test whether the drug was effective or not in reducing diastolic BP, the statistical test to be applied, will be,

(1) analysis of variance
(2) student's *t*-test for independent samples
(3) chi-square test
(4) paired *t*-test

66. In a cross-sectional study on Coronary Artery Disease (CAD), smoking status and CAD were summarized as under

	Coronary Artery Disease (CAD)		
Smoking	Present	Absent	Total
Smokers	55	84	139
Non smokers	552	1927	2479
Total	607	2011	2618

Which of the following tests is appropriate for testing association between smoking and CAD?

(1) Student's *t*-test
(2) Chi-square test
(3) Sign test
(4) *F*-test

67. 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

68. Which of the following is the non-parametric equivalent of the one way ANOVA?

(1) Kruskal Wallis Test
(2) Fisher's Exact Test
(3) Friedman's Test
(4) Mann Whitney *U*-Test

69. The summary measures of skewed data are best represented graphically by

(1) histogram
(2) Q-Q plot
(3) stem and leaf
(4) box and whisker plot

70. For simple random sampling, true is

(1) adjacent number is considered for taking a sample
(2) each population unit has equal chance for being selected in the sample
(3) each portion of sample represents corresponding strata of the universe
(4) None of the above

71. The mean and SD of incubation period of measles in 25 children are 8 and 2 days respectively. The standard error will be

(1) 0·40 (2) 1·0 (3) 2·0 (4) 0·50

72. In a population of 100 pregnant females, Hb was estimated with a SD of 1 mg %. The standard error shall be

(1) 1·0 (2) 0·10 (3) 0·01 (4) 10·0

73. Mean Hb level in a sample of 100 pregnant women was found to be 10 mg % with a SD of 1·0 mg %. The standard error of the estimate will be

(1) 0·01 (2) 0·10 (3) 1·00 (4) 10·0

74. Which one of the following is a non-parametric test?

(1) Student's *t*-test for independent samples

(2) *F*-test

(3) Wilcoxon Rank sum test

(4) Paired *t*-test

75. For testing statistical significance of difference of mean Body Mass Index (BMI) between males ($n = 10$) and females ($n = 12$), appropriate statistical test (when form of the distribution BMI values in both the sexes is not known) to be used, will be

(1) Wilcoxon Signed Rank Test (2) Fisher's Exact Test

(3) Wilcoxon Rank Sum Test (4) Bartlett Test

76. The non-parametric test, analogous to the unpaired *t*-test is

(1) Kruskal Wallis test (2) Wilcoxon signed rank test

(3) Wilcoxon Rank Sum Test (4) Friedman test

77. Which statistical test do you suggest to test the equality of means from more than two non-normal and independent data sets with sample sizes < 20 ?

(1) Student's *t*-test (2) One-way ANOVA (parametric)

(3) Kruskal Wallis test (4) Friedman test

78. The Mann Whitney U-test is also called

(1) Kruskal Wallis Test
(2) Wilcoxon Signed Rank Test
(3) Wilcoxon Rank Sum Test
(4) Friedman Test

79. Correlation coefficient (r) between two continuous variables measures

(1) the extent to which they are clustered
(2) type and extent of linear relationship
(3) degree of non-linear relationship
(4) whether variables are mutually exclusive or not

80. In the analysis of correlation between two quantitative variables, the Scatter diagram is mainly useful to study

(i) The nature of relationship
(ii) The magnitude of relationship
(iii) Functional relationship
(iv) Identify the outliers

Identify correct option

(1) (i) and (iii)
(2) (ii) and (iv)
(3) (i) and (iv)
(4) (i), (ii) and (iv)

81. The correlation coefficient (r) lies between

(1) – infinity, + infinity
(2) 0, 1
(3) 0, + infinity
(4) -1, $+1$

82. The aim of simple regression analysis is to

(1) replace the dots in the Scatter diagram by a straight line

(2) measure the extent of relationship between the two variables

(3) describe the relationship in straight line form that best describes and enables prediction of one variable in terms of other

(4) investigate linear relationship between two continuous variables

83. In a study of cardiovascular risk factors, 200 young adults, aged 26-32 years were randomly selected. The relationship between systolic BP (SBP) and body mass index (BMI) was positive ($P < 0{\cdot}001$) and the regression line of SBP on BMI was reported to be, SBP = 90·4 + 0·74 BMI.

One can conclude from this regression line

(i) An unit increase in BMI is associated with 0·74 mm Hg of systolic BP

(ii) The regression line would cross the vertical axis Y (SBP) at 90·4 when BMI has zero value

(iii) Increase in BMI is associated with increase in SBP and the slope

(iv) Regression coefficient is the estimated change in SBP per unit change in BMI

Indicate the correct option

(1) (i) and (ii)

(2) (ii) only

(3) (i), (ii) and (iv)

(4) (i), (ii), (iii) and (iv)

84. The degrees of freedom in a contingency table of 4 × 4 will be

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

85. Confidence limits refer to the

(1) range and SD

(2) median and SE

(3) mean and SE

(4) mode and SD

86. If the mean is 230 and the SE is 10, the 95% confidence limits would be

(1) 210-250 (2) 220-240 (3) 225-235 (4) 230-210

87. The BP of a group of persons was first determined and then, after an intervention trial, it was determined again. The correct test of significance for determining the effect of the intervention, will be

(1) chi-square test

(2) paired *t*-test

(3) student's *t*-test for independent samples

(4) correlation coefficient

88. In a group of 100 children, mean weight is 15 kg and the SE of the weight is 1·5 kg. Which one of the following is true?

(1) 95% children weigh between 12 and 18 kg

(2) 95% children weigh between 13·5 and 16·5 kg

(3) 99% children weigh between 12 and 18 kg

(4) 99% children weigh between 13·5 and 16·5 kg

89. A group tested for a drug shows 60% improvement as against a standard drug, showing 40% improvement. The appropriate test for statistical significance of the difference is

(1) student's *t*-test for independent samples

(2) chi-square test

(3) paired *t*-test

(4) *F*-test

90. A test was done to compare serum cholesterol levels in obese and non-obese women. The test for significance of the difference will be

(1) paired *t*-test

(2) student's *t*-test for independent samples

(3) chi-square test

(4) Fisher *t*-test

91. If we reject null hypothesis when it is true, it is called

(1) type I error

(2) type II error

(3) power of the test

(4) specificity

92. If the mean Hb level in a group of women is 13·5 gm/dl with a SD of 1·5 gm/dl. Then for a women with Hb level of 15·0 gm/dl, the *Z*-score will be

(1) 9·0 (2) 10·0 (3) 2·0 (4) 1·0

93. The chi-square test cannot be applied when

(1) expected cell frequency is less than 1

(2) sample size is more than 100

(3) three groups are to be compared

(4) association between two factors is to be examined

94. In the multiple regression analysis, the term *R* indicates

(1) correlation coefficient

(2) level of significance

(3) coefficient of determination

(4) coefficient of variation

95. In case of quantitative dependent variable and several similar independent variables, the multi variable analysis, to be used to determine the role of independent variables, is called

(1) logistic regression analysis
(2) multiple linear regression analysis
(3) discriminant analysis
(4) survival analysis

96. In the multiple regression analysis, the number of independent variables should be

(1) only two
(2) only three
(3) more than one
(4) only one

97. In multiple regression analysis, no. of dependent variables should be

(1) two (2) three (3) any number (4) one

98. In multiple regression model $Y = a1 \times 1 + a2 \times 2 + \cdots$; Y is called

(1) independent variable
(2) dependent variable
(3) random variable
(4) constant

99. In multiple regression model $Y = a1 \times 1 + a2 \times 2 + \cdots$; $X1, X2, X3$ are called

(1) independent variables
(2) dependent variables
(3) random variables
(4) constant

100. Which one of the following analyses, is not a multivariate analysis?

(1) Logistic regression
(2) Multiple regression
(3) Multiple correlation
(4) One way analysis of variance

101. Non-parametric statistical test includes

(1) regression analysis
(2) correlation analysis
(3) student's *t*-test
(4) Wilcoxon Rank Sum Test

102. If the distribution of the population is not known, which of the following test shall be used?

(1) *F*-test
(2) Student's *t*-test
(3) ANOVA
(4) The sign test

103. The sensitivity of the test is

(1) true positive/{true positive + false negative}
(2) true negative/{true negatives + false positive}
(3) false negative/{true negative + true positive}
(4) false negative/{true positive + false negative}

104. Incidence rate is measured in a

(1) case control study
(2) Cohort study
(3) cross-sectional study
(4) crossover study

105. Incidence rate is calculated from

(1) retrospective study
(2) prospective study
(3) cross-sectional study
(4) random study

106. Specificity is related to

(1) true positive
(2) true negative
(3) false positive
(4) false negative

107. Which of the following is the best for calculating incidence of the disease?

(1) Case control study (2) Cohort study

(3) Cross-sectional study (4) On the spot study

108. A women exposed to multiple sex partners has 5 times increased risk for CaCx. The attributable risk is

(1) 20% (2) 50% (3) 80% (4) 100%

109. The table below gives screening test results of a disease in relation to the true disease status of the population being tested.

Screening Test Results	*True Disease Status*		Total
	Yes	No	
Positive	400	200	600
Negative	100	600	700
Total	500	800	1300

The specificity of the test is

(1) 70% (2) 75% (3) 79% (4) 86%

110. The incidence of the diabetes in a population is 10%. The chance that three persons selected at random from the population, will have diabetes is

(1) 0·01 (2) 0·03 (3) 0·001 (4) 0·003

111. In a Simple Random Sampling Without Replacement (SRSWOR), probability of selecting a specified unit from a population of size N at the rth draw shall be,

(1) r/N (2) $1/(N-r)$ (3) $1/N$ (4) $1/(N-r+1)$

112. Consider population having units 5, 4, 3, 2 and 1. A sample of size 2 is to be drawn from it. In case of Simple Random Sampling Without Replacement (SRSWOR), the SE of mean will be

(1) 0·7746 (2) 0·8660 (3) 1·0000 (4) 0·9229

113. The precision of a random sample

(1) decreases with increase in sample size

(2) increases with increase in sample size

(3) is nothing to do with sample size

(4) remains constant with increase/decrease in sample size

114. The sex ratio is defined as

(1) number of males per 1000 population

(2) number of females per 1000 population

(3) number of females per 1000 males

(4) number of males per 1000 females

115. The age and sex composition of a population can be described by

(1) demographic transition (2) population projection

(3) population density (4) population pyramid

116. The Infant Mortality Rate (IMR) is defined as the number of infants' deaths in a population during one year

(1) per 1000 live births

(2) per 1000 population

(3) per 1000 women

(4) per 1000 women of the reproductive age group

117. The Crude Birth Rate (CBR) is defined as the number of live births in a population during a year per 1000

(1) mid-year male population

(2) mid-year population

(3) mid-year female population

(4) mid-year women population of reproductive age group

118. The density of the population is defined as

(1) total population/(divided by) land area

(2) land area/(divided by) total population

(3) land area + total population

(4) land area × total population

119. Standardization is a method of adjusting the event according to

(1) crude rate of the event

(2) growth rate

(3) IMR

(4) age/sex structure

120. Expectation of life at birth is

(1) number of years most people live

(2) average number of years of life

(3) number of years a person is expected to live

(4) number of years most people are expected to live

121. Total fertility rate is derived from

(1) age specific fertility rates

(2) gross reproduction rate

(3) general fertility rate

(4) net reproduction rate

122. Denominator of general fertility rate is

(1) all females

(2) mid-year female population of reproductive age group

(3) all females above the age of 15 years

(4) mid-year population

123. Denominator of the Maternal Mortality Rate is

(1) total number of births

(2) mid-year population

(3) mid-year female population of reproductive age group

(4) total number of live births in the year

124. Two populations can be compared with

(1) proportional death rate (2) specific death rate

(3) standardized death rate (4) crude death rate

125. Infant Mortality Rate is concerned with deaths of children

(1) below 1 month (2) below 1 year

(3) up to 1 year (4) 28 days

126. General Fertility Rate is based on

(1) mid-year women population of the reproductive age-group

(2) all married women of reproductive age group

(3) total number of live births

(4) total number of all births

127. General Fertility Rate is a better measure of fertility than Crude Birth Rate as its denominator is

(1) mid-year women population of the reproductive age-group

(2) mid-year population

(3) total women population

(4) married women population

128. Which of the following rates is not only an indicator of mortality but also of the socio-economic condition of the community?

(1) Infant Mortality Rate

(2) Post-Neonatal Mortality Rate

(3) Maternal Mortality Rate

(4) Specific Death Rate

129. Basic events recorded by vital statistics are

(1) deaths only

(2) births only

(3) divorces only

(4) All of the above

130. Sample Registration System is done once in

(1) 6 months (2) 1 year (3) 2 years (4) 5 years

131. Registration of births and deaths with 6 monthly survey is done in

(1) National Sample Survey

(2) Vital Statistics System

(3) Census

(4) Sample Registration System

132. Population Census in India is done

(1) every year

(2) every 5 years

(3) every 10 years

(4) As and when required

133. Following table gives results of a study on diagnosis of diabetes and its association with regular exercise :

Regular Exercise	*Diabetes*		
	+ve	-ve	Total
Yes	25	300	325
No	125	550	675
Total	150	850	1000

To test the statistical significance of the association between regular exercise and diabetes, the appropriate statistical test will be

(1) chi-square test

(2) paired *t*-test

(3) McNemar's chi-square test

(4) analysis of variance

134. To test the statistical significance of the difference between mean Hb levels of 50 pregnant and 100 non-pregnant women in the age group 25-35 years, assuming equality of variances in two groups, the statistical test of significance, to be used is

(1) paired *t*-test

(2) student's *t*-test for independent samples

(3) chi-square test

(4) analysis of variance

135. The following data pertain to smoking habits in lung cancer patients and normal subjects

Smoking habit	*Lung Cancer*		
	Yes	No	Total
Smokers	8	6	14
Non-smokers	2	14	16
Total	10	20	30

To test whether lung cancer is significantly associated with smoking habit, the appropriate statistical test is

(1) chi-square test (with correction for continuity)

(2) Fisher's exact test

(3) McNemar's chi-square test

(4) chi-square test for trend

136. Age (years) and cholesterol values (mg%) of 6 men are listed below along with their means and SD.

Age	25	80	65	90	60	75	Mean	SD
Cholesterol	180	450	220	250	200	500	65·8	138·4

The most appropriate method for studying correlation in the above data is

(1) Pearson's correlation coefficient

(2) Spearman's rank correlation coefficient

(3) coefficient of variation

(4) coefficient of association

137. Following are the number of malaria cases, reported from 2001 to 2010 :

Years	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Cases	200	120	350	100	90	110	130	270	3000	200

Average of malaria cases per year can be correctly computed by using

(1) arithmetic mean
(2) mode
(3) median
(4) geometric mean

138. One of the following is not a statistical software

(1) SPSS (2) SAS (3) Microsoft (4) SYSTAT

139. Expansion of SPSS is

(1) Statistical Package for Social Sciences
(2) Statistical Package for Social Scientists
(3) Science Package for Social Sciences
(4) Standard Package for Social Scientists

140. Expansion of SAS is

(1) Statistical Analysis Systems
(2) Statistical Application Systems
(3) Statistical Studies
(4) Standard Analysis Systems

141. The statistical software EPI Info was developed by

(1) WHO
(2) UNICEF
(3) Centre for Disease Control, Atlanta
(4) ICMR

142. What is not related to Hospital Statistics?

(1) Admission rate
(2) Migration rate
(3) Discharge rate
(4) Average duration of stay

143. The Registrar General of India is responsible for

(1) census
(2) medical research
(3) National Family Health Survey
(4) medical education

144. The major health survey in India has been

(1) National Family Health Survey (NFHS)
(2) Census
(3) Sample Registration System (SRS)
(4) Civil Registration System

145. The hospital index that depends on the principle of point prevalence is

(1) admission rate
(2) discharge rate
(3) death rate
(4) percentage of bed occupancy

146. The threshold value of a measurable variable to diagnose a condition/disease can be computed from

(1) frequency
(2)
(3) ROC curve
(4) Scatter diagram

147. Sample size for testing a hypothesis, shall be higher if we

(1) Consider only higher level of significance

(2) consider only higher power

(3) consider higher level of significance as well as higher power

(4) consider either higher level of significance or higher power

148. In the estimation of sample size in a cross-sectional study on a prevalence of a disease, the information required are

(1) only a rough estimate of the prevalence of disease

(2) only the amount of error, investigator would like to accept in the estimate

(3) Both (1) and (2) as above

(4) Both (1) and (2) and the confidence level required in the estimation

149. If the association between a factor (A) and occurrence of the disease can be explained by another factor (B), then factor B is called

(1) constant

(2) concomitant variable

(3) confounder

(4) chance variable

150. An investigator—trying to study the effect of asbestos exposure on lung cancer, collects relevant data on asbestos exposure retrospectively on 200 lung cancer patient and 200 persons without lung cancer. Assuming that the two groups are otherwise comparable, the study design the investigator has used is

(1) cross-sectional study design

(2) Cohort study design

(3) experimental study design

(4) case control study design

* * *

अभ्यर्थियों के लिए निर्देश

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

1. प्रश्न पुस्तिका मिलने के 10 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, प्रश्न-पुस्तिका संख्या व सेट संख्या (यदि कोई हो) तथा प्रश्न-पुस्तिका पर अनुक्रमांक सं० और ओ० एम० आर० पत्र सं० की प्रविष्टियों में उपरिलेखन की अनुमति नहीं है।

7. उपर्युक्त प्रविष्टियों में कोई भी परिवर्तन कक्ष निरीक्षक द्वारा प्रमाणित होना चाहिये अन्यथा यह 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 लिये 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 लिये 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 सम्बन्धित पंक्ति के सामने दिये गये सभी वृत्तों को खाली छोड़ दें। ऐसे प्रश्नों पर शून्य अंक दिये जायेंगे।

11. रफ़ कार्य के लिये प्रश्न-पुस्तिका के मुखपृष्ठ के अन्दर वाले पृष्ठ तथा अंतिम पृष्ठ का प्रयोग करें।

12. परीक्षा के उपरान्त केवल ***ओ०एम०आर० 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।