						Code No.	T – 2121
Er	ntrance Exan	ninatior Teac	n for Ac	dmissio Departm	n to the ents, 202	P.G. Course 24	s in the
				CSS			
			DAT				
			<u>Genei</u>	ral Instruc	tions		
1. The	Question Pape	r is havin	ig 100 O	bjective (	Questions,	each carrying o	one mark.
2. The	answers are to	be (✔) 't	ick mark	ked' <b>only</b>	in the " <b>Res</b>	ponse Sheet"	provided.
3. <u>Nec</u>	ative marking	: <b>0.25 m</b> a	a <b>rks</b> will	be deduc	cted for eac	ch wrong answ	er.
Time : 2	Hours					Ma	ax. Marks : 100
To be fil	ed in by the Ca	ndidate					
Register	in Figures						
Number	in words						
	·						
					Г		

Choose appropriate answer from the options in the questions.

(100 × 1 = 100 marks)

- A. 0.03 B. 0.9
- C. 0.18 D. 0.108

DONOTWRITEHERE

# 2. If P is an integer point with a value 1000, then what will be the value of P+5?

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Α.	1020	В.	1005
C.	1004	D.	2020

- 3. Simplify the following expression :  $Y = A\overline{B}C + A\overline{B}\overline{C}$ 
  - A. Y=C B. Y=B
  - C. Y = A D.  $Y = A\overline{B}$
- 4. Total number of Boolean functions possible over *n* Boolean variables are
  - A.  $2^{2n}$  B.  $2^n$
  - C.  $n^{2n}$  D. None of these

C. 5, 1 D. 8,7 The number of one-to-one functions from  $\{1,2,3\}$  to  $\{1,2,3,4,5\}$  is 6. 125 243 Α. Β. C. 10 D. 60 What is the range of the function  $f(x) = \frac{|x-1|}{|x-1|}$ ? 7. {3,5} B. {0, 2} A. D. {-2,4} C. {-1, 1} Operations carried out by NOT gate is also known as 8. converting reverting Α. Β. C. inverting D. reversing Find the reminder when the smallest 6-digit number divisible by 12,15 and 25 is 9. divisible by 9 Α. 3 B. 7 C. 2 D. 0 10. Let n(A) = x and n(B) = y, then the total number of non-empty relations that can be defined from A to B is A.  $2x^{y}$ B.  $3y^{x}-1$ C. 7xy - 1D. None of these 11. What is the range of  $f(x) = \frac{\sin(\pi [x^2 + 1])}{x^4 + 1}$ , where [] is the greatest integer function? B. [-1, 11] A. [0, 10] C. D. None of these Ø 3 T - 2121

Two finite sets have *m* and *n* elements. The total number of subsets of the first is 56 more than the total number of subsets of the second set. Then values of

Β.

6, 3

5.

m and n are 7,6

Α.

12.	Which of the following are correct file opening modes in C?				
	Α.	r	В.	r b	
	C. I	Both of them	D.	None of these	
13.	If f(x	$f(y) = f(x+y)f(x-y) \forall x, y$ , then	n f(x	) is	
	A. I	Even	Β.	Odd	
	C. I	Neither even nor odd	D.	Both even and odd	
14.	How negat	many solutions does the equatio tive integers	n <i>x</i> +	y+z=11 have, where $x, y, z$ are non	
	A. 7	78	В.	68	
	C. 8	89	D.	99	
15.	If the of one	set A contains 23 elements and e-one and onto mapping from A t	B co o B is	ontains 16 elements, then the number	
	Α.	720	В.	120	
	C. (	0	D.	None of these	

- 16. The Boolean function AB+AC is equivalent to
  - A.AB+AC+BCB.A'B'C'+A'AA+B'CBC.AA+BB+CCD.ABC+ABC'+AB'C
- 17. Let *T* be the set of all triangles in the euclidean plane and let a relation *R* on *T* be defined as *aRb* if *a* is congruent to  $b \forall a, b \in T$ . Then *R* is

A. reflexive but not transitive B.	equivalence
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C. more than one of above D. None of these

# 18. Evaluate $\lim_{x \to 4} \frac{3x-4}{x^2-2x-12}$

A. undefinedB. 0C.  $\infty$ D. None of these

- 19. The function  $f(x) = \log x$ 
  - A. has maxima at x=e B. has minima at x=e
  - C. has neither maxima nor minima D. all of these
- 20. The sum of two numbers is *k*, the maximum value of the product of the first and the square of second is
  - A. 4 B. 1
  - C. 3 D. 0
- 21. Number of non negative integer solutions to the inequality  $(x_1 + x_2 + ... + x_6) \le 15$  is
  - A. *p*(21,6) B. *c*(15, 6)
  - C. *p*(15, 6) D. *x*(21, 6)
- 22. A man is known to speak truth 3 out of 4 times. He throws a dice and reports that it is a six. Find the probability that it is actually a six

A.	$\frac{1}{8}$	В.	5 8
C.	2 7	D.	3 8

- 23. A group consists of 4 girls and 7 boys. In how many ways can a team of 5 members be selected is the team has no girl?
  - A.
     12
     B.
     21

     C.
     14
     D.
     None of these
- 24. What is the type of the int data type(in bytes) in C?

A.	4	В.	8
C.	2	D.	7

25. Mean of 9 observations was found to be 35. Later on, it was detected that an observation 81 was misread as 18. Find the correct mean of the observation.

Α.	42	В.	24
C.	80	D.	None of these

26.	The last term of an AP 21, 18, 15, is –351. Find $n^{th}$ term :					
	Α.	213	В.	123		
	C.	312	D.	-231		
27.	lf A	and <i>B</i> are square matrices of orde	er 2, t	hen $(A+B)^2 =$		
	A.	$A^2 + 2AB + B^2$	В.	$A^2 + AB + BA + B^2$		
	C.	$A^2$ + 2 $BA$ + $B^2$	D.	None of these		
28.	The	number of arrangements of six ide	entica	al balls in three identical bins is		
	Α.	4	В.	22		
	C.	7	D.	None of these		
29.	Whi	ich of the following is not correct?				
	Α.	$log(2+3) = log(2 \times 3)$	В.	$\log_{10} = \log_1$		
	C.	More than one above	D.	None of these		
30.	lf fo	r some numbers <i>a</i> and <i>d</i> , if first te	erm is	$\frac{1}{a}$ , second term is $\frac{1}{a+d}$ third term is		
	1 	$\frac{1}{2d}$ and so on, then 5 <sup>th</sup> term of seq	luenc	e is :		
	A.	a+4d	В.	a-4d		
	C.	$\frac{1}{a+4d}$	D.	None of these		
31.	$\int \frac{1}{1+1}$	$\frac{1}{x^2}$ for limit [0,1]				
	A.	$\frac{2\pi}{3}$	B.	$\frac{\pi}{2}$		
	C.	$\frac{7\pi}{6}$	D.	None of these		

6

32. If A is a subset of B and B is a subset of C, then the cardinality of  $A \cup B \cup C$ 

- A. Cardinality of C B. Cardinality of B
- C. Cardinality of A D. None of these
- 33. The maximum value of the function  $f(x) = \sin x (1 + \cos x)$  is :
  - A.  $\frac{3\sqrt{3}}{4}$  B.  $\frac{3\sqrt{3}}{2}$  

     C.  $3\sqrt{3}$  D.  $\sqrt{3}$
- 34. Which of the following is an odd function?
  - A.  $\sin x^2$  B.  $\frac{a^x + 1}{a^x 1}$
  - C.  $x^2 |x|$  D. None of these
- 35. Which of the following is an even function?
  - A.  $f(x) = \sin x$ B.  $f(x) = \frac{a^{x} + 1}{a^{x} - 1}$ C.  $f(x) = x \frac{a^{x} - 1}{a^{x} + 1}$ D. None of these
- 36. One root of the equation (x+1)(x+3)(x+2)(x+4)=120 is
  - A. -1 B. 2 C. 1 D. 0

37. Let  $\star$  :  $\mathbb{R} \times \mathbb{R} \to \mathbb{R}$  given by  $(a, b) \to a + 4b^2$  is a binary operation, compute  $(-5) \star (2 \star 0)$ 

- A. 25
   B. 11

   C. 29
   D. 34
- 38. If A=5, then find the number of commutative binary operations on A
  - A.
      $5^{15}$  B.
      $5^7$  

     C.
      $5^3$  D.
     None of these

39.	If R is a selection 'less than' from $A = \{1, 2, 4, 5\}$ to $B = \{3, 4\}$ , the set of ordered pairs corresponding to <i>R</i> , then the inverse of <i>R</i> is				
	A.	{(3,1),(3,2), (3, 3)}	В.	{(4,1),(4,2), (4,3)}	
	C.	{(4,3), (4,4),(4, 5)}	D.	None of these	
40.	The	following propositional statement	$(P \rightarrow$	$(Q \lor R)) \rightarrow ((P \land R) \rightarrow Q)$ is	
	Α.	Satisfiable but not valid	В.	Valid	
	C.	Contradiction	D.	None of these	
41.	Let	* be a binary operation defined on	R by	$p^*q = rac{p+2}{2} \forall p,q \in R$ . Then * is	
	Α.	Commutative but not associative	В.	Commutative and associative	
	C.	Both of them	D.	None of these	
42.	The	number of all possible matrices of	orde	er $3 \times 3$ with each entry 0 or 1 is	
	Α.	18	В.	81	
	C.	512	D.	521	
43.	The	AM of 10 items is 50. If each item	is ind	creased by 5, then new <i>AM</i> would be :	
	Α.	50	Β.	55	
	C.	60	D.	45	
44.	Find	I the maximum value of $(x+8)(7-$	<b>x</b> )		
	A.	$\frac{240}{4}$	В.	$\frac{200}{4}$	
		255		225	
	C.	$\frac{200}{4}$	D.	$\frac{223}{4}$	
45.	lf 8	P(4, n) = 6P(2, n-1) then <i>n</i> is			
	Α.	8	В.	3	
	C.	6	D.	None of these	
		8	3	T – 2121	

- 46. If each exterior angle of regular polygon are 24°, then how many sides does regular polygon have
  - Α. 10 Β. 8
  - C. 15 D. 12
- 47. Which of the following propositions is not a tautology?
  - $q \lor (q \rightarrow p)$  $(q \lor q) \rightarrow q$ Α. B. C.  $p \rightarrow (p \rightarrow q)$ D. None of these
- 48. If  $A = \{1, 2, 5, 7\}$  and  $B = \{2, 4, 6\}$ , then find the number of proper subsets of  $A \cup B$ 
  - B. 64 Α. 127
  - C. 63 D. 77
- 49.  $P \rightarrow (Q \rightarrow R)$  is equivalent to
  - A.  $(P \lor Q) \rightarrow R$ B.  $(P \land Q) \rightarrow R$ C.  $(P \lor Q) \rightarrow Q$ D. None of these
- 50. In every n+1 element subset of the set (1,2,3,...,2n), which of the following is correct?
  - Α. At least two natural numbers which are prime to each other
  - At least three natural numbers which are prime to each other B.
  - C. There exists no consecutive natural numbers
  - D. None of these
- 51. The negation of the statement  $(p \rightarrow q) \land r$  is
  - B.  $(p \sim p \land q) \land (\sim r)$  $p \wedge \sim p \vee (\sim p)$ Α.
  - $(q \wedge \sim q) \wedge p$ C. D. None of these
- 52. The sides of an equilateral triangle is increasing at the rate of 2 cm/sec. At what rate is its area increasing when the side of the triangle is 40 cm.
  - A.  $20\sqrt{3}$  cm<sup>2</sup> sec B.  $3\sqrt{5}$  cm<sup>2</sup> sec
  - C  $144 \, cm^2 \, sec$ D. None of these

53.	5. If the 9-digit number 45069 $\times$ 4y8 is divisible by 44, then what is the value $(x-2y)$ for the minimum value of <i>y</i> :			
	Α.	6	Β.	4
	C.	2	D.	None of these
54.	Let	$f(x) = (-1)^{[6x]}$ where [] denotes the	grea	atest integer function, then
	Α.	Range of <i>f</i> is {– 1,1}	В.	<i>f</i> is even
	C.	f is odd	D.	None of these
55.	lf A	={1}. How many elements $P[P(P($	A))]	contains
	Α.	16	В.	8
	C.	14	D.	6
56.	lf A	is a skew symmetric matrix, then the	race	of A is
	Α.	1	Β.	-1
	C.	0	D.	None of these
57.	A m the	nan has two parents, 4 grandparer number of ancestors during the 8 g	nts, 8 gener	great grand parents and so on. Find rations preceding his own
	Α.	455	В.	450
	C.	767	D.	510
58.	The of th	e simplest measure of dispersion w ne extreme items of <i>s</i> series	hich	defines the difference between values
	Α.	MD	В.	B. Range
	C.	SD	D.	НМ
59.	Hov	v many words can be formed from	the w	vord 'DATA SCIENCE'?
	Α.	335654	В.	657499
	C.	100000	D.	None of these
60.	Em	pty set is always		
	Α.	universal set	В.	finite set
	C.	empty set	D.	unknown set

Α. 0 Β. 6 C. All the elements of A D. None of these 62. What is the output of the following # include  $\langle stdio.h \rangle$ int main () { for (int x = 10; x > = 0; x - -){ int z = x & (x >> 1);if (z); printf ("% d", x); } } Α. 763 Β. 769 C. 678 D. 679 63. What will be the output of the following pseudocode; # include  $\langle stdio.h \rangle$ int main () { float x = 0.0; long int y = 10; printf ("% d", size of (x) = = size of (x+y)); return 0; } Α. 1 Β. 0 C. 4 8 D. 64. The domain of the function log(log(sin x))Α.  $2n\pi < x < (2n+1)\pi$  $0 < x < \pi$ Β. none of these C. empty set D. 65. The period of the function  $f(x) = |\sin x| + |\cos x|$  is  $\pi/2$ Α. Β. π C.  $2\pi$ D. None of these 11 T – 2121

61. How many elements are there in the complement of set X?

66. Three bells tolls together at intervals 9, 12, 15 minutes. They start tolling together. At what interval of time will they toll together again :

- A. 3 hr B. 1½ hr
- C. 2½ hr D. 1 hr
- 67. The value of  $9^{\frac{1}{3}}$ ,  $9^{\frac{1}{9}}$ ,...,∞ A. 3 B. 6 C. 9 D. None of these
- 68. Consider a vocabulary with only four propositions A,B,C and D. How many models are there for the sentence B V C
  - A. 22 B. 12 C. 15 D. 16
- 69. What is the inverse of the function  $y=5^{\log x}$ ?
  - A.  $x=5^{1/\log y}$ B.  $x=y^{1/\log 5}$ C.  $x=5^{\log y}$ D. None of these
- 70. In a GP of positive terms, if every term is equal to the sum of next two terms, then find the common ratio of the GP
  - A.  $2\sin 18^{\circ}$  B.  $2\sin 72^{\circ}$  

     C.  $2\cos 11^{\circ}$  D.  $2\cos 66^{\circ}$

71. Let 
$$A^{-1} = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 4 & 3 \\ 3 & 1 & 6 \end{bmatrix} = \frac{adj(A)}{k}$$
, then find k  
A. -25 B. -15  
C.  $-\frac{1}{15}$  D. 144

72.	Let	$f(x)=x^2, g(x)=\tan x, h(x)=\ln x$ Wh	at is	$[f \circ (f \circ f)](2)$ ?
	Α.	2	В.	8
	C.	16	D.	256
73.	Let	A be a $3 \times 3$ matrix and B be its ac	ljoint	matrix. If $ B  = 64$ , then $ A  = ?$
	Α.	±2	В.	±4
	C.	±8	D.	±12
74.	Let	$A = \frac{1^{55} + 2^{55} + 3^{55} + 4^{55}}{3}, B = \frac{1^{55} + 3^{55}}{4}$	₅ –,C=	$=\frac{2^{55}+4^{55}}{2}$ then
	Α.	B <a>C</a>	В.	A > B < C
	C.	B > C > A	D.	None of these
75.	The	e solution of the equation $(x+1)(x+1)$	3)( <i>x</i> -	+2)(x+4)=120 is
	Α.	-1	Β.	2
	C.	1	D.	0
76.	Fino that	d the number of ways of arranging t all the vowels in the word are to c	the ome	letters of the word <i>"MATERIAL"</i> such together?
	Α.	720	В.	1440
	C.	1860	D.	2120
77.	lf lo	og2,log $(2^{x}-1)$ and log $(2^{x}+3)$ are in	AP t	then the value of <i>x</i> is
	Α.	5/2	В.	log <sub>2</sub> 5
	C.	log <sub>5</sub> 2	D.	log <sub>3</sub> 5
78	lf v	$x = \ln(e^x \ln x)$ then $y' = 2$		
70.	ע יי ^	- in(0, ), alon y = .	Б	1 . 1 /
	А.		D.	I+I/X
	C.	$\frac{1}{x}e^{x}$	D.	ln e <sup>x</sup>

79.	The area bounded by the lines $y =  x  - 2$ and $y = 1 -  x - 1 $ is						
	Α.	4 square units	В.	6 square units			
	C.	2 square units	D.	8 square units			
80.	Cor mo	Consider a vocabulary with only four propositions <i>A</i> , <i>B</i> , <i>C</i> and <i>D</i> . How many models are there for the following sentence $B \lor C$ .					
	Α.	10	В.	12			
	C.	15	D.	16			
81.	For any two sets A and $B, A - (A - B) = ?$						
	Α.	В	В.	A-B			
	C.	$A \cap B$	D.	$A^C \cap B^C$			
82.	What is the time 100 hrs after 7 am?						
	Α.	7 pm	В.	12 am			
	C.	11 am	D.	6 pm			
83.	The geometric mean of the sequence $1, 2, 4, 8, \dots, 2^n$ :						
	A.	2 <sup>n/2</sup>	В.	$2^{(n+1)/2}$			
	C.	$2^{(n+1)-1}$	D.	2 <sup>(n-1)</sup>			
84.	The value of <i>n</i> for which $\frac{a^{n+1}+b^{n+1}}{a^n+b^n}$ is a AM of <i>a</i> and <i>b</i> is						
	Α.	-1	В.	0			
	C.	1	D.	1/2			
85.	If x and y are prime numbers which of the following CANNOT be the sum of x and $y$ ?						
	Α.	5	В.	9			
	C.	16	D.	23			

- 86. If *u* is a positive integer and *v* is an even prime number, which of the following can be the GCD of 20 *u* and 6v?
- 2 Α. Β. 4 C. 6 D. 20 87.  $\int \frac{1}{\sqrt{16-25x^2}} dx =$ A.  $\sin^{-1}\left(\frac{5x}{4}\right) + c$ B.  $\frac{1}{5}\sin^{-1}(x/4)+c$ C.  $\frac{1}{5}\sin^{-1}(4/x)+c$ D. None of these 88. If  $A = \{a, b, p\}, B = \{2, 3\}$  and  $C = \{p, q, r, s\}$ , then  $n[(A \cup C) \times B]$  is Α. 8 B. 20 C. 12 D. 16 89. If we roll a six-faced dice large number of times, the what would be the mean values of its outcome? 2.4 B. Α. 4.9C. 3.5 5.9 D. 90. If A = (x:x) is an odd natural number) and B = (x:x) is a prime number), then  $A \cap B$  is the set odd natural numbers A. Β. the set prime numbers C. the set of odd prime numbers D. none of these 91. What is the number of subsets of set containing 5 elements? Α. 32 Β. 8 C. 6 other than above D. 92. The number of subsets of  $A = \{0, 1, 2\}$  is Α. 3 Β. 6 C. 8 D. None of these 93. Find the greatest number that will divide 43, 91 and 183 so as to leave the same reminder in each case Α. 4 Β. 7 C. 9 D. 3

94. If *a* is a simple constant, what is the derivative of  $y = x^a$ 

A.  $ax^{a-1}$ B.  $(a-1)^x$ C. ax+4D. None of above

95. If *H* is the harmonic mean of *P* and *Q*, then the value of  $\frac{H}{P} - \frac{H}{Q}$ 

- A. 4 B. P C. 2 D. PQ
- 96. If  $\phi(x) = a^{x}$ , then  $[\phi(p)^{3}]$  is A.  $\phi(3p)$ B.  $3\phi(p)$ C.  $5\phi(p)$ D. p

97.	lf 2	$f(x)+f\left(\frac{1}{x}\right)=\log x$ , for all $x>0$ ,	then f(e	<sup>x</sup> ) is
	Α.	<b>x</b> <sup>2</sup>	В.	x
	C.	2 <i>x</i>	D.	6 <i>x</i>

98. Consider a group of 73 persons. Then which of the following is necessarily true?

- A. At least 10 persons were born in the same month
- B. At least two months should have 7 persons born in
- C. At least one month should have 7 persons born in
- D. None of these
- 99. How many words with seven letters are there that starts with a vowel and end with an *A*?
  - A. 45087902 B. 6438677788
  - C. 456789023 D. 59406880
- 100. In course, a professor gives five grades  $\{A, B, C, E, F\}$ . What is the minimum number of students required so that four of them are guaranteed to get the same grade?
  - A. 8 B. 23
  - C. 16 D. None of these

#### ANSWER SHEET

1	А	В	С	D	Е
2	Α	В	С	D	Е
3	Α	В	С	D	Е
4	Α	В	С	D	Е
5	Α	В	С	D	Е
6	Α	В	С	D	Е
7	А	В	С	D	Е
8	Α	В	С	D	Е
9	А	В	С	D	Е
10	А	В	С	D	Е
11	А	В	С	D	Е
12	Α	В	С	D	Е
13	Α	В	С	D	Е
14	А	В	С	D	Е
15	А	В	С	D	Е
16	Α	В	С	D	Е
17	Α	В	С	D	Е
18	А	В	С	D	Е
19	Α	В	С	D	Е
20	Α	В	С	D	Е
21	Α	В	С	D	Е
22	Α	В	С	D	Е
23	Α	В	С	D	Ε
24	Α	В	С	D	Е
25	Α	В	С	D	Е

26	А	В	С	D	Е
27	Α	В	С	D	Е
28	Α	В	С	D	Е
29	Α	В	С	D	Е
30	А	В	С	D	Е
31	А	В	С	D	Е
32	А	В	С	D	Е
33	А	В	С	D	Е
34	А	В	С	D	Е
35	А	В	С	D	Е
36	А	В	С	D	Е
37	А	В	С	D	Е
38	Α	В	С	D	Е
39	Α	В	С	D	Е
40	А	В	С	D	Е
41	А	В	С	D	Е
42	Α	В	С	D	Е
43	А	В	С	D	Е
44	Α	В	С	D	Е
45	Α	В	С	D	Е
46	Α	В	С	D	Е
47	Α	В	С	D	Е
48	Α	В	С	D	Е
49	Α	В	С	D	Е
50	Α	В	С	D	Е





# **ROUGH WORK**

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