Set No. 1   18P/301/25

No. of Printed Pages : 28   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)* .... (2018)

Serial No. of OMR Answer Sheet ....

Centre Code No.

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 OMR 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.*

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

4. Write all the entries by blue/black ball pen in the space provided above.

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

6. No overwriting is allowed in the entries of Roll No., Question Booklet No. and Set No. (if any) on OMR Answer Sheet and also Roll No. and OMR Answer Sheet Serial 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 OMR Answer Sheet by darkening the appropriate circle* in the corresponding row of the OMR Answer Sheet, by ball-point pen as mentioned in the guidelines given on the first page of the OMR Answer Sheet.

9. For each question, darken only one circle on the OMR 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. On completion of the Test, the Candidate must handover the OMR Answer Sheet to the Invigilator in the examination room/hall. However, candidates are allowed to take away Text Booklet and copy of OMR Answer Sheet with them.

13. Candidates 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.

परीक्षा निर्देश हिन्दी में अन्तिम आवरण-पृष्ठ पर दिये गए हैं।

SPACE FOR ROUGH WORK

रफ़ कार्य के लिए जगह

No. of Questions : 120

Time : 2 Hours   **Full Marks :** 360

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. 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 the above program segment the value of x and y if n = 0 is

(1) x = 2, y = 0   (2) x = 1, y = 0

(3) x = 1, y = 1   (4) x = 2, y = 1

(31)   1   (P.T.O.)

2. Consider the following segment of 'C' program

```
int x, y;
x = 10;
y = 7;
while(x%y>= 2)
  {
      x = x + 1;
      y = y + 2;
  }
```

Number of times the body of while loop is executed

(1) 2 ✓   (2) 5   (3) 4   (4) 3

3. 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 the above segment 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

4. Which one of the following is not a valid variable name declaration?

   (1) int _a3;　　　(2) int a_3;　　　(3) int 3_a;　　　(4) int _3a

5. All keywords in 'C' are in

   (1) Upper Case letters　　　　(2) Camel Case letters

   (3) None of the mentioned　　　(4) Lower Case letters

6. The format identifier '%i' is used for ——— data type.

   (1) char　　　(2) int　　　(3) float　　　(4) double

7. ```
#include <stdio.h>
int main( )
  {
      int a = 1, b = 1, c;
      c = a + + + b;
      printf("%d, %d", a, b);
  }
```
   After execution of the above 'C' program the value of a and b will be

   (1) a = 1, b = 1　　(2) a = 1, b = 2　　(3) a = 2, b = 1　　(4) a = 2, b = 2

8. ```
#include <stdio.h>
  int main( )
  {
      int x = 2, y = 0;
      int z = (y + +)? y == 1 && x : 0;
      printf("%d\n", z);
      return 0
  }
```
   After execution of the above 'C' program the value of z will be

   (1) compile time error　　　　(2) 1

   (3) undefined behavior　　　　(4) 0

9.
```
#include <stdio.h>
    int main( )
    {
        float f = 1;
        switch (f)
        {
        case 1.0:
            printf ("yes\n");
            break;
        default:
            printf("default\n");
        }
    }
```

After execution of the above 'C' program the output will be

(1) compile time error

(2) yes default

(3) undefined behavior

(4) yes

10. Which keyword can be used for coming out of recursion?

(1) break

(2) return

(3) exit

(4) Both break and return

11. Which C function definition will run correctly?

(1) int sum(int a, int b)
    return (a + b);

(2) int sum(a, b)
    return (a + b);

(3) int sum(int a, int b)
    {return (a + b);}

(4) None of the mentioned

12. What is the return-type of the function *sqrt()* ?

    (1) int

    (2) float

    (3) depends on the data type of the parameter

    (4) double

13. Consider the following 'C' program

    ```
    #define clrscr( ) 100
    main( )
    {
    clrscr( );
    printf("%d\n", clrscr( ));
    }
    ```

    The output of the program will be

    (1) clrscr( ) 100   (2) clrscr( )   (3) No output   (4) 100

14. ```
    #include <stdio.h>
    int main( )
    {
        int i = 0;
        do {
          i++;
          printf("In while loop\n");
        } while (i<3);
    }
    ```

    The output of the program will be

    (1) In while loop In while loop In while loop In while loop

    (2) In while loop
        In while loop
        In while loop

    (3) In while loop In while loop

    (4) In while loop
        In while loop

(31)   5   (P.T.O.)

15. The default return type if it is not specified in function definition

(1) int ✓   (2) void   (3) double   (4) short int

16. For the declaration bellow, which statement will be true?

const int *ptr;

(1) You cannot change the pointer ptr itself.

(2) You may or may not change the value pointed by ptr.

(3) You cannot change the value addressed by ptr.

(4) You can change the pointer as well as the value pointed by it.

17.
```
#include <stdio.h>
main( )

{
int arr[ ] = {0,1,2,3,4};
int *ptr, i;
for(ptr = arr + 4; ptr> = arr; ptr--)
printf("%d", arr[ptr-arr]);
}
```
The output of the program will be

(1) 0 1 2 3 4   (2) 4 3 2 1 0 ✓

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

18. Consider the following declaration of structure
```
struct test
    {
        int k;
        char c;

    };
```
Number of bytes allocated for 32 bit machine

(1) one   (2) two   (3) three ✓   (4) four

19. 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[1]   (3) B[1]   (4) &B[0]

20. In union

   (1) each member has common memory location

   (2) each member has its own memory location

   (3) same data type member share common memory space

   (4) same data type member has its own memory

21. Which of the following file opening modes would destroy the file being opened, if the file already exists on the disk?

   (1) "rb+"   (2) "wb+"   (3) "ab+"   (4) "r+"

22. The requirement is that the program should receive a key from the keyboard. However, the key that is hit should not appear on the screen. Which one of the following functions would you use?

   (1) getche( )   (2) getchar( )   (3) getch( )   (4) fgetchar( )

23. A program is allocated in the smallest available hole in memory. This allocation policy is

   (1) Best–fit   (2) First-fit   (3) Worst-fit   (4) Buddy

24. The linker

(1) is similar to interpreter

(2) uses source code as its input

(3) is required to create a load module ✓

(4) None of the above

25. Which one of the following statements is true?

(1) The body of while loop is executed at least once.

(2) The body of a do ...... while loop is executed at least once. ✓

(3) The body of a do ...... while loop is executed zero or more times.

(4) A for loop can never be used in place of a while loop.

26. Conditional statement $P \rightarrow Q$ is equivalent to

(1) $\bar{P} \wedge Q$ (2) $\bar{P} \vee Q$ ✓   (3) $\bar{P} \wedge \bar{Q}$ (4) $\bar{P} \vee \bar{Q}$

27. The simplified form of the Boolean expression $(X + Y + XY)(X + Z)$ is

(1) $X + Y + ZX + Y$ (2) $XY - YZ$

(3) $X + YZ$ ✓   (4) $XZ + Y$

28. Let $A(x)$ is predicate. The logical expression $\sim (\exists x) A(x)$ is equivalent to

(1) $(\forall x) A(x)$ (2) $(\exists x)(\forall x) \sim A(x)$

(3) $(\exists x) \sim (\forall x) A(x)$ (4) $(\forall x) \sim A(x)$ ✓

29. Postfix expression equivalent to infix expression $(A - B)*(D/E)$ is

(1) $ABDE*/-$ (2) $ABDE-/*$ (3) $AB - DE /*$ ✓   (4) None of these

30. If the input to T-flipflop is 100 Hz signal, the final output of the three T-flip flops in cascade is

(1) 1000 Hz   (2) 500 Hz   (3) 333 Hz   (4) 12·5 Hz

31. The digital logic family which has the lowest propagation delay time is

(1) ECL   (2) TTL   (3) CMOS   (4) PMOS

32. Which Boolean expression is for Ex-OR?

(1) $\bar{A}B + A\bar{B}$ (2) $AB + \overline{AB}$ (3) $\bar{A} + B$ (4) $\overline{AB}$

33. Memory in which any location can be reached in short and fixed amount of time by specifying it address is called

(1) cache memory   (2) RAM

(3) ROM   (4) None of the above

34. The simplification of the Boolean expression $\bar{A} + A$ is

(1) 0   (2) A (3) $\bar{A}$ (4) 1

35. How many OR and AND gates are required to realize $Y = CD + EF + G$?

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

36. Aberration INTR stands for

(1) INTRRUPT REQUEST   (2) INTRRUPT RIGHT

(3) INTRRUPTRONGH   (4) INTRRUPT RESET

37. $1's$ complement of $(110101)_2$ is

    (1) 000110   (2) 001001

    (3) 001100   (4) 001010 ✓

38. $2's$ complement of $(101100)_2$ is

    (1) 010011   (2) 010100 ✓

    (3) 010101   (4) 001101

39. Any negative number in binary representation is recognized by its

    (1) MSB ✓   (2) LSB   (3) Bits   (4) Nibble

40. If A and B are the inputs of a half adder, the carry is given by

    (1) A NOR B   (2) A OR B

    (3) A AND B ✓   (4) A Ex-OR B

41. A system of homogeneous linear equations $AX = 0$ has only trivial solution if

    (1) A is symmetric matrix   (2) A is singular matrix

    (3) A is not singular matrix ✓   (4) A is not of full rank

42. The locus of intersection of two mutually perpendicular tangents to a parabola is a

    (1) circle   (2) parabola   (3) straight line ✓   (4) ellipse

43. If $[x]$ denotes greatest integer function, then the value of $[2e]$ is

    (1) 5 ✓   (2) 4   (3) 2   (4) 6

(31)   10

44. If $z = \dfrac{1+3i}{1+i}$, then

   (1) $\mathrm{Re}(z) = \mathrm{Im}(z)$

   (2) $\mathrm{Re}(z) + 2\,\mathrm{Im}(z) = 0$

   (3) $\mathrm{Re}(z) = 2\,\mathrm{Im}(z)$

   (4) $\mathrm{Re}(z) + \mathrm{Im}(z) = 0$

45. The locus of complex number z, satisfying $|z-2| = 4$ is

   (1) a line segment

   (2) a circle

   (3) an ellipse

   (4) a straight line

46. The domain of real valued function $f(x) = \sqrt{5x - x^2 - 6}$ is

   (1) $\mathbb{R}$

   (2) $(0, \infty)$

   (3) $(2, 3)$

   (4) $[2, 3]$

47. The locus of point of intersection of three mutually perpendicular tangent planes to a hyperboloid of one sheet is a

   (1) sphere

   (2) circle

   (3) plane

   (4) hyperboloid of two sheet

48. The centre of the sphere which passes through points $(a, 0, 0), (0, b, 0), (0, 0, c)$ and $(0, 0, 0)$ is

   (1) $\left(\dfrac{a}{2}, 0, 0\right)$

   (2) $\left(0, \dfrac{b}{2}, 0\right)$

   (3) (a, b, c)

   (4) $\left(\dfrac{a}{2}, \dfrac{b}{2}, \dfrac{c}{2}\right)$

49. The rank of the linear transformation $T : R^2 \to R^2$ given by $T(x, y) = (x - y, y - x)$ is

   (1) 0

   (2) 1

   (3) 2

   (4) cannot determine

50. Let $f(x, y)$ is a homogeneous function of two variables of degree 4, then th value of $x \dfrac{\partial f}{\partial x} + y \dfrac{\partial f}{\partial y}$ is

(1) f (2) $2f$ (3) $3f$ (4) $4f$

51. The value of the integral $\displaystyle\int_0^{\frac{\pi}{2}} \dfrac{\sin^{2018} x}{\sin^{2018} x + \cos^{2018} x} dx$ is equal to

(1) 0 (2) 1 (3) $\dfrac{\pi}{4}$ (4) $\dfrac{\pi}{2}$

52. The value of $\displaystyle\int_0^\infty e^{-t} t^{2018} dt$ is

(1) $\Gamma(2019)$ (2) $\Gamma(2018)$ (3) $\Gamma(2017)$ (4) $\Gamma(2016)$

53. The value of $\Gamma\left(\dfrac{1}{2}\right)$ is a/an

(1) rational number   (2) integer

(3) complex number   (4) irrational number

54. Which one of the following sets is convex?

(1) $\{(x, y): y \geq 2, y \leq 4\}$ (2) $\{(x, y): y^2 \geq x\}$

(3) $\{(x, y): 3x^2 + 4y^2 \geq 5\}$ (4) $\{(x, y): x^2 + y^2 \geq 1\}$

55. The image of the point $(1, 3, 4)$ in the plane $2x - y + z + 3 = 0$ is

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

56. If $\vec{a}$ is any vector, then $|\vec{a} \times \hat{i}|^2 + |\vec{a} \times \hat{j}|^2 + |\vec{a} \times \hat{k}|^2$ is equal to

(1) $|\vec{a}|^2$ (2) $2|\vec{a}|^2$ (3) $3|\vec{a}|^2$ (4) $4|\vec{a}|^2$

57. The series $\Sigma \dfrac{(-1)^n}{n} |x|^n$ is uniformly convergent if

(1) $-1 < x < 1$ (2) $-1 \le x \le 1$

(3) $x < -1$ or $x > 1$ (4) $x \le -1$ or $x \ge 1$

58. If $z = 1 - \cos\theta + i \sin\theta$, then $|z|$ is equal to

(1) $2 \sin \dfrac{\theta}{2}$ (2) $2 \cos \dfrac{\theta}{2}$ (3) $2 \left| \sin \dfrac{\theta}{2} \right|$ (4) $2 \left| \cos \dfrac{\theta}{2} \right|$

59. If $(1+i)(1+2i)(1+3i)\dots(1+ni) = a + ib$, then $2 \cdot 5 \cdot 10 \cdot 17 \dots (1+n^2)$ is equal to

(1) $a - ib$ (2) $a^2 - b^2$ (3) $a^2 + b^2$ (4) $(a+b)^2$

60. Particular integral of $\dfrac{d^2 y}{dx^2} + 9y = \sin 3x$ is

(1) $-\dfrac{x}{6} \cos 3x$ (2) $\dfrac{x}{6} \cos 3x$ (3) $\dfrac{x}{6} \sin 3x$ (4) $-\dfrac{x}{6} \sin 3x$

61. If $\dfrac{dx}{dt} + 7y = 0$ and $\dfrac{dy}{dt} - 7x = 0$, then

(1) $y = A \cos 7t - B \sin 7t$ (2) $y = A \cos 7t + B \sin 7t$

(3) $y = -A \cos 7t + B \sin 7t$ (4) $y = -A \cos 7t - B \sin 7t$

62. The number of continuous function f from $[-1,1]$ to $\mathbb{R}$ satisfying $(f(x))^2 = x^2$ all $x \in [-1, 1]$ is

(1) 2   (2) 3   (3) 4 ✓   (4) infinite

63. Let $q \in \mathbb{N}$. The number of elements in the set $\left\{ \left(\cos \dfrac{\pi}{q} + i \sin \dfrac{\pi}{q} \right)^n \mid n \in \mathbb{N} \right\}$

(1) 1   (2) q (3) infinite   (4) $2q$ ✓

64. If A and B are 3×3 real matrices with rank $(AB) = 1$, then rank (BA) cannot be

(1) 3 ✓   (2) 1   (3) 2   (4) 0

65. The number of common solutions of $x^{36} - 1 = 0$ and $x^{24} - 1 = 0$ in the set complex number is

(1) 1   (2) 2   (3) 6   (4) 12 ✓

66. If $I = \displaystyle\int_0^1 \dfrac{1}{1 + x^8} \, dx$, then

(1) $I < \dfrac{1}{2}$ (2) $I < \dfrac{\pi}{4}$ (3) $I > \dfrac{\pi}{4}$ ✓   (4) $I = \dfrac{\pi}{4}$

67. Consider all 2×2 matrices whose entries are distinct and belong to $(1, 2, 3,$ The sum of determinants of all such matrices is

(1) 4!   (2) 0 ✓   (3) negative   (4) odd

68. For some real number $c \in [a, b]$, the value of $\displaystyle\int_a^b \sin x \, dx$ is

(1) $(b - a) \sin c$ ✓   (2) $(b - a) \cos c$

(3) $\dfrac{\sin c}{(b - a)}$ (4) $\dfrac{\cos c}{(b - a)}$

69. The set of all real numbers x such that $||3-x|-|x+2||=5$ is

(1) $[3, \infty)$

(2) $(-\infty, -2]\cup[3, \infty)$

(3) $(-\infty, -2]$

(4) $(-\infty, -3]\cup[2, \infty)$

70. The four vectors $(1, 1, 0, 0)$, $(1, 0, 0, 1)$, $(1, 0, a, 0)$, $(0, 1, 3, b)$, are linearly independent if a and b satisfy

(1) $a \neq 0, b \neq 2$

(2) $a \neq 2, b \neq 0$

(3) $a \neq 0, b \neq -2$

(4) $a \neq -2, b \neq 0$

71. Let $f(x) = \sin x + \cos x$. The infimum of $f(x)$ over the interval $[0, \pi/4]$ is

(1) 0

(2) 1

(3) $\sqrt{2}$

(4) $1/\sqrt{2}$

72. Let A be the set of points where the function $f(x) = \cos|x-5| + |x+10|^3$ is not differentiable. Then

(1) $A = \{5\}$

(2) $A = \{5, 10\}$

(3) $A = \{-10\}$

(4) $A = \phi$

73. How many factors of $2^5 3^6 5^2$ are perfect square?

(1) 24

(2) 20

(3) 30

(4) 36

74. Let $f(x) = \begin{cases} 3x + x^2 & \text{if } x < 0 \\ x^3 + x^2 & \text{if } x \geq 0 \end{cases}$. Then $f''(0)$ is

(1) 0

(2) 2

(3) 3

(4) not defined

75. The minimum value of the function $f(x) = x^x$, $x \in (0, \infty)$ is

(1) $\left(\dfrac{1}{10}\right)^{\frac{1}{10}}$

(2) $10^{\frac{1}{10}}$

(3) $\dfrac{1}{e}$

(4) $\left(\dfrac{1}{e}\right)^{\frac{1}{e}}$

76. If $x^2 + x + 1 = 0$, then the value of $\left(x + \dfrac{1}{x}\right)^2 + \left(x^2 + \dfrac{1}{x^2}\right)^2 + \ldots + \left(x^{27} + \dfrac{1}{x^{27}}\right)^2$ is

(1) 27　　　　(2) 54　　　　(3) 0　　　　(4) −27

77. The curve satisfying $\dfrac{dy}{dx} = \dfrac{y^2 - 2xy - x^2}{y^2 + 2xy - x^2}$ and passing through $(1, -1)$ is

(1) a straight line

(2) a circle

(3) an ellipse

(4) a parabola

78. The value of $[\vec{a} \times \vec{b} \ \ \vec{b} \times \vec{c} \ \ \vec{c} \times \vec{a}]$ is

(1) $2[\vec{a}\,\vec{b}\,\vec{c}]$　　　(2) $3[\vec{a}\,\vec{b}\,\vec{c}]$　　　(3) $[\vec{a}\,\vec{b}\,\vec{c}]^2$　　　(4) 0

79. Let $M = \begin{pmatrix} -2 & -1 \\ 3 & 1 \end{pmatrix}$. Then M^{2018} is equal to

(1) $\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$

(2) $\begin{pmatrix} -2^{2018} & -1 \\ 3^{2018} & 1 \end{pmatrix}$

(3) $\begin{pmatrix} -2 & -1 \\ 3 & 1 \end{pmatrix}$

(4) $\begin{pmatrix} 1 & 1 \\ -3 & -2 \end{pmatrix}$

80. For what value of α the vector $\alpha(x + y)\hat{i} + 4y\,\hat{j} + 3\hat{k}$ is solenoidal?

(1) 0　　　　(2) 4　　　　(3) −2　　　　(4) −4

81. The probabilities that a husband and wife will be alive for 20 years from now is 0·8 and 0·9 respectively. Then the probability that at least one will be alive for 20 years from now is

(1) 0·98　　　(2) 0·96　　　(3) 0·74　　　(4) 0·72

82. Which one of the following distributions has mean less than that of its variance?

(1) Hypergeometric distribution   (2) Geometric distribution

(3) Poisson distribution   (4) Negative binomial distribution

83. If $f(x, y) = \frac{1}{3}(x+y), 0 \le x \le 1, 0 \le y \le 2$, then $E(x)$ is

(1) $\frac{2}{9}$ (2) $\frac{5}{9}$ (3) $\frac{11}{9}$ (4) $\frac{16}{9}$

84. In a laboratory, an experiment is repeated everyday till it is successful, the probability of success is p. The experiment starts on Monday, then the probability that the process of repetition end on Sunday is

(1) $p(1-p)^5$ (2) $p(1-p)^6$ (3) $(1-p)^5$ (4) $(1-p)^6$

85. If X is a random variable with *pdf*

$$f(x) = \frac{1}{\theta} e^{-\frac{x}{\theta}}, \quad x \ge 0, \theta > 0$$

Then its variance is

(1) $\frac{1}{\theta}$ (2) $\frac{1}{\theta^2}$ (3) θ (4) θ^2

86. The variance of Chi-square distribution with n degrees of freedom is

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

87. Lack of memory property is possessed by

(1) only exponential distribution

(2) only geometric distribution

(3) Both exponential and geometric distributions ✓

(4) Neither exponential nor geometric distributions

88. One group having 100 observations has mean 15 and variance 9. If there a 250 observations in a whole of two groups with mean 15·6 and variance 13·4 then standard deviation of other group is

(1) 4·0 ✓   (2) 4·5   (3) 5·4   (4) 5·0

89. If $P(A \cup B) = \dfrac{23}{36}$ and $P(B) = \dfrac{11}{36}$, then $P(\bar{A} \mid \bar{B})$ is

(1) $\dfrac{11}{25}$ (2) $\dfrac{11}{36}$ (3) $\dfrac{13}{25}$ ✓   (4) $\dfrac{13}{36}$

90. The odds against School X settling the wage dispute with the teachers are 8 and odds in favour of School Y settling the same dispute are $14 : 16$. What is tl probability that the dispute will be settled if they try independently?

(1) $\dfrac{63}{105}$ (2) $\dfrac{73}{105}$ ✓   (3) $\dfrac{83}{105}$ (4) $\dfrac{93}{105}$

91. If $r_{12} = r_{13} = r_{23} = 0{\cdot}8$, then coefficient of partial correlation is

(1) 0·222   (2) 0·333   (3) 0·444 ✓   (4) 0·555

92. There are $(n+1)$ observations in a series. If $\bar{x}_1$ is the mean of first n observations and $\bar{x}_2$ is the mean of last n observations, then

(1) $x_2 = x_1 + x_{n+1} - x_1$

(2) $\bar{x}_2 = \bar{x}_1 - x_{n+1} + x_1$

(3) $\bar{x}_2 = \bar{x}_1 + (x_{n+1} - x_1)/n$

(4) $\bar{x}_2 = \bar{x}_1 - (x_{n+1} - x_1)/n$

93. t-test is not used in testing

(1) the significance of an observed sample correlation

(2) the significance of an observed regression coefficient

(3) the homogeneity of correlation coefficient

(4) for difference of mean

94. Which probability model can be used to estimate number of fish in a lake?

(1) Binomial distribution

(2) Negative binomial distribution

(3) Geometric distribution

(4) Hypergeometric distribution

95. In a Poisson frequency distribution, frequency corresponding to 3 successes is $\frac{2}{3}$ times frequency corresponding to 4 successes. Then the mean of the distribution is

(1) 6

(2) 7·5

(3) 7

(4) 8

96. The mean and variance of binomial distribution are 4 and $\frac{4}{3}$ respectively. Then $P(X \geq 1) =$

(1) 0·8632

(2) 0·9863

(3) 0·9986

(4) 0·9998

97. Given $x - 4y = 5$ and $x - 16y = -64$ are the regression lines, the coefficient of correlation is

(1) 0·35   (2) 0·40   (3) 0·45   (4) 0·50

98. Given $r = 0.4$, $\sum_{i=1}^{n} (x_i - \bar{x})(y_i - \bar{y}) = 108$, $\sigma_y = 3$ and $\sum_{i=1}^{n} (x_i - \bar{x})^2 = 900$. Find number of pairs of observations

(1) 8   (2) 9   (3) 10   (4) 12

99. A distribution has mean 30, coefficient of variation 20% and coefficient of skewness 0·3. Then its mode is

(1) 22·6   (2) 24·8   (3) 26·0   (4) 28·2

100. The first four moments of a distribution about the value "5" are 2, 20, 40 and 200 respectively. Then its mean and standard deviation is

(1) $(7, 4)$ (2) $(2, 4)$ (3) $(2, 6)$ (4) $(7, 6)$

101. Let A and B be two events defined on a sample space Ω, such that $P(A) = \dfrac{3}{4}$, $P(B) = \dfrac{5}{8}$, then which statement is most correct?

(1) $P(A \cap B) \geq \dfrac{3}{4}$ (2) $P(A \cap B) \geq \dfrac{3}{8}$

(3) $P(A \cap B) \geq \dfrac{5}{8}$ (4) $P(A \cap B) \geq \dfrac{1}{2}$

102. If probability of a boy to pass a test is $\frac{3}{5}$ and that of a girl to pass is $\frac{2}{5}$. Then the probability that at least one of them will pass the test is

(1) $\frac{13}{25}$

(2) $\frac{16}{25}$

(3) $\frac{19}{25}$

(4) $\frac{21}{25}$

103. If probability mass function of a random variable X is

$$p(x) = \frac{3-x}{10}, \quad x = -1, 0, 1, 2$$

then expectation of X is

(1) 0

(2) 0·1

(3) 0·2

(4) 0·5

104. The mean and standard deviation of 10 observations were 9·5 and 2·5. If one more observation with value 15 is included in the group, then standard deviation of new group is

(1) 2·6062

(2) 2·7204

(3) 2·8604

(4) 2·9262

105. A machine consists of two parts P_1 and P_2. Probability of defect in P_1 is 0·08 and that of P_2 is 0·05. Then the probability that the assembled machine will not have any defect is

(1) < 0·25

(2) 0·50

(3) 0·75

(4) > 0·75

106. A student drives scooty from his hostel to department at a speed of 60 km/hr and returns back from department to his hostel by same route at 20 km/hr. His average speed is

(1) 25

(2) 30

(3) 35

(4) 40

107. The average salary of male employee in a firm was Rs 5,200 and that of females was Rs 4,200. The mean salary of all employees was Rs 5,000, then percentage of female employee in the firm is

(1) 20

(2) 25

(3) 30

(4) 35

108. If a random variable has probability density function

$$f(x) = \frac{x}{b^2} e^{-x^2/2b^2}, 0 < x < \infty$$

Then the mean of X is

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

(2) $\sqrt{\frac{\pi}{2}}$

(3) $\frac{b\pi}{2}$

(4) $\frac{\pi}{2b}$

109. The expectation of number of failures preceding the first success in an infinite series of independent trial with constant probability of success p and probability of failure q in each trial is

(1) $\frac{p}{q}$

(2) $\sqrt{\frac{p}{q}}$

(3) $\sqrt{\frac{q}{p}}$

(4) $\frac{q}{p}$

110. A problem is given to three students Vijay, Srishti and Diksha whose chances to solving it are $\frac{1}{3}$, $\frac{2}{3}$ and $\frac{1}{4}$ respectively. If all try to solve independently, then the probability that the problem will be solved is

(1) $\frac{13}{18}$

(2) $\frac{5}{6}$

(3) $\frac{8}{9}$

(4) $\frac{17}{18}$

111. Which one of the following cannot be negative?

(1) Range

(2) Median

(3) Mode

(4) Mean

112. Which measure of central tendency will be more suitable for following data set?

    2, 4, 5, 6, 7, 4, 5, 6, 7, 9, 10, 12, 50

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

113. Let $f(x, y) = 8xy$, $0 < x < y < 1$, then $E[Y^2 \mid X = x]$ is

    (1) $\dfrac{2}{1 + x^2}$ (2) $\dfrac{1 + x^2}{2}$ (3) $\dfrac{1 - x^2}{2}$ (4) $\dfrac{2}{1 - x^2}$

114. If $f(x) = 6x(1 - x)$, $0 < x < 1$, then $P\left\{ X \le \dfrac{1}{2} \middle| \dfrac{1}{3} \le X \le \dfrac{2}{3} \right\}$ is

    (1) $\dfrac{17}{26}$ (2) $\dfrac{15}{26}$ (3) $\dfrac{1}{2}$ (4) $\dfrac{11}{26}$

115. If $P(s) = \dfrac{s}{2 - s}$ is probability generating function, then its corresponding probability density function is

    (1) $\dfrac{1}{(2 - x)^r}$ (2) $\dfrac{1}{2^r}$ (3) $\dfrac{1}{2^{r/2}}$ (4) $\dfrac{1}{(2 - x)^{r/2}}$

116. A pair of fair dice is rolled. The sum of 8 has appeared, then the probability that one die shows "3" is

    (1) $\dfrac{1}{5}$ (2) $\dfrac{2}{5}$ (3) $\dfrac{3}{5}$ (4) $\dfrac{4}{5}$

117. If a random variable follows a Chi-square distribution with 16 degrees of freedom, then its coefficient of skewness is

(1) $\frac{1}{2}$ ✓

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

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

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

118. If X is a discrete random variable with probability mass function

$$p(x) = \frac{6}{\pi^2 x^2}, \quad x = 1, 2, 3 \cdots$$

then its expectation is

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

(2) $\frac{3}{\pi}$

(3) $\frac{36}{\pi^2}$

(4) Does not exists

119. A speaks truth 4 out of 5 times. A die is rolled. He reports that there is a "five". Then the chance that actually there appeared a "five" on the die is

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

(2) $\frac{4}{5}$

(3) $\frac{4}{9}$ ✓

(4) $\frac{4}{7}$

120. If a random variable follows a t distribution with 7 degrees of freedom, then its mean is

(1) $\frac{2}{7}$

(2) $\frac{5}{7}$

(3) $\frac{7}{5}$ ✓

(4) $\frac{7}{2}$

★★★

SPACE FOR ROUGH WORK

रफ़ कार्य के लिए जगह

अभ्यर्थियों के लिए निर्देश

(इस पुस्तिका के प्रथम आवरण-पृष्ठ पर तथा ओ०एम०आर० 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 पृष्ठ या पृष्ठ 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 प्रवेश-पत्र के अतिरिक्त, लिखा या सादा कोई भी खुला कागज साथ में न लायें।

3. ओ०एम०आर० उत्तर-पत्र अलग से दिया गया है। इसे न तो मोड़ें और न ही विकृत करें। दूसरा ओ०एम०आर० उत्तर-पत्र नहीं दिया जायेगा। केवल ओ०एम०आर० उत्तर-पत्र का ही मूल्यांकन किया जायेगा।

4. अपनी परीक्षार्थी प्रथम आवरण-पृष्ठ पर नीली/काली बाल पेन से निर्धारित स्थान पर लिखें।

5. ओ०एम०आर० 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 एवं केन्द्र कोड नम्बर तथा सेट का नम्बर उचित स्थानों पर लिखें।

6. ओ०एम०आर० उत्तर-पत्र पर अनुक्रमांक संख्या, प्रश्न-पुस्तिका संख्या व सेट संख्या (यदि कोई हो) तथा प्रश्न-पुस्तिका पर अनुक्रमांक सं० और ओ०एम०आर० उत्तर-पत्र सं० की प्रविष्टियों में अधिलेखन की अनुमति नहीं है।

7. उपर्युक्त प्रविष्टियों में कोई भी परिवर्तन कक्ष निरीक्षक द्वारा प्रमाणित होना चाहिये अन्यथा यह एक अनुचित माध्यम 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 ओ०एम०आर० उत्तर-पत्र की सम्बन्धित पंक्ति के सामने दिये गये वृत्त को ओ०एम०आर० 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. रफ कार्य के लिये प्रश्न-पुस्तिका के मुखपृष्ठ के अन्दर वाले पृष्ठ तथा अंतिम पृष्ठ का प्रयोग करें।

12. परीक्षा की समाप्ति के बाद अभ्यर्थी अपना ओ०एम०आर० उत्तर-पत्र परीक्षा कक्ष/हाल में कक्ष निरीक्षक को सौंप दें। अभ्यर्थी अपने साथ प्रश्न-पुस्तिका तथा ओ०एम०आर० उत्तर-पत्र की प्रति ले जा सकते हैं।

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।