Msc. in Computational Science Code No (471)

**17P/301/23**

10085

**Set No. – 1** 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) ..... 2017 ..... 218.

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 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 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 changes in the aforesaid entries is to be verified by the invigilator, otherwise it will be taken as unfairmeans.
8. Each question in this Booklet is followed by four alternative answers. ***For each question, you are to record the correct option on the Answer Sheet by darkening the appropriate circle in the corresponding row of the Answer Sheet, by 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 marks***).
11. For rough work, use the inner back page of the title cover and the blank page at the end of this Booklet.
12. Deposit ***only 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 गये हैं। ]

SEAL

Total No. of Printed Pages : 32

195.

**FOR ROUGH WORK / रफ कार्य के लिए**

312

M.Sc. in Computational Science Code No. (471)

2017

17P/301/23(Set-1)

No. of Questions : 120

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

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

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

1. Consider the following C program :

```
main()
{
int num1, num2, num3;
scanf ("%2d %5d", &num1, &num2);
scanf ("%2d", &num3);
printf("%d%d%d", num1, num2, num3);
}
```

If the data input to the program 31426, 50, and 100 then the output will be :

(1) 31426, 50, 100 (2) 50, 31426, 100 (3) 314, 2650, 100 (4) 31, 426, 50

2. Consider the following C program :

```
main()
{
int p, q, r;
scanf ("%3d%4d%3d", &p, &q,&r);
printf("%d%d%d", p, q, r);
}
```

If the data input to the program 123456789, then the output will be :

(1) 123, 456, 789 (2) 123, 45, 678 (3) 123, 4567, 89 (4) 12, 3456, 789

**3.** Minimum size of character array required to store word "WELLDONE" is :

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

**4.** Consider the following C program :

```
main()
{
float me = 1.1;
double you = 1.1;
if(me = =you)
printf("I love U");
else
printf("I hate U");
}
```

The output of the program will be :

(1) I love U (2) I hate U

(3) I LOVE U (4) I HATE U

**5.** Consider the following C program :

```
main()
{
static int var = 5;
printf("%d ",var--);
if(var)
main();
}
```

The output of the program will be :

(1) 12345 (2) 23451

(3) 54321 (4) 32145

6. Consider the following C program :

```
main()
{
int c[ ]={2.8,3.4,4,6.7,5};
int j, *p=c, *q=c;
for(j=0;j<5;j++) {
printf(" %d ",*c);
++q; }
for(j=0;j<5;j++){
printf(" %d ",*p);
++p; }
}
```

The output of the program will be :

(1) 2222223465 (2) 2222233465

(3) 2222234465 (4) 2222223456

7. Consider the following C program :

```
main()
{
int i=-1, j=-1, k=0, l=2, m;
m=i++&&j++&&k++||l++;
printf("%d %d %d %d %d",i,j,k,l,m);
}
```

The output of the program will be :

(1) 00113 (2) 00111

(3) 00131 (4) 00133

8. Consider the following C program :

```
main()
{
char *p;
printf("%d %d ",sizeof(*p),sizeof(p));
}
```

The output of the program will be :

(1) 2 1 (2) 4 1 (3) 8 1 (4) 1 2

9. Consider the following C program :

```
main()
{
int i=3;
switch(i)
{
default:printf("zero");
case 1: printf("one");
break;
case 2:printf("two");
break;
case 3: printf("three");
break;
}
}
```

The output of the program will be :

(1) three (2) two

(3) one (4) zero

10. Consider the following C program :

```
main()
{
int c=- -2;
printf("c=%d",c );
}
```

The output of the program will be :

(1) –2 (2) 2 (3) c (4) 0

11. Consider the following C program :

```
#define int char
main()
{
int i=65;
printf("sizeof(i)=%d" ,sizeof(i));
}
```

The output of the program will be :

(1) sizeof(i) =1 (2) sizeof(1)

(3) sizeof=1 (4) 1

12. Consider the following C program :

```
main()
{
int i=10;
i=!i> 14;
printf ("i=%d",i);
}
```

The output of the program will be :

(1) 14 (2) 10 (3) 1 (4) 0

13. Consider the following C program :

```
main()
{
printf("\nab");
printf("\bsi") ;
printf("\rha");
}
```

The output of the program will be :

(1) abs (2) abh (3) hai (4) iah

14. Consider the following C program :

```
main()
{
int i=5;
printf("%d%d%d%d%d%d",i++,i--,++i,--i,i);
}
```

The output of the program will be :

(1) 45545 (2) 54545

(3) 45455 (4) 55454

15. Consider the following C program :

```
#include <stdio.h>
#define a 10
main()
{
#define a 50
 printf("%d", a);
}
```

The output of the program will be :

(1) 10 (2) 50 (3) a (4) a 10

16. Consider the following C program :

```
main()
{
int i=400,j=300;
printf("%d .. %d");
}
```

The output of the program will be :

(1) 400..300 (2) 400300

(3) 4003 (4) 400..

17. Consider the following C program :

```
main()
|
int i;
printf("%d",scanf("%d",&i));
]
```

If value 10 is given as input, then output will be :

(1) 0 (2) 10 (3) 1 (4) 2

18. Consider the following C program :

```
main()
{
int i=-1;
+i;
printf("i = %d, +i = %d \n",i,+i);
}
```

The output of the program will be :

(1) i = -1 +i = -1 (2) i = 1, +i = -1

(3) i = -1 +i = 1 (4) i = -1, +i = -1

19. Consider the following C program :

```
main()
{
char *str1 ="abcd";
char str2[]="abcd";
printf("%d %d %d",sizeof(str1),sizeof(str2),sizeof("abcd"));
}
```

The output of the program will be :

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

20. Consider the following C program :

```
main()
{
char not;
not=!2;
printf(" %d" ,not);
}
```

The output of the program will be :

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

21. Consider the following C program :

```
#define FALSE -1
#define TRUE 1
#define NULL 0
main()
{
if(NULL)
puts("NULL");
else if(FALSE)
puts("TRUE");
else
puts("FALSE");
}
```

The output of the program will be :

(1) FALSE (2) NULL (3) 1 (4) TRUE

**22.** Consider the following C program :

```
main()
{
int k=1;
printf("%d= =1 is" "%s", k, k= =1 ?"TRUE":"FALSE");
}
```

The output of the program will be :

(1) 1=1 is TRUE
(2) 1=1 is FALSE
(3) 1==1 is TRUE
(4) 1==1

**23.** Consider the following C program :

```
main()
{
int y;
scanf("%d",&y);
if( (y%4= =0 && y%100 != 0) || y%100 = = 0)
printf("%d is a leap year");
else
printf("%d is not a leap year");
}
```

If input given is 2000, then the output of the program will be :

(1) 2000 is not leap year
(2) 2000 is a leap year
(3) Error
(4) 2000

**24.** Consider the following C program :

```
main()
{
int *j;
{
int i=10;
j=&i;
}
printf("%d", *j);
}
```

The output of the program will be :

(1) 2 (2) 4 (3) Address of j. (4) 10

**25.** Consider the following C program :

```
#include<stdio.h>
main()
{
register i=5;
char j[]= "hello";
printf("%s %d",j,i);
}
```

The output of the program will be :

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

**26.** Consider the following C program :

```
main()
{
int i=5,j=6,z;
printf("%d",i++j);
}
```

The output of the program will be :

(1) 12 (2) 11 (3) 5+6 (4) 6

**27.** Consider the following C program :

```
void main()
{
int i;
for(i=1; i<4,i++)
switch(i)
case 1: printf("%d",i);break;
{
case 2:printf("%d",i);break;
case 3 :printf("%d",i); break;
}
switch(i) case 4:printf("%d",i);
}
```

The output of the program will be :

(1) 1,2,3,4 (2) 1,2,3,4,5 (3) 0,1,2,3 (4) 1,2,3,5

**28.** Consider the following C program :

```
main()
{
int i= _1_abc(10);
printf("%d\n",–i);
}
int _1_abc(int i)
{
return(i++);
}
```

The output of the program will be :

(1) 10 (2) 11 (3) 9 (4) 0

**29.** Consider the following C program :

```
main()
{
int i=0;j=0;
if(i && j++)
printf("%d..%d",i++, j);
printf("%d..%d",i,j);
}
```

The output of the program will be :

(1) 0..0 (2) 0..1 (3) 0++1 (4) 0+1

**30.** Consider the following C program :

```
main()
{
int i=0;
while(+(+i–)!=0)
i-=i++;
printf("%d",i);
}
```

The output of the program will be :

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

**31.** The NAND gate output will be low if the two inputs are :

(1) 00 (2) 01 (3) 10 (4) 11

**32.** The simplification of the Boolean expression $\overline{A} \bullet A$ is :

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

**33.** The number of control lines for a 8 – to – 1 multiplexer is :

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

**34.** Which Boolean expression is for Ex-OR :

(1) $\overline{A}B + A\overline{B}$ (2) $AB + \overline{A}\,\overline{B}$

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

**35.** Which is true for D-flip flop :

(1) Output is complement of input.

(2) Output does not depend on input.

(3) Outputs depend on past input and clock.

(4) Output is same as input.

**36.** Data can be changed from special code to temporal code by using :

(1) Counters (2) Combinational circuits

(3) Shift registers (4) A/D converters.

**37.** A device which converts BCD to Seven Segment is called :

(1) Encoder (2) Decoder

(3) Multiplexer (4) Demultiplexer

**38.** Program counter is :

(1) Register in microprocessor

(2) Memory location in RAM

(3) Memory location in ROM

(4) Location in disc

**39.** Words having 8-bits are to be stored, into computer memory. The number of lines required for writing into memory are :

(1) 1 (2) 2 (3) 4 (4) 8

**40.** Karnaugh Map (K-map) is used to determine the :

(1) Maximal Boolean expression.

(2) Standard sum of product form of the Boolean expression.

(3) Minimal Boolean expression.

(4) Standard product of sum form of the Boolean expression.

**41.** The locus of point of intersection of three mutually perpendicular tangent planes to a hyperboloid is :

(1) a sphere (2) a circle

(3) a plane (4) a straight line

**42.** The domain of a real valued function $f(x) = \sqrt{7x - x^2 - 10}$ is :

(1) R (2) $(0, \infty)$ (3) (2, 5) (4) [2, 5]

**43.** The equation to a plane in intercept form is :

(1) $\frac{x}{a} + \frac{y}{b} + \frac{z}{c} = 1$ (2) $lx + my + nz = p$

(3) $x \cos\alpha + y \cos\beta + z \cos\gamma = p$ (4) $ax + by + cz + d = 0$

**44.** The function $f : R \to R$ defined by $f(x) = x + [x]$, where $[x]$ is greatest integer function, then $f$ is :

(1) Continuous everywhere but not differentiable at $x = 0$.

(2) Differentiable everywhere but not continuous at $x = 0$.

(3) Continuous and differentiable everywhere.

(4) Neither continuous nor differentiable.

**45.** The angle between the lines $y = x, z = 0$ and $x + y + z = 0, z = 0$ is :

(1) 90° (2) 30° (3) 60° (4) 0°

**46.** The centre of the sphere which passes through points (4,0,0), (0,6,0), (0,0,8) and (0,0,0) is :

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

(3) (4,6,8) (4) (2,3,4)

**47.** The maximum value of the function $f(x) = x^2 + 3x + 2$ on the interval $[-2,2]$ is :

(1) 12 (2) 0 (3) $-1/4$ (4) 15

**48.** If $f(x) = \sin x + \cos x$, $0 \le x \le \pi$, the value $x$ at which $f$ has a maximum is :

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

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

(1) 0 (2) 1

(3) 2 (4) Cannot determine

**50.** The radius of curvature of a curve $x = 5 \cos t$, $y = 5 \sin t$ at the point $t = \frac{\pi}{4}$ is given by :

(1) 5 (2) 1 (3) 0 (4) $\frac{1}{5}$

**51.** The remainder, when 2016! + 1 is divided by 2017 is :

(1) 2016 (2) 0

(3) 1 (4) Cannot determine

**52.** The value of $\int_{-\pi/2}^{\pi/2} x^{2017} \cos x \, dx$ is :

(1) 2017 (2) $\pi$ (3) 0 (4) $\pi/2$

**53.** If C is a unit circle centered at origin then the value of $\int_C \frac{1}{z^2} dz$ is :

(1) 0 (2) $2\pi i$

(3) $2\pi$ (4) Cannot determine

**54.** The angle between any two diagonals of a cube is :

(1) $\cos^{-1}\frac{1}{3}$ (2) $\cos^{-1}\frac{2}{3}$ (3) $\frac{\pi}{4}$ (4) $\frac{\pi}{2}$

**55.** If [x] denotes greatest integer function, then the value of $[-\pi^2]$ is :

(1) –6 (2) –7 (3) –10 (4) $-\pi^2$

**56.** The locus of complex number, z, satisfying $|z-i|+|z+i|=2$ is :

(1) Line segment (2) Circle

(3) Ellipse (4) Straight Line

**57.** A root of $x^3 - 8x^2 + px + q = 0$ where $p$ and $q$ are real numbers is $4 + i\sqrt{5}$. Then the value of $q$ is :

(1) 0 (2) 1 (3) $p$ (4) 8

**58.** The number of trivial subgroup of a cyclic group of order 8 is :

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

**59.** If $f(x) = \sin 4x, 0 \le x \le \pi/2$, the value $x$ at which tangent is parallel to $x$-axis :

(1) $\pi/8$ (2) $\pi/4$ (3) $\pi/3$ (4) $\pi/6$

**60.** The polar equation $r = a \sin\theta$ represents :

(1) Straight line (2) Circle

(3) Parabola (4) Point

**61.** The infinite series $\frac{1}{1^3}+\frac{1}{2^3}+\frac{1}{3^3}+\ldots\ldots$ is :

(1) Convergent (2) Divergent

(3) Oscillatory (4) Cannot determine

**62.** The value of integral $\int_0^{\pi/2}\frac{\sec^{2017}x}{\sec^{2017}x+\operatorname{cosec}^{2017}x}dx$ is equal to :

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

**63.** The Laplace transform of $\frac{1}{2}(1+\cos 2t)$ is :

(1) $\frac{1}{2}\left[\frac{1}{s^2+4}+\frac{1}{s}\right]$ (2) $\frac{1}{2}\left[\frac{1}{s^2+4}-\frac{1}{s}\right]$

(3) $\frac{1}{2}\left[\frac{s}{s^2+4}+\frac{1}{s}\right]$ (4) $\frac{1}{2}\left[\frac{s}{s^2+4}-\frac{1}{s}\right]$

**64.** The value of the constant $a$ for which the vector $\overline{A}=(2xy+3yz)\hat{i}+(x^2+3xy-4z^2)\hat{j}-(3xy+ayz)\hat{k}$ is irrotational :

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

**65.** The shortest distance between the lines $\frac{x-1}{2}=\frac{y-2}{3}=\frac{z-3}{4}$ and $\frac{x-2}{3}=\frac{y-4}{4}=\frac{z-4}{5}$ is :

(1) 1/6 (2) $1/\sqrt{6}$ (3) $1/\sqrt{3}$ (4) 1/3

**66.** The parametric equations $x=4+t^2$, $y=2t+3$ represent :

(1) a parabola with focus at (4,3)

(2) a parabola with vertex at (4,3)

(3) an ellipse with centre at (4,3)

(4) a hyperbola with focus at (4,3)

**67.** The *Sup* and *inf* of the set $\left\{m+\frac{1}{n};m,n\in N\right\}$ are respectively :

(1) 1, 0 (2) does not exist, 0

(3) does not exist, 1 (4) does not exist, does not exist

**68.** If S is a non empty subset of R, which is bounded above, then the set of upper bounds of S has :

(1) a least element

(2) a greatest element

(3) both greatest and least element

(4) neither least nor greatest element

**69.** The superior limit of $\langle(-1)^n\rangle$ is given by :

(1) $-1$ (2) $-2$ (3) 0 (4) 1

**70.** If $F(n) = \frac{1}{n}\{(n+1)(n+2)(n+3) \ldots \ldots (2n)\}^{1/n}$ then $\lim_{n\to\infty} F(n)$ is equal to :

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

**71.** The alternating group $A_4$ on 4 symbols has a normal subgroup of order :

(1) 2 (2) 3 (3) 4 (4) 6

**72.** General solution of differential equation $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$ is of the form :

(1) $u = f(x + iy) + g(x - iy)$ (2) $u = f(x - iy) + g(x + iy)$

(3) $u = f(x + iy) - g(x - iy)$ (4) $u = f(x - iy) - g(x - iy)$

**73.** Which is true about the function $f(x) = \begin{cases} x, & \text{when } x \text{ is irrational} \\ -x, & \text{when } x \text{ is rational} \end{cases}$ :

(1) no where continuous.

(2) everywhere continuous.

(3) continuous exactly at one point.

(4) continuous everywhere except one point.

**74.** General solution of differential equation $\frac{d^2y}{dx^2} + 4y = \sec^2 2x$ is :

(1) $y = c_1 \cos 2x + c_2 \sin 2x - \frac{1}{4} + \frac{1}{4} \sin 2x \log(\sec 2x + \tan 2x)$

(2) $y = c_1 \cos 2x - c_2 \sin 2x + \frac{1}{4} \sin 2x \log(\sec 2x + \tan 2x)$

(3) $y = (c_1 + c_2 x) e^{2x} + \frac{1}{4} \log(\sec 2x + \tan 2x)$

(4) $y = c_1 \cos 2x + c_2 \sin 2x + \frac{1}{4} - \frac{1}{4} \sin 2x$

**75.** If $a$ lies inside the closed contour C, then $\int_C \frac{ze^z}{(z-a)^3} dz$ is :

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

(3) $e^a$ (4) $e^a\left(\frac{1+a}{2}\right)$

**76.** Which of the following is ***not*** an integrating factor of $xdy - ydx = 0$ ?

(1) $\frac{1}{x^2}$ (2) $\frac{1}{x^2+y^2}$

(3) $\frac{1}{xy}$ (4) $\frac{x}{y}$

**77.** Complete integral for the partial differential equation (PDE) $z = px + qy - \sin pq$ is :

(1) $z = ax + qy - \sin aq$ (2) $z = ax + by - \sin ab$

(3) $z = ax - by + \sin ab$ (4) $z = bx + ay + \sin ab$

**78.** Which one of the following is ***not*** a linear transformation :

(1) $T(x_1, x_2) = (x_1, x_2)$

(2) $T(x_1, x_2) = (x_1, -x_2)$

(3) $T(x_1, x_2) = (x_1 + x_2 + 2, x_1 + x_2 - 2)$

(4) $T(x_1, x_2) = (2x_1 + 3x_2, 3x_1 + 5x_2)$

**79.** The directional derivative of $\frac{1}{r}$ (where $\vec{r} = x\hat{i} + y\hat{j} + z\hat{k}$) in the direction of $\vec{r}$ is :

(1) $\frac{1}{(x^2+y^2+z^2)^{1/2}}$ (2) $-\frac{1}{(x^2+y^2+z^2)^{1/2}}$

(3) $\frac{1}{(x^2+y^2+z^2)}$ (4) $-\frac{1}{(x^2+y^2+z^2)}$

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

(1) 0 (2) 4 (3) –2 (4) –4

**81.** If the probability of a male child birth is ½, the probability that in a family of four children there will be at least two males is :

(1) 5/16 (2) 6/16 (3) 11/16 (4) 12/16

**82.** The probability density function of a random variable X is

$f(x) = 2x$, if $0<x<1$

$= 0$, otherwise.

The cumulative distribution function $F(y)$ of $Y = \sqrt{X}$ will be :

(1) $y^3$ (2) $4y^3$ (3) $2y^2$ (4) $4y^2$

**83.** If $P(X > s + t \mid X > s) = P(X > t)$, and X is non-negative integer valued random variable, then X follows :

(1) Geometric distribution. (2) Hyper geometric distribution.

(3) Exponential distribution. (4) Poisson distribution.

**84.** The probability mass function of a random variable X is $f(x) = k\,a^x$; $0 < a < 1$, $x = 1, 2, 3, \ldots \infty$ and k is constant. The value of k and mean of X are respectively :

(1) $(1-a)^{-1}$ and $(1-a)\,a^{-1}$ (2) $(1-a)^{-1}$ and $(1-a)^{-1}$

(3) $(1-a)a^{-1}$ and $(1-a)^{-1}$ (4) $(1-a)a^{-1}$ and $(1-a)a^{-1}$

**85.** If X is a Poisson variable with parameter $m$, then $P(X \geq 2)$ is equal to :

(1) $\int_0^m xe^{-x}dx$ (2) $\int_0^m x^2e^{-x}dx$

(3) $\int_0^m e^{-x}dx$ (4) none of these

**86.** If the random variable X assumes only two values 0 and 1 with $P(X=0) = 3\,P(X=1)$, the variance of X will be :

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

**87.** If X is standard normal variable and $P(|X| \leq 1) = .6826$, then the $P(X > -1)$ will be :

(1) .3174 (2) .8174 (3) .3413 (4) .8413

**88.** The random variables X and Y have joint probability density function as

$f(x,y) = x \exp[-x(1+y)]$; if $x > 0, y > 0$

$= 0$ ; otherwise

Then the regression equation for Y on X will be

$S_1$ : linear

$S_2$ : passing through origin

Select the ***correct*** answer from the following codes :

(1) Both $S_1$ and $S_2$ are true

(2) $S_1$ is true but $S_2$ is false

(3) $S_1$ is false but $S_2$ is true

(4) Both $S_1$ and $S_2$ are false

**89.** If $d_i$ is the difference between the ranks of $i$th ($i$ = 1, 2, ..... n) individual awarded by two examiners, the maximum value of $\sum_{i=0}^{n} d_i^2$ will be :

(1) $n(n+1)(2n+1)/6$ (2) $n(n-1)(n+1)/6$

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

**90.** The standard deviation of a leptokurtic distribution is 5. Then the fourth central moment for the distribution is :

(1) greater than 1875

(2) equal to 1875

(3) less than 1875 but greater than 225

(4) less than 225

**91.** A random sample of size 3 is drawn from a population consisting of 10 units using SRSWOR method. The probability that fifth unit will be selected in the sample is :

(1) 1/10 (2) 3/10

(3) 1/120 (4) 1/1000

**92.** From the histogram of a frequency distribution, we can calculate the value of :

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

**93.** The most appropriate diagram to represent the Five year plan outlay of our state indifferent economic sector is :

(1) Divided bar
(2) Percentage bar
(3) Pie
(4) Column

**94.** Mr. X wants to purchase a car but he is confused to choose the one. The probabilities that he will go for the category B or category C cars are respectively 0.54 and 0.46. If he selects category B cars, he will buy either Palio or Indica with respective probabilities 0.48 and 0.52. On the other hand if he goes for category C, the probabilities of buying Accent is 0.59 and that of Ikon is 0.41. In the light of the above information, which car do you think Mr. X is most likely to purchase ?

(1) Palio
(2) Indica
(3) Accent
(4) Ikon

**95.** In tossing of a coin four times, the events $E_1$ and $E_2$ are mutually exclusive if :

(1) $E_1$ : Getting at least two heads and $E_2$ : Getting at most two tails.

(2) $E_1$ : Getting at least two heads and $E_2$ : Getting at least two tails.

(3) $E_1$ : Getting at least three heads and $E_2$ : Getting at most three tails.

(4) $E_1$ : Getting at least three heads and $E_2$ : Getting at least three tails.

**96.** An unbiased coin is tossed until a head is obtained or the total number of tosses is 7. It is desired to calculate probability of the event E that coin is tossed at least three times. In this context read the following carefully :

(i) The total number of mutually exclusive and equally likely outcomes is 8.

(ii) The number of favourable outcomes to event E is 3.

(iii) Probability of E is 3/8.

Choose the correct answer from the following :

(1) (i) is true but (ii) and (iii) are false.

(2) (i) is false but (ii) and (iii) are true.

(3) All are true.

(4) All are false.

**97.** In a university 60% students are male and 50% of the male students and 30% of the female students are smokers. If a student is seen smoking, the probability that it is a female student is :

(1) Equal to 0.3 (2) Less than 0.3

(3) Between 0.3 and 0.4 (4) More than 0.3

**98.** There are three bags, each containing 12 white and 8 black balls. One ball is drawn from the first bag and placed in the second bag. Then a ball is drawn from the second bag and placed in the third bag. Finally a ball is drawn from the third bag. The probability that the ball drawn is white is :

(1) 12/20 (2) 13/20 (3) 12/21 (4) 13/21

**99.** Two friends Mr. X and Mr. Y decide to meet at the gate of a hotel to have the dinner together between 8:30 p.m. and 9:30 p.m. They further decide to wait no more than 15 minutes from the time of their arrival or the end of the meeting hour. They reach hotel independently during meeting hours. Define A: They meet, B: X arrives before Y and C : X arrives after Y. Consider the following Statements in this context.

$S_1$ : The conditional events $B \mid A$ and $C \mid A$ are equally likely.

$S_2$ : The conditional events $A \mid B$ and $A \mid C$ are equally likely.

Choose the correct answer from the following :

(1) Both $S_1$ and $S_2$ are true

(2) $S_1$ is true but $S_2$ is false

(3) $S_1$ is false but $S_2$ is true

(4) Both $S_1$ and $S_2$ are false

**100.** Consider the events A and B such that $P(A) = \frac{1}{4}$, $P(B \mid A) = \frac{1}{2}$ and $P(A \mid B) = \frac{1}{4}$.

The random variables X and Y are defined as

$X(w) = 1$, if $w \in A$

$= 0$, otherwise

and

$Y(w) = 1$, if $w \in B$

$= 0$, otherwise

Which of the following is true ?

(1) $P(X=0 \cap Y=0) = 5/8$

(2) $P(X=0 \cap Y=1) = 1/8$

(3) $P(X=1 \cap Y=0) = 3/8$

(4) $P(X=1 \cap Y=1) = 1/8$

**101.** Two discrete random variables X and Y have $P(X=1 \cap Y=1) = 2/9$, $P(X=1 \cap Y=2) = P(X=2 \cap Y=1) = 1/9$ and $P(X=2 \cap Y=2) = 5/9$. Read the following statements carefully :

$S_1$ : X and Y are independently distributed.

$S_2$ : X and Y are identically distributed.

Choose the correct answer from the following :

(1) Both $S_1$ and $S_2$ are true

(2) $S_1$ is true but $S_2$ is false

(3) $S_1$ is false but $S_2$ is true

(4) Both $S_1$ and $S_2$ are false

**102.** Read the following statements carefully :

$S_1$ : Poisson distribution is limiting case of Binomial distribution.

$S_2$ : Poisson distribution is limiting case of Negative Binomial distribution.

$S_3$ : Geometric distribution is special case of Negative Binomial distribution.

Choose the correct answer from the following :

(1) $S_1$ and $S_2$ are true but $S_3$ is false

(2) $S_2$ and $S_3$ are true but $S_1$ is false

(3) $S_1$ and $S_3$ are true but $S_2$ is false

(4) $S_1$ and $S_2$ and $S_3$ all are true

**103.** The chance that a doctor D will diagnose a disease X correctly is 60%. The chance that a patient will die by the treatment of the doctor D even after correct diagnosis of X is 40% and the chance of death after wrong diagnosis is 70%. A patient of doctor D who had disease X died after his treatment. The probability that his disease was correctly diagnosed by the doctor is :

(1) 7/13 (2) 6/13

(3) 6/25 (4) 8/25

**104.** If $X_1$, $X_2$ and $X_3$ are three independent Poisson variables with parameters $\lambda_1$, $\lambda_2$ and $\lambda_3$ respectively, the conditional distribution of $X_1$, $X_2$ and $X_3$ given that $X_1 + X_2 + X_3 = n$(fixed number) is :

(1) Poisson
(2) Binomial
(3) Hyper geometric
(4) Multinomial

**105.** The distribution function of any random variable is

$S_1$ : always right continuous.

$S_2$ : discontinuous at countable number of points only if the random variable is discrete.

$S_3$ : monotone non-increasing.

Choose the correct answer from the following :

(1) $S_1$ and $S_2$ are true but $S_3$ is false
(2) $S_2$ and $S_3$ are true but $S_1$ is false
(3) $S_1$ and $S_3$ are true but $S_2$ is false
(4) $S_1$ and $S_2$ and $S_3$ all are true

**106.** t-distribution with one degree of freedom is a

(1) Gamma distribution
(2) Beta distribution
(3) Normal Distribution
(4) Cauchy Distribution

**107.** If X has a f-distribution with $(n_1, n_2)$ degrees of freedom, the limiting distribution of $Y = C/X$ will be 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 $n_1 \to \infty$

**108.** The power of a test is the probability of :

(1) Rejecting $H_0$ when $H_1$ is true
(2) Rejecting $H_0$ when $H_0$ is true
(3) Rejecting $H_1$ when $H_1$ is true
(4) Rejecting $H_1$ when $H_0$ is true

**109.** Which of the following statements are ALWAYS true ?

$S_1$ : Sum of independent Binomial variable is Binomial variable.

$S_2$ : Sum of independent Poisson variable is Poisson variable.

$S_3$ : Sum of independent Normal variable is Normal variable.

Choose the correct answer from the following :

(1) $S_1$ and $S_2$ are true but $S_3$ is false

(2) $S_2$ and $S_3$ are true but $S_1$ is false

(3) $S_1$ and $S_3$ are true but $S_2$ is false

(4) $S_1$ and $S_2$ and $S_3$ all are true

**110.** If X and Y are independent random variables and each is uniformly distributed over (0,1), then $P(|X - Y| \leq 0.5)$ is :

(1) 0.25 (2) 0.50

(3) 0.75 (4) None of these

**111.** The equation of pair of regression lines for a given data is reported as $4X + 5Y + 33 = 0$ and $20X - 9Y - 107 = 0$.

Statement (S) : We cannot calculate the correlation coefficient between X and Y.

Reason(R) : It is not specified which one is regression of X on Y and which one is Y on X.

(1) S is true and R is its correct explanation.

(2) S is true but R is not its correct explanation.

(3) S is false but R is true.

(4) Both S and R are false.

**112.** Select the pair of value which cannot be possible value of coefficient of skewness and kurtosis respectively.

(1) (1.2,2.1) (2) (0.7, 7.0)

(3) (3.5,5.3) (4) (2.6, 6.2)

**113.** If the classes are not of equal width in a grouped frequency distribution

Statement(S) : We cannot represent it by frequency polygon.

Reason(R) : Histogram cannot be traced for such data.

(1) S is true and R is its correct explanation.

(2) S is true but R is not its correct explanation.

(3) S is false but R is true.

(4) Both S and R are false.

**114.** In a statistical table the titles given to the rows are called :

(1) Subtitle (2) Stub

(3) Caption (4) Body

**115.** For moderately skewed distributions, it is empirically observed that

(1) Median = 3 Mean – 2 Mode

(2) Median = 3 Mode – 2 Mean

(3) Mode = 3 Median – 2 Mean

(4) Mode = 3 Mean – 2 Median

**116.** 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) $\bar{x}_2 = \bar{x}_1 + x_{n+1} - x_1$

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

**117.** The mean weight of 150 students in a class is 60 Kgs. The mean weight of boys is 70 Kgs. and that of girls is 55 Kgs. The number of boys and girls in the class are respectively :

(1) 50, 100 (2) 75, 75

(3) 80, 70 (4) 100,50

**118.** Read the following statements carefully :

$S_1$ : The mean deviation is least when measured from arithmetic mean.

$S_2$ : Standard deviation is least when measured from geometric mean.

Choose the correct answer from the following :

(1) Both $S_1$ and $S_2$ are true.

(2) $S_1$ is true but $S_2$ is false.

(3) $S_1$ is false but $S_2$ is true.

(4) Both $S_1$ and $S_2$ are false.

**119.** A and B are two events with $A \subset B$ and $P(B) < 1$. If $p_1 = P(A^c \cup B^c)$, $p_2 = P(A^c \cap B^c)$ and $p_3 = P(A^c \mid B^c)$ then

(1) $p_1 \leq p_2 \leq p_3$ (2) $p_1 \leq p_3 \leq p_2$

(3) $p_2 \leq p_1 \leq p_3$ (4) $p_2 \leq p_3 \leq p_1$

**120.** A fair die is thrown twice. The probability that either at most 2 on the first throw or at least 5 on the second throw is obtained is :

(1) 4/9 (2) 5/9

(3) 6/9 (4) 7/9

**FOR ROUGH WORK / रफ कार्य के लिए**

# 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 है 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 संख्या और ओ० एम० आर० पत्र संख्या की प्रविष्टियों में उपरिलेखन की अनुमति नहीं है।
7. उपर्युक्त प्रविष्टियों में कोई भी परिवर्तन कक्ष निरीक्षक द्वारा प्रमाणित होना चाहिये अन्यथा 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 बाल-प्वाइंट 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 इस पुस्तिका के मुखपृष्ठ के अंदर वाला पृष्ठ तथा अंतिम खाली पृष्ठ का प्रयोग करें।
12. परीक्षा के उपरान्त ***केवल ओ० एम० आर० उत्तर-पत्र*** ही परीक्षा भवन में जमा करें।
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।