M.Sc in Statistics and Computation

520

16P/297/4 Question Booklet No.....

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

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

Roll No.

Code No. 502

(Write the digits in words) .....

Serial No. of OMR Answer Sheet 2016

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 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 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 : 44+2

16P/297/4

No. of Questions : 150

Time : 2½ Hours

Full Marks : 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.

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

1. A random sample of 500 households in Varanasi was selected and several *variables are recorded* for each household. Which of the following is not correct?

(1) Household total income is a ratio scaled variable

(2) The number of persons in the household is a discrete variable

(3) Socioeconomic status was coded as 1 = low income, 2 = middle income, 3 = high income, thus it is an interval scaled variable

(4) The primary language used at home is a nominal scaled variable

2. A researcher is interested to predict the score in a Statistics examination from the duration of daily study hours. In this study, the explanatory variable is

(1) the researcher

(2) the duration of daily study hours

(3) the score in the examination

(4) the fact that this is a Statistics examination

3. In a Statistics course, a linear regression equation was computed to predict the final examination score from the score in the first test. The equation of the least-squares regression line was $y = 10 + 0 \cdot 9x$, where y represents the final examination score and x the score on the first examination. Suppose, Arun scores 90 in the first examination. What would be the predicted value of his score in the final examination?

(1) 91

(2) 89

(3) 81

(4) Cannot be determined from the information given. We also need to know the correlation

4. Which of the following is true regarding the least-squares regression line?

(1) The slope is the change in the response variable that would be predicted by a unit change in the explanatory variable

(2) It always passes through the point (A, B), where A and B are the means of the explanatory and response variables, respectively

(3) It will only pass through all the data points if $r = \pm 1$

(4) All of the above

5. Two variables in a study are said to be confounded if

(1) One cannot separate their effects on a response variable

(2) They are highly correlated

(3) They do not have a normal distribution

(4) One of them is a placebo

6. If the correlation between the variables X and Y is 0·5, then the correlation between the variables $2x - 4$ and $3 - 2y$ is

(1) 1 (2) 0·5 (3) $-0·5$ (4) 0

7. If ρ is the simple correlation coefficient, the quantity ρ^2 is known as

(1) coefficient of determination (2) coefficient of non-determination

(3) coefficient of alienation (4) None of these

8. If X_1, X_2 and X_3 are three variables, the partial correlation between X_2 and X_3 eliminating the effect X_1 in terms of simple correlation coefficients is given by the formula

(1) $r_{23\cdot1} = \dfrac{r_{23} - r_{21}r_{31}}{\sqrt{(1 - r_{21}^2)(1 - r_{31}^2)}}$ (2) $r_{23\cdot1} = \dfrac{r_{23} - r_{12}r_{13}}{\sqrt{(1 - r_{12}^2)(1 - r_{13}^2)}}$

(3) $r_{23\cdot1} = \dfrac{r_{32} - r_{12}r_{13}}{\sqrt{(1 - r_{12}^2)(1 - r_{13}^2)}}$ (4) None of these

9. If the rank correlation coefficient between marks in Management and Mathematics for a group of students is 0·6 and the sum of squares of the differences in ranks is 66. What is the number of students in the group?

(1) 10 (2) 9 (3) 8 (4) 11

10. If the arithmetic mean of two numbers is 4·5 and their harmonic mean is 4, then the numbers are

(1) 1 and 8 (2) 7 and 2 (3) 3 and 6 (4) 4 and 5

11. The most appropriate diagram to represent the data related to the number of male and female students in a college during each of last six years is

(1) histogram (2) pie diagram

(3) line diagram (4) double bar diagram

12. Which one of the following measures of central tendency is most affected by extreme values?

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

13. The sum of absolute deviations is minimum about the

(1) arithmetic mean (2) median

(3) mode (4) harmonic mean

14. Which one of the following can be computed with the help of ogives?

(1) Arithmetic mean (2) Median

(3) Mode (4) Mean deviation

15. The most appropriate diagram to represent planned expenditure of a country for different economic sectors will be

(1) frequency polygon (2) cumulative frequency curve

(3) histogram (4) pie chart

16. The probability mass function of a random variable X is given below

$$f(x) = x/15; \quad x = 1, 2, 3, 4, 5$$
$$= 0 \quad ; \quad \text{otherwise}$$

Then the conditional probability that X lies between $\frac{1}{2}$ and $\frac{5}{2}$ given that X is greater than 1 is

(1) $\frac{1}{7}$ (2) $\frac{3}{7}$ (3) $\frac{2}{15}$ (4) $\frac{1}{5}$

17. A continuous random variable X has the probability density function $f(x) = kx^2$ for $0 \leq x \leq 1$. The median of the distribution is

(1) $\frac{1}{2}$ (2) $\left(\frac{1}{2}\right)^{\frac{1}{2}}$

(3) $\left(\frac{1}{2}\right)^{\frac{1}{3}}$ (4) None of the above

18. A continuous random variable X has the probability density function $f(x) = k \times (2 - x)$ for $0 \leq x \leq 2$. Read the following statements carefully in this context :

Assertion (A) : The median of the distribution is 1

Reason (R) : It is average of the upper and lower limit of the variable

Select your answer from the following codes :

(1) Both A and R is true and R is correct explanation of A

(2) Both A and R is true but R is not correct explanation of A

(3) A is true but R is false

(4) A is false but R is true

19. The geometric mean of the distribution $f(x) = 6(x-2)(1-x)$, for $1 \le x \le 2$ is

(1) $\left(\frac{1}{16}\right)\log\left(\frac{19}{6}\right)$ (2) $\left(\frac{1}{16}\right)e^{\left(\frac{19}{6}\right)}$

(3) $\left(\frac{1}{6}\right)\log\left(\frac{17}{6}\right)$ (4) $\left(\frac{1}{6}\right)e^{\left(\frac{17}{6}\right)}$

20. A random variable X has the cumulative distribution function $F(x)$ given below

$$F(x) = 0, \quad \text{if} \quad x < 0$$
$$= x, \quad \text{if} \quad 0 \le x < 1$$
$$= 1, \quad \text{if} \quad x > 1$$

The probability density function corresponding to $F(x)$ is $f(x)$. Then read the *following* :

Statement S : $f(x) = 1$, if $0 < x < 1$
$= 0$, elsewhere

Statement P : $f(x)$ is discontinuous at $x = 0$ and $x = 1$.

Choose your answer from the following codes :

(1) Both S and P are true

(2) S is true but P is false

(3) S is false but P is true

(4) Both S and P are false

21. Consider the following function $F(x)$:

$$F(x) = 0, \quad \text{if} \quad 0 > x$$
$$= x, \quad \text{if} \quad 0 \leq x \leq 1$$
$$= 2 - x, \quad \text{if} \quad 1 < x \leq 2$$
$$= 1, \quad \text{if} \quad 2 < x$$

In this context, read the following carefully :

Assertion (A) : $F(x)$ is continuous at $x = 0$.

Reason (R) : $F(x)$ is a cumulative distribution function of a continuous random variable X.

Choose your answer from the following codes :

(1) Both A and R is true and R is correct explanation of A

(2) Both A and R is true but R is not correct explanation of A

(3) A is true but R is false

(4) A is false but R is true

22. Read the following in context of cumulative distribution function $F(x)$ of any random variable X :

Statement S : $F(x)$ is always right continuous.

Statement P : $F(x)$ may have uncountable number of discontinuity points.

Choose your answer from the following codes :

(1) Both S and P are true

(2) S is true but P is false

(3) S is false but P is true

(4) Both S and P are false

23. Two random variables X and Y are stochastically independent if and only if

Statement S_1 : $F_{x,y}(x, y) = F_x(x).F_y(y)$ for all real x and y ; (F is used here for cumulative distribution function).

Statement S_2 : $f_{x,y}(x, y) = f_x(x).f_y(y)$ for all real x and y ; (f is used here for probability density/mass function).

Statement S_3 : $P(a_1 < X \le b_1 \cap a_2 < Y \le b_2) = P(a_1 < X \le b_1)P(a_2 < Y \le b_2)$ for all choices of a_i and b_i (such that $a_i \le b_i$ for $i = 1, 2$) which are real may be $\pm \infty$.

Choose your answer from the following codes :

(1) All the above S_1, S_2 and S_3 are true

(2) Only S_1 and S_2 are true

(3) Only S_1 and S_3 are true

(4) Only S_2 and S_3 are true

24. Let the distribution function of a random variable X is $F(x) = 1 - e^{-2x}$, $x \ge 0$. Then, the density function is

(1) e^{-2x}, $x \ge 0$

(2) $1 - 2e^{-2x}$, $x \ge 0$

(3) $2e^{-2x}$, $x \ge 0$

(4) $1 - 2e^{-x}$, $x \ge 0$

25. Let X and Y be two independent Poisson variates such that

$$P(X = 1) = P(X = 2), P(X = 2) = P(X = 3)$$

then the $\text{cov}(X + Y, X - Y)$

(1) -1

(2) -11

(3) $-\frac{1}{5}$

(4) 5

26. Read the following in context of cumulative distribution function $F_{x,y}(x, y)$

$$F_{x,y}(x, y) = 0, \quad \text{if} \quad x + 2y \leq 1$$
$$= 1, \quad \text{if} \quad x + 2y > 1$$

Statement S : $F_{x,y}(x, y)$ **is cumulative distribution function of discrete random variables** (X, Y).

Statement P : $P\left(X = \frac{1}{2} \cap Y = \frac{1}{4}\right) = 1$

Choose your answer from the following codes :

(1) Both S and P are true

(2) S is true but P is false

(3) S is false but P is true

(4) Both S and P are false

27. Under usual notations, which of the following is always true for all real values of x and y :

(1) $F_{x,y}(x, y) \geq F_x(x) + F_y(y)$

(2) $F_{x,y}(x, y) \geq F_x(x) + F_y(y) - 1$

(3) $F_{x,y}(x, y) \geq 1 - F_x(x) - F_y(y)$

(4) $F_{x,y}(x, y) \geq (F_x(x) + F_y(y)/2$

28. Under usual notations, which of the following is not always true for all real values of x and y :

(1) $F_{x,y}(x, y) \leq F_x(x)$

(2) $F_{x,y}(x, y) \leq F_y(y)$

(3) $F_{x,y}(x, y) \leq [F_x(x) + F_y(y)]^{\frac{1}{2}}$

(4) $F_{x,y}(x, y) \leq [F_x(x).\, F_y(y)]^{\frac{1}{2}}$

29. Under usual notations, the value of p for a binomial variate X, with $n = 6$ and $9P(X = 4) = P(X = 2)$ shall be

(1) $\frac{1}{4}$

(2) $\frac{1}{2}$

(3) $\frac{3}{4}$

(4) None of these

30. *Let* x_1, x_2 be independent random variable each having Geometric distribution $q^k p$; $k = 0, 1, 2, 3, \cdots$, then what is the conditional distribution of x_1 given $x_1 + x_2$?

(1) Uniform (2) Geometric (3) Exponential (4) None of these

31. Let $f(x)$ represent the largest integer less than or equal to x. Let $g(x)$ represent the smallest integer greater than or equal to x. Which of the following remark will be true for any x?

(1) $g(x) = f(x) + 1$ (2) $f(x) = g(x)$

(3) $f(-x) = -g(x)$ (4) All of the above

32. Let X and Y are two random variables having joint density function

$$f(x, y) = \frac{1}{8}(6 - x - y); \quad 0 \le x < 2, 0 \le y < 4$$
$$= 0; \quad \text{otherwise}$$

What is the value of $P(x + y < 3)$?

(1) $\frac{3}{24}$ (2) $\frac{5}{24}$ (3) $\frac{1}{6}$ (4) $\frac{1}{12}$

33. Consider the following function :

$$f(x, y) = 2, \text{ for } 0 < x < 1 \text{ and } 0 < y < x$$

Statement S : $f(x, y)$ is a joint probability density function.

Statement P : The conditional probability density function X given Y is $f_{x|y}(x|y) = (1 - y)^{-1}; 0 < x < 1$

Choose your answer from the following codes :

(1) Both S and P are true (2) S is true but P is false

(3) S is false but P is true (4) Both S and P are false

34. If A, B and C are three mutually exclusive and exhaustive event associated with certain random experiment. Find $P(A)$ given that $P(B)=\left(\frac{3}{2}\right)P(A)$ and $P(C)=\left(\frac{1}{2}\right)P(B)$

(1) $\frac{1}{13}$ (2) $\frac{2}{13}$ (3) $\frac{3}{13}$ (4) $\frac{4}{13}$

35. The joint probability density function of (X, Y) is $f(x, y)=\exp\{-(x+y)\}$, for $0<x<\infty$ and $0<y<\infty$.

Statement S : X and Y are independently distributed.

Statement P : $P(X<Y \mid X<2Y)=P(X<Y)$.

Choose your answer from the following codes :

(1) Both S and P are true (2) S is true but P is false

(3) S is false but P is true (4) Both S and P are false

36. If the moment generating function of binomial random variable is

$$M(t)=\left(\frac{2}{3}+\frac{1}{3}e^{t}\right)^{5}$$

then the mean and variance are respectively

(1) $\frac{10}{9}, \frac{5}{3}$ (2) $\frac{2}{3}, \frac{1}{3}$ (3) $\frac{1}{3}, 5$ (4) $\frac{5}{3}, \frac{10}{9}$

37. If the joint p.d.f. of the two random variables X and Y is

$$f(x, y) = \begin{cases} X + Y & , \ 0 \le X, Y \le 1 \\ 0 & , \ \text{otherwise} \end{cases}$$

then the marginal distribution of x is

(1) $f_X(x) = X + \frac{1}{4}$ (2) $f_X(x) = X + \frac{1}{2}$

(3) $f_X(x) = X + 1$ (4) $f_X(x) = X + 2$

38. *Let*

$$f(x, y) = \begin{cases} 2, & 0 < X < Y < 1 \\ 0, & \text{otherwise} \end{cases}$$

The conditional mean of X given $Y = y$ is

(1) $\frac{1}{2y}$ (2) $\frac{y}{2}$ (3) y (4) $2y$

39. Let

$$f(x, y) = \begin{cases} 1, & 0 \le X \le 1, \ 0 \le Y \le 1 \\ 0, & \text{otherwise} \end{cases}$$

Then $P(X^2 + Y^2 < \frac{1}{4})$ is

(1) $\frac{\pi}{2}$ (2) $\frac{\pi}{4}$ (3) $\frac{\pi}{8}$ (4) $\frac{\pi}{16}$

40. If X is uniformly distributed over $(0,10)$, then $P(1 < X < 6)$ is

(1) $\frac{3}{10}$ (2) $\frac{1}{10}$ (3) $\frac{5}{10}$ (4) *None of these*

41. Let X, Y, Z be three independent normal variables $N(0, 1)$. Then $E(X + Y + Z)^2$ is

(1) 3 (2) 9 (3) 6 (4) 0

42. A snowball sampling is

(1) an unequal probability selection sampling method

(2) an equal probability selection sampling method

(3) a non-random sampling method

(4) a combination of random sampling and non-random sampling methods

43. $\bar{X}$ denotes the sample mean of a random sample of size n drawn from normal population with mean μ and variance σ^2. The inconsistent estimator of μ among the following is

(1) $\bar{X} + \dfrac{2n+1}{n^2+4n-19}$

(2) $\dfrac{n\bar{X}+17}{n-57}$

(3) $\dfrac{7n^2\bar{X}+11n+29}{7n^2-101n+529}$

(4) $\dfrac{23n\bar{X}+79}{51n-57}$

44. A random sample $X_1, X_2, \cdots, X_n$ is drawn from a population having p.d.f.

$$f(x|\mu,\theta) = \theta \exp[-\theta(x-\mu)], \text{ for } x > \mu, \theta > 0$$
$$= 0, \text{ otherwise}$$

Let S is min $(X_1, X_2, \cdots, X_n)$ and M is the sample mean. Then the MLE of μ and θ are respectively

(1) S and M (2) S and $M-S$ (3) S and $\dfrac{1}{M}$ (4) S and $\dfrac{1}{(M-S)}$

45. In stratified sampling, if N_i, S_i and C_i denote the ith stratum size, standard deviation and cost of observation per unit respectively, then in order to minimize the variance of the estimate, the number of units selected from it should be proportional to the product of

(1) N_i, S_i and C_i

(2) N_i, S_i and $\left(\dfrac{1}{C_i}\right)$

(3) N_i, S_i and $(C_i)^{1/2}$

(4) N_i, S_i and $\left(\dfrac{1}{C_i}\right)^{1/2}$

46. Cluster sampling and simple random sampling will be equally efficient if the intra-class correlation coefficient is

(1) +1 (2) −1

(3) 0 (4) None of the above

47. Two-stage sampling is more efficient than single-stage sampling if the correlation between units in the first stage is

(1) negative (2) positive (3) zero (4) None of these

48. Assertion (*A*) : The total error in sample surveys will be more than that in complete enumeration.

Reason (*R*) : In sample surveys both sampling and non-sampling errors occur whereas in complete enumeration only non-sampling errors occur.

Choose your answer from the following codes :

(1) Both *A* and *R* is true and *R* is correct explanation of *A*

(2) Both *A* and *R* is true but *R* is not correct explanation of *A*

(3) *A* is true but *R* is false

(4) *A* is false but *R* is true

49. A single observation is drawn from a population having probability density function

$$f(x)=\begin{cases}\frac{2x}{\theta^2}, & 0<x<\theta\\ 0, & \text{otherwise}\end{cases}$$

The most powerful critical region of size ·05 for testing $H_0:\theta=1$ against $H_1:\theta=2$ is

(1) $\{X:X>\cdot 05\}$ (2) $\{X:X>\cdot 95\}$

(3) $\{X:X>\sqrt{\cdot 05}\}$ (4) $\{X:X>\sqrt{\cdot 95}\}$

50. Let X be a random sample of size one from a Poisson distribution with parameter μ. The unbiased estimator of $e^{-(k+1)\mu}$ is

(1) $e^{-(k+1)X}$ (2) e^{-kX} (3) $(-k)^X$ (4) $(1-k)^X$.

51. X and Y are two random variables having finite means. Which of the following are always true?

(i) $E[\text{Min. } (X, Y)] \leq \text{Min. } [E(X), E(Y)]$

(ii) $E[\text{Max. } (X, Y)] \leq \text{Max. } [E(X), E(Y)]$

(iii) $E[\text{Min. } (X, Y) + \text{Min. } (X, Y) +] = E(X) + E(Y)$

Choose the answer from the following :

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

(3) Only (ii) and (iii) (4) All the three

52. If X is normally distributed with mean zero and variance one, the variance of X^2 would be

(1) 0 (2) 1 (3) 2 (4) 4

53. Which of the following statement is true about the normal distribution $N(\mu, \sigma^2)$ (symbols carry their usual meaning)?

(1) $\beta_1 = 0, \beta_2 = 3$ and point of inflection is $\mu + \sigma$

(2) $\beta_1 = 0, \beta_2 > 3$ and point of inflections are $\mu \pm \sigma$

(3) $\beta_1 = 0, \beta_2 = 3$ and point of inflections are $\mu \pm \sigma$

(4) $\beta_1 = 0, \beta_2 > 3$ and point of inflection is $\mu + \sigma$

54. In a grouped frequency table, against the class having class limits 20-39 the cumulative frequency less than and the cumulative frequency more than type are written as 5 and 12 respectively. In this context which of the following statement is true?

S1 : There are 5 observations in the data which are less than 20.
S2 : There are 12 observations in the data which are more than 30.

Choose your answer from the following codes :

(1) Both S1 and S2 are correct
(2) S1 is correct but S2 is false
(3) S1 is false but S2 is correct
(4) Both S1 and S2 are false

55. Let $X_1, X_2, \cdots, X_n$ be a random sample from the following p.d.f.

$$f(x, \theta) = e^{-(x-\theta)}, \; x > \theta$$

Then, consider the following statements :

Statement 1 : $(\bar{X} - 1)$ is an unbiased estimate of θ.

Statement 2 : $X_{(1)}$ is a consistent estimator of θ.

Which of the above statement is/are correct? Choose your answer from the following codes :

(1) Only Statement 1 is correct
(2) Only Statement 2 is correct
(3) Both Statements 1 and 2 are correct
(4) Neither Statement 1 nor 2 is correct

56. In case of three variables X_1, X_2 and X_3, all pair wise simple correlation coefficients are equal. Then (in the usual notations)

(1) $R^2_{1.23} = r_{12.3}\, r_{13.2}$
(2) $R^2_{1.23} = 2r_{12.3}\, r_{13.2}$
(3) $R^2_{1.23} = \dfrac{r_{12.3}\, r_{13.2}}{2}$
(4) $R^2_{1.23} = \dfrac{r_{12.3}\, r_{13.2}}{4}$

57. A random variable X has the cumulative distribution function $F(x)$ given below

$$F(x) = 0, \text{ if } x \leq 0$$
$$= x, \text{ if } 0 < x \leq 1$$
$$= 1, \text{ if } 1 < x$$

The probability density function corresponding to $F(x)$ is $f(x)$. Then

S: $f(x) = 1$, if $0 < x < 1$
$= 0$, elsewhere

P : $f(x)$ is discontinuous at $x = 0$ and $x = 1$.

Choose your answer from the following codes :

(1) Both S and P are true
(2) S is true but P is false
(3) S is false but P is true
(4) Both S and P are false

58. In Cauchy's population the consistent estimator of the population mean is

(1) sample mean
(2) sample median
(3) Both (1) and (2)
(4) None of the above

59. T_1 is an MVU estimator of $\tau(\theta)$, T_2 is any other unbiased estimator of $\tau(\theta)$ with efficiency e and the correlation coefficient between T_1 and T_2 is r. Then

(1) $r = \sqrt{e}$
(2) $r = 2\sqrt{e}$
(3) $r = \frac{1}{2}\sqrt{e}$
(4) None of these

60. The probability density function of a random variable X is $f(x) = 6(2-x)(x-1)$ for $1 \leq x \leq 2$ and zero elsewhere. Which of the following statements are true?

S : The logarithm of arithmetic mean is the geometric mean of the logarithm of the variable.

P : The geometric mean of the above distribution is $(1/16)\exp(19/6)$

Choose your answer from the following codes :

(1) Both S and P are true
(2) S is true but P is false
(3) S is false but P is true
(4) Both S and P are false

61. Match the following :

List A	*List B*
(A) Consistent estimator	(1) $E(T)=\theta$
(B) Unbiased estimator	(2) $P[\,\lvert T-\theta\rvert<\varepsilon\,]=1-\eta$
(C) Efficient estimator	(3) $V(T)<V(T_1)$
(D) Moment estimator	(4) Asymptotically normal

Choose your answer from the following codes :

(1) A B C D
2 1 3 4

(2) A B C D
3 2 1 4

(3) A B C D
4 3 2 1

(4) A B C D
2 1 4 3

62. Consider the following joint probability density function of random variable (X, Y).

$$f(x, y)=[2x^2y]^{-1}\ I_{(1,\infty)}(X)\, I_{(1/x,\,x)}(Y)$$

The marginal distribution of Y is obtained from

(1) $\left[\int_1^{\infty} \frac{1}{2x^2y}\,dx\right] I_{(1,\infty)}(Y)$

(2) $\left[\int_{\frac{1}{y}}^{\infty} \frac{1}{2x^2y}\,dx\right] I_{(0,1)}(Y)$

(3) $\left[\int_0^{y} \frac{1}{2x^2y}\,dx\right]\ I_{(0,1)}(Y)+\left[\int_y^{\infty} \frac{1}{2x^2y}\,dx\right] I_{(1,\infty)}(Y)$

(4) $\left[\int_{\frac{1}{y}}^{\infty} \frac{1}{2x^2y}\,dx\right] I_{(0,1)}(Y)+\left[\int_y^{\infty} \frac{1}{2x^2y}\,dx\right] I_{(1,\infty)}(Y)$

63. If X follows standard Cauchy distribution, then $\frac{1}{X}$ will follow

(a) Standard Cauchy distribution

(b) The same distribution as that of square root of F-statistic with (1, 1) degree of freedom

(c) The same distribution as that of t-statistic with one degree of freedom

Choose your answer from the following :

(1) Only (a) and (b) are correct

(2) Only (a) and (c) are correct

(3) Only (c) and (b) are correct

(4) (a), (b) and (c) all are correct

64. A sample of size 3 is drawn from a population of size 5 using simple random sampling without replacement. What is the probability that the first and the last population units are included in the sample?

Choose your answer from the following :

(1) $\frac{1}{20}$ (2) $\frac{2}{5}$ (3) $\frac{9}{20}$ (4) $\frac{3}{10}$

65. A population is divided into 4 strata of size 20, 30, 40 and 50 having variances 1, 2, 3 and 4 respectively. If a stratified random sample of size 28 is to be drawn using proportional allocation, the stratum sample sizes would be respectively

(1) 2, 6, 8, 12

(2) 2, 6, 12, 8

(3) 4, 6, 10, 8

(4) 4, 6, 8, 10

66. Let X_1 and X_2 be IID Poisson random variable with mean one. Then $P(\text{Max.}(X_1, X_2) > 1)$ is

(1) $1 - e^{-2}$ (2) $1 - 2e^{-2}$ (3) $1 - 3e^{-2}$ (4) $1 - 4e^{-2}$

67. The 95% asymptotic confidence interval for the parameter θ of a Poisson distribution based on a sample of size n and having sample mean as $\bar{X}$ is

(1) $\bar{X} \mp 2 \cdot 58 \sqrt{\bar{X}}$

(2) $\bar{X} \mp 2 \cdot 58 \sqrt{\frac{\bar{X}}{n}}$

(3) $\bar{X} \mp 1 \cdot 96 \sqrt{\bar{X}}$

(4) $\bar{X} \mp 1 \cdot 96 \sqrt{\frac{\bar{X}}{n}}$

68. Consider the following statements :

Statement *A* : If T is a sufficient estimator for the parameter θ and $\Phi(\theta)$ is a one to one function of T, then $\Phi(T)$ is a sufficient for $\Phi(\theta)$.

Statement *B* : If T is a maximum likelihood estimator for the parameter θ and $\Phi(\theta)$ is a one to one function of T, then $\Phi(T)$ will be the maximum likelihood estimator for $\Phi(\theta)$.

Then, which of the above statements is/are true? Choose your answer from the following codes :

(1) Only *A*

(2) Only *B*

(3) Both *A* and *B*

(4) Neither *A* nor *B*

69. Regarding *t*-distribution, consider the following statements :

Statement *A* : Moment generating function of this distribution does not exist.

Statement *B* : Mean is zero.

Statement *C* : It is asymmetric distribution.

Statement *D* : Variance is $\frac{n^2}{n-2}$; $n > 2$.

Which of the above statements is/are correct? Choose your answer from the following codes :

(1) *A* and *B* only

(2) *A*, *B* and *C* only

(3) A, B and *D* only

(4) All of the above

70. T follows t-distribution with n degrees of freedom, then T^2 will follow

(1) chi-square distribution with n degrees of freedom

(2) F-distribution with $(n, 1)$ degrees of freedom

(3) Cauchy's distribution

(4) None of the above

71. Let $X_{(1)}, X_{(2)}, \cdots, X_{(n)}$ be an ordered sample from a uniform distribution on $(0, \theta)$. Then consider the following statements :

S1 : $X_{(n)}$ is the complete sufficient statistics for θ

S2 : $X_{(n)}$ is an unbiased estimator for θ

S3 : $\left(\frac{n+1}{n}\right) X_{(n)}$ is the asymptotically unbiased for θ

S4 : $\left(\frac{n+1}{n}\right) X_{(n)}$ is the UMVUE for θ

Which of the above statements is/are correct? Choose your answer from the following codes :

(1) S1, S2 and S3 only

(2) S1, S2 and S4 only

(3) S1, S3 and S4 only

(4) S2, S3 and S4 only

72. A linear fractional programming problem can be solved by using

(1) graphical method

(2) simplex method

(3) modified simplex method

(4) revised simplex method

73. The optimal solution of the linear programming problem

Maximize $Z = 10x + 15y$

subject to $2x + y \leq 26$

$x + 2y \leq 8$

$y - x \leq 5 \qquad x \geq 0, y \geq 0$

is

(1) $x = 6$ and $y = 10$ (2) $x = 8$ and $y = 10$

(3) $x = 6$ and $y = 1$ (4) $x = 8$ and $y = 8$

74. In a system of m simultaneous linear equations in n unknown $(m < n)$, the number of basic variables will be

(1) $n - m$ (2) m (3) n (4) $n + m$

75. In a assignment problem involving four workers and three jobs, total number of assignments possible are

(1) 7 (2) 12 (3) 3 (4) 4

76. If D_1 and D_2 be the two designs with error variances σ_1^2 and σ_2^2 and replications r_1 and r_2 respectively, then the efficiency of design D_1 with respect to design D_2 is

(1) $\frac{2\sigma_2^2 r_1}{r_2 \sigma_1^2}$ (2) $\frac{\sigma_2^2 r_1}{r_2 \sigma_1^2}$ (3) $\frac{2\sigma_2^2}{\sigma_1^2}$ (4) $\frac{\sigma_2^2}{\sigma_1^2}$

77. The precision in a design of experiment is

(1) directly proportional to the replications

(2) inversely proportional to the replications

(3) inversely proportional to the square root of replications

(4) inversely proportional to the square of replications

78. In a randomised block design of t treatments and b blocks, the degree of freedom for the experimental error is

(1) $(b-1)(t-1)$ (2) $(bt-1)$ (3) bt (4) $b(t-1)$

79. Identify the true statements from the following in context of incompletely randomised design :

Statement A : Treatments are assigned completely at random to experimental units.

Statement B : Factor like block is taken into consideration on the allocation of treatment.

Statement C : Statistical analysis remains simple even if some or all allocations for any treatment are missing or rejected.

Choose your answer from the following codes :

(1) All (2) A and C (3) A and B (4) B and C

80. For the existence of BIBD, the parametric relations (notations carry their usual meanings) to hold is

(1) $rv \geq bk$ and $b \geq v, \lambda \geq 0$

(2) $b \leq v$ and $vb = rk$

(3) $rv = bk, \lambda(v-1) = r(k-1)$ and $b \geq v$

(4) $rv \leq k$ and $\lambda \geq v$

81. A BIBD is said to be symmetric if (notations carry their usual meanings)

(1) $b > v$ and $r = k$ (2) $b = v$ and $r = k$

(3) $b < v$ and $r = k$ (4) $b \leq v$ and $r < k$

82. In the given rectangular game, it is known that the saddle point exists for the entry (A_1, B_2). The range of the unknown entry p will be

	B_1	B_2	B_3
A_1	10	7	10
A_2	2	4	5
A_3	4	p	6

Choose the most appropriate answer from the following codes :

(1) $p \leq 7$ (2) $7 \leq p \leq 8$ (3) $8 \leq p \leq 9$ (4) $9 \leq p$

83. If the coefficient of variations of the study variable Y and the auxiliary variable X in a population are 18 and 32 respectively, then for what range of the coefficient of correlation ρ between X and Y, the ratio method of estimation will be preferable over simple random sample?

Choose your answer from the following codes :

(1) $\rho < 0 \cdot 63$ (2) $0 \cdot 33 < \rho < 0 \cdot 80$

(3) $\rho > 0 \cdot 63$ but less than 0·85 (4) $\rho > 0 \cdot 88$

84. A system of 5 identical units consists of two part A and B which are connected in series. Part A has 2 units connected in parallel and part B has 3 units connected in parallel. All the 5 units function independently with probability of failure 0·5, then the reliability of the system is

(1) 0·65625 (2) 0·34375 (3) 0·030125 (4) 0·96875

85. $X_1, X_2, \cdots$, is a sequence of independently and identically distributed random variables with common variance σ^2. Let $Y_n = \frac{1}{\square}\sum_{k=1}^{n} X_{2k-1}$ and $Z_n = \frac{1}{\square}\sum_{k=1}^{n} X_{2k}$. Define $T_n = \sqrt{n}\,(Y_n - Z_n)$. Then $\{T_n\}$ is a sequence of random variables which is

(1) independently and identically distributed

(2) identically but not independently distributed

(3) independently but not identically distributed

(4) neither independently and nor identically distributed

86. If X has a F-distribution with (n_1, n_2) degrees of freedom, the limiting distribution of $Y = C/X$ will follow a chi-square distribution if

(1) $C = n_1$ and $n_2 \to \infty$

(2) $C = n_1$ and $n_1 \to \infty$

(3) $C = n_2$ and $n_2 \to \infty$

(4) $C = n_2$ and $n_1 \to \infty$

87. The index number satisfies the time reversal test if

(1) $I_{01} + I_{10} = 1$

(2) $I_{01} - I_{10} = 0$

(3) $I_{01} \cdot I_{10} = 1$

(4) $I_{01}/I_{10} = 1$

88. The long-term movement of a time series is called

(1) trend

(2) seasonal variation

(3) cyclic variation

(4) random variation

89. Match the items in List A with those in List B :

List A (Law of large numbers)

I : Weak Law of Large Numbers

II : Strong Law of Large Numbers

III : Central Limit Theorem

List B (Type of convergences)

A : Convergence in Law

B : Convergence in Probability

C : Convergence Almost Sure

Choose the answer from the following codes :

	I	II	III
(1)	A	B	C

	I	II	III
(2)	A	C	B

	I	II	III
(3)	B	A	C

	I	II	III
(4)	B	C	A

90. In a sequential probability ratio test for testing simple null hypothesis against simple alternative hypothesis, the pre-specified probability of first and second kind of errors are α and β respectively. If the corresponding actual probabilities are α and β, then

(1) $\alpha \geq \alpha$

(2) $\beta \geq \beta$

(3) $\alpha + \beta \geq \alpha + \beta$

(4) All the above are true

91. In a sequential probability ratio test, the pre-specified probability of first and second kind of errors are α and β respectively. The test rejects the null hypothesis $H_0 : \theta = \theta_0$ if the probability ratio is greater than or equal to A, accepts if it is less than are equal to B and continues the sampling otherwise. The value of A and B are approximated by

(1) $A = \dfrac{(1-\beta)}{\alpha}, \; B = \dfrac{\beta}{(1-\alpha)}$

(2) $A = \dfrac{\beta}{(1-\alpha)}, \; B = \dfrac{(1-\beta)}{\alpha}$

(3) $A = \dfrac{\alpha}{(1-\beta)}, \; B = \dfrac{(1-\alpha)}{\beta}$

(4) $A = \dfrac{(1-\alpha)}{\beta}, \; B = \dfrac{\alpha}{(1-\beta)}$

92. For testing the independence of two attributes on the basis of the data provided in a $r \times c$ contingency table, the degrees of freedom associated with the respective chi-square test Statistics would be

(1) $rc-1$ (2) $r(c-1)$ (3) $(r-1)c$ (4) $(r-1)(c-1)$

93. Samples of sizes 10 and 15 are drawn from normal populations $N(\mu_1, 16)$ and $N(\mu_2, 16)$. The most appropriate test for testing $H_0 : \mu_1 = \mu_2$ would be

(1) normal test (2) T-test

(3) chi-square test (4) F-test

94. If probability of type I and type II errors are denoted by α and β respectively, then for a most powerful test

(1) $\alpha \leq \beta$ (2) $\alpha \geq \beta$ (3) $\alpha + \beta \leq 1$ (4) $\alpha + \beta \geq 1$

95. For a 2^2-factorial experiment in r replicates, the sum of square for the effect A in the ANOVA table is

(1) $\frac{[A]^2}{4r}$ (2) $\frac{[A]^2}{r}$ (3) $\frac{2[A]^2}{r}$ (4) $\frac{4[A]^2}{r}$

96. Match the items in List A with those in List B :

List A (Description of the data)	*List B* (Type of classification)
I : Year-wise food production of a country	A : Chronological
II : City-wise population of India	B : Geographical
III : Distribution of persons according to their level of education belonging to a given region	C : Qualitative
IV : Distribution of families according to the number of family members	D : Quantitative

Choose the answer from the following codes :

	I	II	III	IV
(1)	B	C	A	D
(3)	D	A	C	B

	I	II	III	IV
(2)	A	D	C	B
(4)	A	B	C	D

97. $x_1, x_2, \cdots, x_n$ are the increasing values of the characteristic under study with corresponding frequencies $f_1, f_2, \cdots, f_n$. Assume that $x_0 (< x_1)$ and $x_{n+1} (> x_n)$ are hypothetical values of it each with frequency zero. The consecutive points, with abscissa as the values and ordinate as the corresponding frequencies, are joined by the straight line to give a frequency polygon. The total area within the polygon would be proportional to

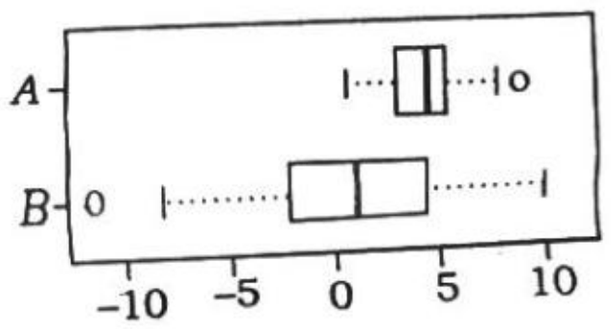
(1) $\sum_{i=1}^{n} f_i (x_{i+1} - x_{i-1})$

(2) $\sum_{i=1}^{n} f_i (x_{i+1} - x_i)$

(3) $\sum_{i=1}^{n} x_i (f_{i+1} - f_{i-1})$

(4) $\sum_{i=1}^{n} x_i (f_{i+1} - f_i)$

98. Two distributions (A and B) are shown on the box plot below. Which of the following statements is not supported by the plot?



(1) Both distributions are unimodal

(2) Median of A is higher than median of B

(3) Both distributions are roughly symmetric

(4) B is more variable than A

99. The following is the layout of one replicate of a 2^3-factorial experiment :

Block 1	(1)	*b*	*ac*	*abc*
Block 2	*a*	*ab*	*c*	*bc*

The interaction effect confounded above is

(1) *ab* (2) *ac* (3) *bc* (4) *abc*

100. *Which of the following* indicate how many future mothers would be born to present mothers according to the current levels of fertility and mortality?

(1) Total fertility rate (2) Gross reproduction rate

(3) Net reproduction rate (4) Female birth rate

101. X is normally distributed with mean zero and variance σ^2 and Y independently follows exponential distribution with mean $2\sigma^2$. We wish to test $H_0: \sigma^2 \leq 1$ against $H_1: \sigma^2 > 1$ at α percent level of significance. The Uniformly Most Powerful (UMP) test

(1) does not exist (2) is a chi-square test

(3) is a *t*-test (4) is a *F*-test

102. In randomized block design with k treatments and two blocks with mean B_1 and B_2, which one of the following is the correct sum of the squares due to blocks?

(1) $\frac{(B_1 - B_2)^2}{k}$ (2) $\frac{(B_1 - B_2)^2}{2k}$

(3) $\frac{k(B_1 - B_2)^2}{2}$ (4) $\frac{(B_1 - B_2)^2}{2}$

103. For a Political Science class, it is required to get opinion on free primary education of members of a particular party from a town. The town is divided into 17 blocks, each with similar socio-economic status distribution and other diversities. Rather than trying to obtain a list of all members of that party of the town. It is decided to select 3 blocks at random, using simple random sampling without replacement. For selected blocks, the list of all current members of the party will be collected from the block office of the party. Then the opinion on free primary education of the members was collected. What kind of design has been used above?

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

104. Given the ultimate class frequencies $(AB) = 250, (A\beta) = 120, (\alpha B) = 200$ and $(\alpha\beta) = 70$, then (α) and (β) are

(1) 450 and 370
(2) 370 and 450
(3) 270 and 190
(4) 190 and 270

105. Which of the following behaviors will be exhibited by the data for last 50 years of yearly average price of wheat?

(1) Trend only
(2) Cyclic variation only
(3) Trend and cyclic variations
(4) Trend, cyclic and random variations

106. The ratio of a new price to the base year price is called the

(1) price decrease
(2) price relative
(3) price increase
(4) price absolute

107. A simple aggregate price index

(1) ignores relative quantities

(2) considers relative quantities

(3) compares absolute prices to absolute quantities

(4) compares relative quantities to relative prices

108. In usual notations, the formula

$$\frac{\Sigma P_0 Q_1}{\Sigma P_0 Q_0} \times 100$$

is used to calculate

(1) the Laspeyres price index

(2) the Paasche price index

(3) the Paasche quantity index

(4) the Laspeyres quantity index

109. A scaling factor is used to

(1) change a simple index to a weighted index

(2) change an aggregate index to a weighted index

(3) change the base year

(4) convert the Paasche index to a Laspeyres index

110. If the net reproduction rate is equal to 'one', then the population will have a tendency

(1) to decrease in size

(2) to increase in size

(3) to remain constant in size

(4) to have the same age structure

111. Records of births, deaths, marriages and divorces, gathered through a registration system maintained by governmental units, are referred to as

(1) a census

(2) demographic data

(3) vital statistics

(4) sociological data

112. Which one of the following is correct (notations carry their usual meanings)?

(1) $d_x = l_x + l_{x+1}$

(2) $d_x = q_x l_x$

(3) $d_x = q_{x+1} + l_x$

(4) $d_x = q_x + l_{x+1}$

113. Age specific fertility curve is

(1) slightly positively skewed

(2) highly positively skewed

(3) slightly negatively skewed

(4) highly negatively skewed

114. The Gross Reproduction Rate (GRR)

(1) provides lower limit to Net Reproduction Rate (NRR)

(2) provides upper limit to NRR

(3) has no relationship with NRR

(4) does not consider the prevailing mortality

115. The transition probability matrix P of a Markov chain should be

A : A square matrix

B : A matrix with non-negative elements

C : Such that the row sum of the matrix is unity

Choose the best answer from the following codes :

The matrix P should posses

(1) only A and B

(2) only A and C

(3) only B and C

(4) A, B and C; all the three

116. The nature of the curve, when price elasticity of demand is constant, will be

(1) linear (2) quadratic (3) parabola (4) hyperbola

117. If dual has an unbounded solution, primal has

(1) no feasible solution
(2) unbounded solution
(3) feasible solution
(4) None of the above

118. A relation between the differences of an unknown function at a number of values of the argument is known as

(1) differential equation
(2) partial differential equation
(3) difference equation
(4) linear equation

119. Let a random variable X assume the values 0 and 1 with probabilities θ and $(1-\theta)$ respectively, $\frac{1}{2} \leq \theta \leq 1$. Then, what is the maximum likelihood estimator of θ on the basis of a single observation X ?

(1) $(1+X)$
(2) $\frac{(1+X)}{2}$
(3) $\frac{(1-X)}{2}$
(4) $(1-X)$

120. Select the pair of value which cannot be the possible value of Pearson's coefficient of skewness (β_1) and kurtosis (β_2) respectively

(1) (0·7, 7·0)
(2) (1·2, 2·1)
(3) (2·6, 6·2)
(4) (3·5, 5·3)

121. Assuming the normal distribution, suppose that a 95% confidence interval for mean μ is (50, 60). Which of the following could possibly be a 99% confidence interval for the same?

(1) (52, 58)
(2) (52, 62)
(3) (48, 58)
(4) (48, 62)

122. We have two factors A at p levels and B at q levels. There are r replicates. Each replicate has p blocks and each block has q plots. Factor A is applied randomly to the blocks of each replicate and factor B is applied randomly to the plots of each block. The degrees of freedom of the error for testing interaction effect AB would be

(1) $p(q-1)(r-1)$

(2) $q(p-1)(r-1)$

(3) $r(q-1)(p-1)$

(4) None of the above

123. $\{\Omega, \mathcal{A}, P\}$ is a given probability space and A, B are two events belonging to $\mathcal{A}$ and A^c denote the complement of A, then which of the following is not correct?

(1) $P(A|B^c) > P(A)$ if $P(A|B) < P(A)$

(2) $P(A|B^c) < P(A)$ if $P(A|B) < P(A)$

(3) $P(A|B^c) = P(A)/[1-P(B)]$ if A and B are mutually exclusive

(4) $P(A|A \cap B) = P(A)/\{P(A)+P(B)\}$ if A and B are mutually exclusive

124. A bag contains blue and red balls. Two balls are to be drawn at random from the bag. If drawing of two red balls are five times more probable than drawing of two blue balls and drawing of one ball of each colour is three times more probable than drawing of two red balls, then number of blue and red balls in the bag are respectively

(1) 6 and 3

(2) 3 and 6

(3) $6k$ and $3k$, where k is any positive integer

(4) $3k$ and $6k$, where k is any positive integer

125. $\{\Omega, \mathcal{A}, P\}$ is a given probability space and A, B are two events belonging to $\mathcal{A}$ such that odds against A is 2 to 1 and that in favour of $A \cap B$ is 3 to 1, then probability of happening of B

(1) should be equal to 5/12

(2) should be equal to 9/12

(3) can be any value between 5/12 to 9/12

(4) cannot be guessed from the given information

126. Expression $x = a - b/3 + c^* 2 - 1$ is equivalent to

(1) $x = a - (b/3) + (c^* 2) - 1$

(2) $x = (a - b) / 3 + (c^* 2) - 1$

(3) $x = (a - b)/(3 + c)^* 2 - 1$

(4) $x = (a - b)/(3 + c)^* (2 - 1)$

127. Which statement is true?

(1) * has higher precedence than /

(2) * has lower precedence /

(3) * and / have same precedence

(4) / is evaluated first and than *

128. The standard 'C' function strcmp( ) returns the value

(1) 0 if both arguments are same

(2) -1 if both arguments are not same

(3) numeric difference between the first nonmatching characters in the argument

(4) Both (1) and (3)

129. The 'C' standard function used to convert the lower case string to upper case and vice-versa is

(1) strlwr, strupr

(2) strlr, strup

(3) lwrstr, uprstr

(4) lrstr, upstr

130. Consider the segment of the 'C' program

```
int n[25], x, y ;
n[0]=100;
n[24]=200;
x =*n ;
y =*(n+24)+ *(n+0);
```

The value of x and y is

(1) x = 100, y = 200

(2) x = 100, y = 300

(3) x = 300, y = 100

(4) x = 200, y = 100

131. Consider the following declaration of array in 'C' language :

```
int B[20];
```

Which expression gives the 10th element of the array?

(1) B[9]

(2) *(B+9)

(3) *B[10]

(4) Both (1) and (2)

132. Consider the segment of the following 'C' program :

```
main( )
{
static int b[] = {10, 20, 30, 40, 50};
int i ;
for (i = 0; i < = 4; i + +)
   printf ("%d", i[b] ) ;
}
```

The output of the above program will be

(1) 10, 20, 30, 40, 50

(2) 10, 20, 30, 40

(3) Address of each element

(4) Error

133. Consider the following declaration of array in 'C' language :

```
float B[20];
```

The address of the first element of the array B is obtained by

(1) B[0]

(2) &B

(3) B

(4) *B

134. Consider the following declaration of array in 'C' language :

```
int A[20];
```

The first and last elements of the array are

(1) A[1], A[20]

(2) A[1], A[19]

(3) A[0], A[20]

(4) A[0], A[19]

135. Minimum size of character array required to store word "WELLDONE" is

(1) 1 (2) 9 (3) 8 (4) 10

136. Which of the following is true?

(1) Array is used to group same type data only

(2) Array is used to group different type data only

(3) Array is used for linear data structure only

(4) Array is used to group same type as well as different type of data

137. Consider the following segment of 'C' program :

```
int x, y, z ;
z = (x = 10, y = 5, x + y + +);
```

value of z and y after execution of the above segment are

(1) z = 15, y = 5 (2) z = 16, y = 6

(3) z = 15, y = 6 (4) z = 16, y = 5

138. Consider the following 'C' program :

```
main( )
{
   float y ;
   y = 98·7654;
   printf("%-7.2f", y) ;
}
```

Output of the program will be

(1) 98·76 (2) 0098·76 (3) 98·77 (4) 0098·77

139. Consider the following 'C' program :

```
main( )
{
   printf ("%06d", 9876) ;
}
```

If input to the program is New Delhi 110 002, then the output will be

(1) 9876 (2) 009876 (3) 987600 (4) 09876

140. Consider the following 'C' program :

```
main( )
{
   int a, val ;
   float b ;
   char name[30];
   val = scanf ("%d%f %s", &a, &b, name) ;
   printf ("%d", val);
}
```

If the data input to the program is 20, motor and 150·25, then the output will be

(1) 3 (2) 2 (3) 0 (4) 1

141. Abbreviation ALU stand for

(1) Arithmetic Logic Unit
(2) Atomic Language Unit
(3) Automatic Logic Unit
(4) Arithmetic Logic User

142. Consider the following 'C' program :

```
main( )
{
    int size = 5;
    int arr[size] = {1, 2, 3, 4, 5};
    for (i = 1; i < = size; i + +)
  {
    printf("\n%d", arr[i]);
  }
  getch( );
}
```

The output of the program

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

(2) 2, 3, 4, 5

(3) 1, 2, 3, 4

(4) error

143. Which statement is true about 'C' language?

(1) 'C' language was developed by Dennis Ritchie in the year 1978 while working at Bell laboratories

(2) 'C' language is developed by Dennis Ritchie in the year 19[illegible] while working at IBM

(3) 'C' language was developed by Dennis Ritchie in the year 197[illegible] working at Bell laboratories now it is AT & T Bell laboratories

(4) 'C' language is developed by Dennis Ritchie in the year 1972 while working at IBM

(P.T.O.)

144. Consider the following segment of 'C' program :

```
m = 1;
do
{
m = m + 2;
} while (m < 10)
```

The number of times the body of do–while loop is executed

(1) 5 (2) 3 (3) 6 (4) 7

145. Consider the following logical expression :

(i) a > b && a < c (ii) a < b && a > c

(iii) a = = c || b > a (iv) b > 5 && c < 0 || a > 0

If a = 5, b = 10 and c = –6, then the value of expressions are

(1) F, T, T, F (2) F, T, T, T

(3) F, T, F, F (4) T, F, F, T

146. Consider the following name :

(i) Minimum (ii) First•name (iii) n1 + n2 (iv) &name

(v) Doubles (vi) 3rd_row (vii) int_type (viii) Indouble

The valid variable names are

(1) (i), (ii), (iv) (2) (iii), (iv), (vi)

(3) (i), (v), (vii), (viii) (4) (i), (iii), (iv), (vi)

147. Consider the following :

(i) 0·001 (ii) 5×1·15 (iii) 99999 (iv) +100

(v) 74·45 E–2 (vi) "15·75" (vii) – 45·6 (viii) –1·79 e + 4

(ix) 0·00001234

The invalid constant are

(1) (ii), (v), (vi), (viii) (2) (ii), (v)

(3) (vi), (viii) (4) (ii), (iv), (ix)

148. ANSI stand for

(1) American National Standard Institute

(2) American National Standard Interface

(3) American National Sea Institute

(4) *Both (1) and (2)*

149. Consider the following segment of 'C' program :

```
int a, b, c, d, e, f, g ;
  a =15;
  b =10;
  c = + + a – b;
  d = b + + + a;
  e = a/b;
  f = a%b;
  a *= b;
```

Values of a, b, c, d, e and f after execution of above segments are

(1) a = 176, b = 11, c = 6, d = 26, e = 1, f = 5

(2) a = 170, b = 10, c = 5, d = 26, e = 1, f = 5

(3) a = 176, b = 11, c = 5, d = 26, e = 1, f = 5

(4) None of the above

150. Consider the following segment of 'C' program :

```
int x, y, n ;
x = 1;
y = 1;
if (n > 0)
    x = x + 1;
    y = y - 1;
```

After execution of above program segment the value of x and y if n = 1 is

(1) x = 2, y = 0;

(2) x = 1, y = 0;

(3) x = 1, y = 1;

(4) x = 2, y = 1;

★★★

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।