Elta for SET-"X" (Total No. of printed pages: 21) (DO NOT OPEN, THIS QUESTION BOOKLET BEFORE TIME OR UNTIL YOU ARE ASKED TO DO SO) PG-EE-July, 2025 (Mathematics) Sr. No.___ Code Max. Marks: 100 Total Questions: 100 Time: 1¼ Hours Roll No. _____ (in figure)_____ (in words) Date of Birth: Name:_____ Mother's Name : _____ Father's Name:_____ Date of Examination: (Signature of the Invigilator) (Signature of the candidate) CANDIDATES MUST READ THE FOLLOWING INFORMATION/ INSTRUCTIONS BEFORE STARTING THE QUESTION PAPER. All questions are compulsory. The candidates must return the Question book-let as well as OMR answer-sheet to the Invigilator concerned before leaving the Examination Hall, failing which a case of use of unfair-means / mis-behaviour will be registered against him / her, in addition to lodging of an FIR with the police. Further the answer-sheet of such a candidate will not be evaluated. Keeping in view the transparency of the examination system, carbonless OMR Sheet is provided to the candidate so that a copy of OMR Sheet may be kept by Question Booklet along-with answer key of all the A,B,C and D code shall be got uploaded on the University Website immediately after the conduct of Entrance Examination. Candidates may raise valid objection/complaint if any, with regard to discrepancy in the question booklet/answer key within 24 hours of uploading the same on the University website. The complaint be sent by the students to the Controller of Examinations by hand or through email. Thereafter, no complaint in any case will be considered.

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There will be no negative marking. Each correct answer will be awarded one full mark. Cutting, erasing, overwriting and more than one answer

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in OMR Answer-Sheet will be treated as incorrect answer.

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7.

Sheet.

EXAMINATION.

Question No.	Questions
1.	If $u = \frac{y}{z} + \frac{z}{x} + \frac{x}{y}$, then $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} + z \frac{\partial u}{\partial z}$ is equal to:
	$(1) u \qquad \qquad (2) 2u$
	(3) 1 (4) None of these
2.	$\lim_{x \to 0^{-}} \frac{e^{1/x} - 1}{e^{1/x} + 1} \text{ is :}$
54.	(1) -1 (2) 0
*	(3) 1 (4) None of these
3.	Taylor's Theorem is also known as:
	(1) Ist mean value theorem of differential equation
	(2) IInd mean value theorem of differential equation
	(3) Generalised mean value theorem of differential equation
+	
	(4) None of these
4.	(4) None of these Equation of evolute of parabola $y^2 = 4ax$ is given by:
	Equation of evolute of parabola $y^2 = 4ax$ is given by:
	Equation of evolute of parabola $y^2 = 4ax$ is given by:
	Equation of evolute of parabola $y^2 = 4ax$ is given by:
5.	Equation of evolute of parabola $y^2 = 4ax$ is given by: (1) $27ay^2 = 4(x - 2a)^3$ (2) $27ay^2 = 4(x - 2a)^2$ (3) $27y^2 = 4(x - 2a)^3$ (4) None of these

	Code-/
tion L	Questions
· T	The sum of the eigen values of a matrix is equal to:
((1) A
(2	(2) The sum of the elements of the principal diagonal
(3	(3) The product of the elements on the principal diagonal
(4	(4) None of these
. I	If A is a matrix of order n and A^2 is a null matrix, then what is th
n	maximum possible rank of A:
(1	(1) n (2) n^2
(8	(3) n^3 (4) None of these
. T	The eigen values of a nilpotent matrix are:
((1) 2
(6	(3) 0 (4) None of these
T .	The quadratic form $9x^2 + y^2 + 4z^2 + 6xy - 12xz - 4yz$ is:
(1	(1) Positive definite (2) Positive semi-definite
(8	(3) Negative definite (4) Negative semi-definite
D. L	Let $x^4 - 3x^3 - 5x^2 + 2x - 1 = 0$
(1	(1) All the roots of equation are real.
(2	(2) All the roots of equation are purely imaginary.
(3	(3) Two real and the two imaginary roots.
(4	(4) None of these
(3	(3) Two real and the two imaginary roots.

	Code A			
Question No.	Questions			
11.	The pole of the line $2x + y + 12 = 0$ w.r.t. circle $x^2 + y^2 - 4x + 3y - 1 = 0$			
7	is:			
	(1) (1,3) (2) (2,-2)			
	(3) $(1,-2)$ (4) None of these			
12.	What is the nature of the curve $13x^2 - 18xy + 37y^2 + 2x + 14y - 2 = 0$			
	(1) Circle (2) Sphere			
	(3) Ellipse (4) None of these			
13.	The latus rectum of the conic $16x^2 - 24xy + 9y^2 - 104x - 172y + 44 = 0$			
	is:			
	(1) 2 (2) 4			
	(3) 6			
14.	The length of the major axis of the ellipse $36x^2 + 24xy + 29y^2 - 180 = 0$			
	is:			
	(1) 2			
	(3) 6 (4) None of these			
15.	The centre of the conicoid $3x^2 + 6yz - y^2 - z^2 - 6x + 6y - 2z - 2 = 0$			
, , , , , , , , , , , , , , , , , , ,	(1) (1,0,-1) (2) (2,0,-2)			
	(1) $(1,0,-1)$ (2) $(2,0,-2)$ (3) $(3,0,-3)$ (4) None of these			
16.	The highest power of 7 contained in 1000! is:			
,	(1) 160 (2) 163			
¥	(3) 164 (4) None of these			

Question		Code-/			
No.	•	Questions			
17.	If $(a,b) = 1$, then (ac,b) is equal to:				
	(1) (a,b)	$(2) \qquad (c,b)$			
	(3) 1	(4) None of these			
18.	The quadratic residue of 17 are	e :			
	(1) 1, 2, 4, 8, 9, 13, 15, 16	(2) 1, 3, 5, 7, 9, 14, 16			
	(3) 1, 2, 4, 6, 8, 9, 13, 15	(4) None of these			
19.	The real part of $\sin h (x + iy)$ is				
	(1) $\sin h x \cos y$	(2) $\sin x \cos h y$			
-	(3) $\cos h x \sin y$	(4) None of these			
20.	If $\tan^{-1} \frac{2x}{1-x^2} + \cot^{-1} \frac{1-x^2}{2x} = \frac{\pi}{3}$, the value of x is equal to :			
	(1) $3 + \sqrt{2}$	$(2)_{1}$ $(2-\sqrt{3})_{2}$			
	(3) $3 - \sqrt{2}$	(4) None of these			
21.	The differential equation of first order and first degree is homogeneous				
	if:				
	(1) $\frac{dy}{dx} = \phi(\frac{y}{x})$ (3) $\frac{dy}{dx} = \phi(x)$	(2) $\frac{dy}{dx} = \text{constant}$			
2	(3) $\frac{dy}{dx} = \phi(x)$	(4) None of these			
22.	The general solution of the diffe	rential equation			
	$e^{y}\frac{dy}{dx} + (e^{y} + 1)\cot x = 0 \text{ is :}$				
	$(1) (e^y + 1)\cos x = K$	$(2) \qquad (e^y + 1) \csc x = K$			
	$(3) (e^y + 1)\sin x = K$	(4) None of these			

Question No.	Questions			
23.	What is order and degree of the differential equation			
	$\frac{d^2y}{dx^2} + \sqrt{1 + \left(\frac{d^3y}{dx^3}\right)^4} = 0$			
	(1) First order, second degree (2) Second order, first degree			
52.4 -	(3) Second order, second degree (4) None of these			
24.	Particular integral of the differential equation			
	$x^2 \frac{d^2 y}{dx^2} - x \frac{dy}{dx} + y = 2 \log x \text{ is :}$			
	(1) $2 \log x + 4$ (2) $4 \log x - 2$			
	(3) $4 \log x - 4$ (4) None of these			
25.	For $a, b, c \in R$, if the differential equation			
	$(ax^2 + bxy + y^2)dx + (2x^2 + cxy + y^2)dy = 0$ is exact, then:			
	(1) $b = a, c = 20$ (2) $b = 4, c = 2$			
	(3) $b = 2, c = 2$ (4) None of these			
26.	The points whose position vectors are $60\hat{i} + 3\hat{j}$; $40\hat{i} - 8\hat{j}$; $a\hat{i} - 52\hat{j}$			
	are collinear if:			
	(1) $a = 40$ (2) $a = 20$			
	(3) $a = -40$ (4) None of these			
27.	If ϕ is a scalar point function, then curl (grad ϕ) is equal to:			
	(1) 1 (2) 0			
	(3) -1 (4) None of these			

Question	Ouestions Coue-F
No.	Questions
28.	The value of $\oint_c [(\cos x \sin y - xy)dx + \sin x \cos y dy]$, where c is circl
	$x^2 + y^2 = 1$ is:
	$(1) \pi \qquad \qquad (2) \frac{\pi}{2}$
	(3) 1
29.	If $\vec{F} = 3xy \ \hat{i} - y^2 \ \hat{j}$, then the value of $\int_C \vec{F} . d\vec{r}$, where C is the curve in
	XY-plane, $y = 2x^2$ from $(0,0,)$ to $(1,2)$ is:
	$(1) \frac{7}{6} \qquad (2) \frac{6}{7}$
	$(3) \frac{-7}{6} $ (4) None of these
30.	If $\vec{f} = (x+3y)\hat{i} + (y-2z)\hat{j} + (x+az)\hat{k}$ is solenoidal, then a is equal to:
	(1) 1 (2) 2
	(3) 0
31.	If $\lim_{x\to 0} \frac{x(1+a\cos x)-b\sin x}{x^3} = 1$ then the values of a and b are:
	(1) 2,3 (2) $\frac{5}{2},\frac{3}{2}$
	(3) $\frac{-5}{2}$, $\frac{-3}{2}$ (4) None of these
32.	If $u = \log(x^3 + y^3 + z^3 - 3xyz)$, then $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} + z \frac{\partial u}{\partial z}$ is equal to:
	$(1) 3u \qquad \qquad (2) 3$
	(3) $\frac{3}{\text{None of these}}$

Question No.	· ·		
33.	The radius of curvature of helix $x = a \cos t$, $y = a \sin t$, $z = at \tan \alpha$ is:		
	(1) $a \sec^2 \alpha$	(2)	$a \csc^2 \alpha$
	(3) $a \cot \alpha$	(4)	None of these
34.	The point (0,0) for $f(x,y) = x^3 - 3axy + y^3$ is:		
	(1) A maximum point	(2)	A minimum point
	(3) A saddle point	(4)	None of these
35.	The necessary and sufficient con	ndition	for the curve to be a plane
	curve is:	Ť Ĵ	
	$(1) \left[\overrightarrow{r} \ \overrightarrow{r}' \ \overrightarrow{r}'' \right] = 0$	(2)	$\left[\overrightarrow{r}\ \overrightarrow{r}^{n}\ \overrightarrow{r}^{m}\right] = 0$
	$(3) \left[\overrightarrow{r}'' \ \overrightarrow{r}''' \ \overrightarrow{r}'v \right] = 0$	(4)	$\left[\overrightarrow{r}'\overrightarrow{\overline{r}}''\overrightarrow{r}'''\right] = 0$
36.	A partial differential equation b	y elim	inating the arbitrary function
	from $z = f(x^2 - y^2)$ is given by:		
	(1) $x \frac{\partial z}{\partial x} + y \frac{\partial z}{\partial y}$ (3) $y \frac{\partial z}{\partial x} - x \frac{\partial z}{\partial y}$	(2)	$x\frac{\partial z}{\partial x} - y\frac{\partial z}{\partial y}$
			$y\frac{\partial z}{\partial x} + x\frac{\partial z}{\partial y}$
37.	The partial differential equation	$\frac{\partial^2 z}{\partial x^2} + 0$	$5\frac{\partial^2 z}{\partial x \partial y} + 9\frac{\partial^2 z}{\partial y^2} = 0 \text{ is :}$
	(1) Hyperbolic	(2)	Parabolic
,	(3) Elliptic	(4)	None of these

Question		Code-A			
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38.	The particular integral of the equation $\frac{\partial}{\partial t}$	$\frac{\partial^2 z}{\partial x^2} - 2 \frac{\partial^2 z}{\partial x \partial y} = \sin x \cos 2y \text{ is :}$			
	(1) $\sin(x+3y) + \sin(x-3y)$ (2)	$\sin(x+2y) + \frac{1}{10}\sin(x-2y)$			
	(3) $\frac{1}{6}\sin(x+2y) - \frac{1}{10}\sin(x-2y)$ (4)	None of these			
39.	Two dimensional wave equation is given	by:			
,	22 22	$\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = \frac{1}{c^2} \frac{\partial^2 u}{\partial t^2}$			
	(3) $\frac{\partial^2 u}{\partial x^2} + \frac{\partial u}{\partial y} = \frac{1}{c^2} \frac{\partial^2 u}{\partial t^2}$ (4)	None of these			
40.	The partial differential equation $x\frac{\partial}{\partial t}$	$\frac{\partial^2 z}{\partial x^2} + 2 \frac{\partial^2 z}{\partial y \partial x} + y \frac{\partial^2 z}{\partial y^2} + \frac{\partial z}{\partial x} = 0 \text{is}$			
	hyperbolic in nature if:				
	$(1) xy < 1 \tag{2}$	xy = 1			
	(3) xy > 1	None of these			
41.	One Joule is equal to:				
	(1) 10^3 ergs (2)	10 ⁵ ergs			
	(3) 10^8 ergs (4)	None of these			
42.	The magnitude and direction of the	resultant of two forces of			
	magnitudes 12 N and 14 N, acting at a point and inclined to each other				
	at an angle of 45° is:				
	(1) $R = 42.3 \text{ N}, \ \theta = 45^{\circ}$ (2)	$R = 4.2 \text{ N}, \ \theta = 90^{\circ}$			
	(3) $R = 0.45 \text{ N}, \ \theta = \tan^{-1}(24.03)$ (4)	$R = 24.03 \text{ N}, \ \theta = \tan^{-1}(0.45)$			
		,			

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Question No.	Questions			
43.	If ABCD is a square of side 2m. Forces of magnitude 5, 3, 4 and 6			
	Newtons act along CB, BA, DA and DB respectively. Then the			
	algebraic sum of moments of the forces about vertex C is:			
	(1) $3(1+2\sqrt{2})$ Nm (2) $[3(1-2\sqrt{2})]$ Nm			
	(3) $2(4-3\sqrt{2}) \text{ Nm}$ (4) $2(1+3\sqrt{2}) \text{ Nm}$			
44.	The constant ratio which the limiting friction bears to the normal			
	reaction is called:			
. "	(1) Limiting friction (2) Angle of friction			
	(3) Cone of friction (4) Co-efficient of friction			
45.	The centre of gravity of the area of the position of the parabola			
	$\sqrt{\frac{x}{a}} + \sqrt{\frac{y}{b}} = 1 \text{ between the curve and the axes is :}$ $(1) \left(\frac{a}{2}, \frac{a}{2}\right) \qquad (2) \left(\frac{a}{5}, \frac{b}{5}\right)$			
	(1) $\left(\frac{a}{2}, \frac{a}{2}\right)$ (2) $\left(\frac{a}{5}, \frac{b}{5}\right)$			
	(3) $\left(\frac{a}{3}, \frac{b}{3}\right)$ (4) None of these			
46.	The greatest lower bound of a set, if it exists, is:			
	(1) Two (2) Three			
	(3) Four (4) None of these			
47.	The interior of a set A is the largest subset of A, which is:			
	(1) Open (2) Closed			
	(3) Both (4) None of these			

Question No.	Questions				
48.	The sequence $< n^{1/n} > $ converges to the limit :				
	(1) 0				
	(3) α (4) None of these				
49.	The series $\sum_{n=1}^{\alpha} a_n$, where $a_n = \frac{1}{\sqrt{n}} \sin \frac{1}{n}$ is:				
	(1) Oscillating (2) Divergent				
	(3) Convergent (4) None of these				
50.	If $\sum_{n=1}^{\alpha} a_n$ is a series of real numbers whose sequence $\langle S_n \rangle$ of partial				
	sums is bounded and if $\langle b_n \rangle$ is a non-negative monotonically				
	decreasing sequence tending to zero, then the series $\sum_{n=1}^{\alpha} a_n b_n$ converges.				
	This statement is known as:				
	(1) Abel's test (2) Abel's lemma				
	(3) Dirichlet's test (4) None of these				
51.	The radius of convergence of power series $\sum_{m=0}^{\alpha} \frac{(-1)^m}{5^m} (x+1)^{3m}$ is:				
	$(1) 5^{1/5} \qquad (2) 5^{1/3}$				
y.	(3) 5 (4) None of these				
52.	The value of H_{2n} (0) is:				
	(1) $(-1)^n \frac{(2n)!}{n!}$ (2) $(-1)^n \frac{(2n-1)!}{(n-1)!}$				
	(3) $\frac{(2n)!}{n!}$ (4) None of these				

Question No.	Que	estions	
53.	The value of $L^{-1}\left(\frac{s}{4s^2+15}\right)$ is:		
	$(1) \frac{1}{2} \sin \frac{\sqrt{15}}{2} t$	(2)	$\frac{1}{4} \cos \frac{\sqrt{15}}{2} t$
*	(3) $\frac{1}{4} \tan \frac{\sqrt{15}}{2} t$	(4)	None of these
54.	The finite sine transform of $f(x)$:	= 2x, w	here $0 < x < 4$, is equal to
	$(1) \frac{16}{n\pi}$	(2)	$\frac{32}{n\pi}$
	$(3) \frac{-32}{n\pi} \ (-1)^n$	(4)	None of these
55.	The Fourier cosine transform of j	f(x) =	1, $0 \le x < 1$ 0, $x > 1$ is equal to:
	$(1) \frac{\sin s}{s}$	(2)	coss
	$(3) \frac{\sec s}{s}$	(4)	None of these
56.	C programming language was de	veloped	by:
* #	(1) Bill Gates	(2)	Ken Thompson
	(3) Dennis Ritchie	(4)	None of these
57.	Which of the following key word	is used	for the storage class?
	(1) print f	(2)	external
	(3) auto	(4)	scan f

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Question No.	a questions				
58.	The bitwise AND operator is used	d for:			
	(1) Masking	(2) Comparison			
	(3) Division	(4) Shifting bits			
59.	Which of the following statements is true?				
	(1) C library functions provide I	/O facilities			
	(2) C inherent I/O facilities				
	(3) C does not have I/O facilities				
	(4) Both (1) and (3)				
60.	Which of the following variable na	ames is NOT valid?			
· .	(1) go-cart	(2) go 4 it			
	(3) 4 reason	(4) run 4			
61.	If f is integrable on [0,1], then $\int_0^1 f(x) dx$ is equal to:				
	(1) $\lim_{n \to \alpha} \sum_{r=1}^{n} f\left(\frac{r}{n}\right)$	(2) $\lim_{n \to \alpha} \frac{1}{n} \sum_{r=1}^{n} f\left(\frac{r}{n}\right)$			
	(3) $\lim_{n \to \alpha} \sum_{r=1}^{n} f\left(\frac{n}{r}\right)$. r	(4) None of these	•		
62.	The improper integral $\int_0^1 \frac{dx}{x^2 - 3x + 2}$	is:			
	(1) Convergent	(2) Oscillating			
	(3) Divergent	(4) None of these	,		

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Question No.	Questions
63.	Which one is not a complete metric space:
•	(1) The usual metric space (R,d)
2	(2) The space of complex numbers
*	(3) Any discrete metric space
	(4) None of these
64.	Energy complete metric space is of the second category as a subset of
,	itself is the statement of
	(1) Banach's fixed point theorem
	(2) Baire's category theorem
	(3) Cantor's intersection theorem
	(4) None of these
65.	If $f(x) = x$, $x \in [0,1]$ and $P = \{0, \frac{1}{3}, \frac{1}{2}, \frac{2}{3}, 1\}$ be the partition of [0,1],
,	then $L(f, P)$ is equal to:
	$(1) \frac{8}{26}$ $(2) \frac{7}{16}$
	(3) $\frac{13}{36}$ (4) none of these
66.	Which one is not a compact subset?
,	(1) Any finite subset of a metric space
	(2) $A = [-50, 50]$ of R
	(3) Set $\left\{\frac{1}{n}: n \in \mathbb{N}\right\} \cup \{0\}$ in R
	(4) Usual metric space (R, d)

Question		Code-A	
No.	Questions		
67.	Which one is a dense set?	,	
	(1) Q in R		
	(2) Set of natural numbers in R		
	(3) The subset $A = \left\{ \frac{1}{n}, n \in \mathbb{N} \right\}$ in \mathbb{R}		
	(4) None of these	`\	
68.	The number of non-isomorphic abelian groups of order 8 is	3:	
	(1) 1 (2) 2		
	(3) 3 (4) none of these		
69.	Number of Sylow 2-subgroups of S ₃ is:	<u> </u>	
	(1) 2		
	(3) 6 (4) None of these		
70.	Energy subgroup of a finite cyclic group is:		
	(1) Characteristic subgroup (2) Normal subgroup	p	
	(3) Cyclic subgroup (4) None of these		
71.	If a be any integer and p be any prime number, then ap	≡ a mod p is	
	the statement of:		
	(1) Fermat's theorem (2) Wilson theorem		
,	(3) Lagrange's theorem (4) None of these		

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Question No.			
72.	An ideal of a ring of integers is ma	ximal	iff it is generated by some
× 2	(1) Natural number	(2)	Prime integer
ē.	(3) Real number	(4)	None of these
73.	Let f be a ring isomorphism of R	onto l	R'. If R' is an integral domain.
	then R is		
	(1) Not an integral domain	(2)	An integral domain
	(3) Both (1) and (2)	(4)	None of these
74.	If 'a' is an irreducible element of a	uniqu	ne factorization domain R, then
	'a' must be		
	(1) Natural number	(2)	Real number
	(3) Prime number	(4)	None of these
75.	The order of convergence of Regula	a Falsi	Method is:
	(1) 1	(2)	1.618
	(3) 2	(4)	none of these
76.	$\Delta f(x) g(x)$ is equal to:		
	(1) $f(x) \Delta g(x) + g(x) \Delta f(x)$	(2)	$f(x+h) \Delta g(x) + g(x) \nabla f(x)$
	(3) $f(x+h) \Delta g(x) + g(x) \Delta f(x)$	(4)	None of these
77.	$\mu - \frac{\delta}{2}$ is equal to :		
	(1) $E^{1/2}$	(2)	E .
	(3) E^{-1}	(4)	$E^{-1/2}$

Question No.	Questions
78.	Runge-Kutta method is used for:
	(1) Interpolation
	(2) Numerical differentiation
	(3) Numerical Integration
	(4) Numerical solution of ordinary differention equation
79.	Milne-Simpron's method is a:
	(1) Multiple step method (2) Single step method
	(3) Both (1) and (2) (4) None of these
80.	Which of the following is also known as method of false position?
	(1) Bisection method (2) Newton Raphson method
	(3) Regula-falsi method (4) None of these
81.	If T is one-one linear transformation, then dim Ker T is:
	(1) 0 (2) 1
	(3) 2 (4) None of these
82.	The linear transformation $T: \mathbb{R}^2 \to \mathbb{R}^2$ defined by $T(1, 0) = (2, 3)$,
	T(0, 1) = (5, 6) is:
	(1) One-one and onto (2) One-one but not onto
	(3) Onto but not one-one (4) None of these

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No.	Questions
83.	Let R be the field of real numbers. Which of the following is not a
	sub-space of $V_3(R)$:
	(1) $\{(x,2y,3z): x,y,z \in R\}$
, ±	(2) $\{(x,x,x):x\in R\}$
	(3) $\{(x,y,z):x,y,z \text{ are rational number}\}$
٠.	(4) None of these
84.	If W is a subspace of $V = V_3(R)$ generated by $\{(1,0,0),(1,1,0)\}$. Then
	basis of V_W is:
	(1) $\{W + (0, 8, 8)\}$ (2) $\{W + (0, 0, 1)\}$
	(3) $\{W + (a, 0, a) : a \in R\}$ (4) None of these
85.	Let the linear transformation $T_1: R^2 \to R^2$ such that $T_1(x,y) = (0,4x)$
	and $T_2: \mathbb{R}^2 \to \mathbb{R}^2$ such that $T_2(x,y) = (x,0)$. Then $T_1T_2(x,y)$ is equal to:
	(1) $(0,6x)$ (2) $(3x,y)$
	$(3) (0,0) \qquad (4) (0,4x)$
86.	Let $T: U \to V$ be a homomorphism, then Ker T is a subspace of:
,	$(1) V \qquad \qquad (2) U$
	(3) $T(U)$ (4) None of these
87.	Let u, v be normal vectors in an inner product space V s.t. $ u + v = 1$.
	Then $ u-v $ is:
6.1	(1) $\sqrt{3}$ (2) 1
	(3) $\sqrt{2}$ (4) None of these

Question	Orrestin		
No.	Questions		
88.	The radial and transverse components of velocity of a particle moving		
	along a plane curve $r = f(\theta)$ are :		
	(1) $\frac{d^2y}{dt^2}$, $r\frac{d^2\theta}{dt^2}$ (2) $\frac{dr}{dt}$, $\left(\frac{d\theta}{dt}\right)^2$		
	(3) $\frac{d\theta}{dt}$, $r^2 \frac{d\theta}{dt}$ (4) $\frac{dr}{dt}$, $r \frac{d\theta}{dt}$		
89.	A particle of mass 2 grammes is moving with a S.H.M. If its maximum		
	velocity is 2π cm/sec. and the amplitude of the vibration is 20 cm., then		
	the period of vibration is:		
	(1) 5 seconds (2) 10 seconds		
	(3) 20 seconds (4) None of these		
90.	A particle is projected with a velocity of 24.5 m/sec. in a direction		
-	making an angle 60° with the horizontal. Then the greatest height		
	attained by the particle is:		
	(1) 22.96 m (2) 11.96 m		
	(3) 36.84 m (4) None of these		
91.	A Car weighing 250 kg travelling at 19.6 m/sec. is brought to rest in 4.9 m		
	by application of brakes. Then the force of resistance of brakes is:		
	(1) 7800 Newtons (2) 8800 Newtons		
	(3) 9800 Newtons (4) None of these		

Question	Code-A		
No.	Questions		
92.	The central force is defined as:		
	(1) A force whose line of action always passes through a fixed point		
	(2) A force whose line of action does not pass through a fixed point		
h.			
,	(3) A force whose line of action always passes through variable point(4) None of these		
93.	Polar equation of ellipse referred to focus as pole is:		
6.7	$(1) \frac{l}{r} = 1 + e \cos \theta \qquad (2) \frac{l}{r} = 1 - e \cos \theta$		
	(3) $\frac{l}{r} = e \cos \theta - 1$ (4) None of these		
94.	If $r = \sqrt{x^2 + y^2}$, $\theta = \tan^{-1}(y/x)$, then $\frac{\partial(r,\theta)}{\partial(x,y)}$ is:		
	(1) $\frac{x}{x^2 + y^2}$ (2) $\frac{y}{x^2 + y^2}$		
	(3) $\frac{1}{x^2 + y^2}$ (4) $\frac{1}{\sqrt{x^2 + y^2}}$		
95.	$\int_{0}^{\alpha} e^{-x^{2}} dx \text{ is equal to :}$		
	(1) $\pi/_4$ (2) $\sqrt{\pi}/_4$		
	(3) $\sqrt{\pi}/2$ (4) None of these		
96.	The Fourier co-efficient a_n for the function $f(x) = x$ in $[-\pi, \pi]$ is:		
_	(1) 1 (2) 0		
	(3) $-1/2$ (4) None of these		

Question No.	Questions		
97.	Polar form of C-R equations are:		
	(1) $\frac{\partial u}{\partial \theta} = \frac{1}{r} \frac{\partial v}{\partial r}$, $\frac{\partial v}{\partial r} = \frac{r}{\partial \theta}$ (2) $\frac{\partial u}{\partial r} = \frac{1}{r} \frac{\partial v}{\partial \theta}$, $\frac{\partial v}{\partial r} = \frac{1}{r} \frac{\partial v}{\partial \theta}$		
	(3) $\frac{\partial u}{\partial r} = \frac{r}{\partial \theta} \frac{\partial v}{\partial \theta}$, $\frac{\partial u}{\partial \theta} = \frac{-r}{\partial r} \frac{\partial v}{\partial r}$ (4) $\frac{\partial u}{\partial r} = \frac{1}{r} \frac{\partial v}{\partial \theta}$, $\frac{\partial u}{\partial \theta} = \frac{-r}{\partial r} \frac{\partial v}{\partial r}$		
98.	The function $f(z) = r^2 \cos 2\theta + ir^2 \sin k\theta$ is analytic then the value of k		
	is equal to:		
	(1) 0 (2) 2		
	(3) 4 (4) None of these		
99.	The point on the Complex plane corresponding to the point $(\frac{1}{3}, \frac{2}{3}, \frac{2}{3})$ on		
	the Riemann sphere $X^2 + Y^2 + Z^2 = 1$ is:		
	(1) $1+2i$ (2) $3+2i$		
	(3) $4+3i$ (4) None of these		
100.	The angle of rotation at $z = 2 + i$ for the transformation $w = z^2$ is equal		
	to:		
	(1) $\tan^{-1} \frac{1}{3}$ (2) $\tan^{-1} \frac{1}{2}$		
	(3) $tan^{-1} 2$ (4) None of these		

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SET-"X" (Total No. of printed pages: 21) OPEN THIS QUESTION BOOKLET BEFORE TIME OR UNTIL YOU ARE ASKED TO DO SO) PG-EE-July, 2025 (Mathematics) Sr. No. 10002 Code Max. Marks: 100 **Total Questions: 100** Time: 1¼ Hours (in words) Roll No. _____ (in figure)_____ Date of Birth: Name : _____ Mother's Name:_____ Father's Name : _____ Date of Examination: (Signature of the Invigilator) (Signature of the candidate) CANDIDATES MUST READ THE FOLLOWING INFORMATION/ INSTRUCTIONS BEFORE STARTING THE QUESTION PAPER. All questions are compulsory. The candidates must return the Question book-let as well as OMR answer-sheet to the Invigilator concerned before leaving the Examination Hall, failing which a case of use of unfair-means / mis-behaviour will be registered against him / her, in addition to lodging of an FIR with the police. Further the answer-sheet of such a candidate will not be evaluated. Keeping in view the transparency of the examination system, carbonless OMR Sheet is provided to the candidate so that a copy of OMR Sheet may be kept by the candidate. Question Booklet along-with answer key of all the A,B,C and D code shall be got

uploaded on the University Website immediately after the conduct of Entrance Examination. Candidates may raise valid objection/complaint if any, with regard to discrepancy in the question booklet/answer key within 24 hours of uploading the same on the University website. The complaint be sent by the students to the Controller of Examinations by hand or through email. Thereafter, no complaint in any case will be considered.

The candidate MUST NOT do any rough work or writing in the OMR Answer-Sheet. Rough work, if any, may be done in the question book-let itself. Answers

MUST NOT be ticked in the Question book-let.

There will be no negative marking. Each correct answer will be awarded one full mark. Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer.

Use only Black or Blue BALL POINT PEN of good quality in the OMR Answer-

BEFORE ANSWERING THE QUESTIONS, THE CANDIDATES SHOULD ENSURE THAT THEY HAVE BEEN SUPPLIED CORRECT AND COMPLETE BOOK-LET. COMPLAINTS, IF ANY, REGARDING MISPRINTING ETC. WILL NOT BE ENTERTAINED 30 MINUTES AFTER STARTING OF THE EXAMINATION.



Questions		
The pole of the line $2x + y + 12 = 0$ w.r.t. circle $x^2 + y^2 - 4x + 3y - 1 = 0$		
is:		
(1) (1,3) (2)	(2, -2)	
(3) (1,-2) (4)	None of these	
What is the nature of the curve $13x^2 - 18xy + 37y^2 + 2x + 14y - 2 = 0$		
(1) Circle (2)	Sphere	
(3) Ellipse (4)	None of these	
The latus rectum of the conic $16x^2 - 24xy$	$+9y^2 - 104x - 172y + 44 = 0$	
is:		
(1) 2	4	
(3) 6 (4)	8	
The length of the major axis of the ellipse	$36x^2 + 24xy + 29y^2 - 180 = 0$	
is:		
(1) 2 (2)	4	
(3) 6 (4)	None of these	
The centre of the conicoid $3x^2 + 6yz - y^2$	$-z^2 - 6x + 6y - 2z - 2 = 0$	
$(1) (1,0,-1) \tag{2}$	(2, 0, -2)	
$(3) (3,0,-3) \tag{4}$	None of these	
The highest power of 7 contained in 1000!	is:	
(1) 160 (2)	163	
(3) 164 (4)	None of these	
	The pole of the line $2x + y + 12 = 0$ w.r.t. cis: (1) $(1,3)$ (2) (3) $(1,-2)$ (4) What is the nature of the curve $13x^2 - 18$. (1) Circle (2) (3) Ellipse (4) The latus rectum of the conic $16x^2 - 24xy$ is: (1) 2 (2) (3) 6 (4) The length of the major axis of the ellipse is: (1) 2 (2) (3) 6 (4) The centre of the conicoid $3x^2 + 6yz - y^2 - (1)$ (1) $(1,0,-1)$ (2) (3) $(3,0,-3)$ (4) The highest power of 7 contained in 1000! (1) 160 (2)	

Ornetion	Code-				
Question No.	Questions				
7.	If $(a,b) = 1$, then (ac,b) is equal to	o :			
	(1) (a,b)	(2)	(c,b)		
	(3) 1	(4)	None of these		
8.	The quadratic residue of 17 are:	•			
9	(1) 1, 2, 4, 8, 9, 13, 15, 16	(2)	1, 3, 5, 7, 9, 14, 16		
	(3) 1, 2, 4, 6, 8, 9, 13, 15	(4)	None of these		
9.	The real part of $\sin h (x + iy)$ is:				
, i	(1) $\sin h x \cos y$	(2)	$\sin x \cos h y$		
	(3) $\cos h x \sin y$	(4)	None of these		
10.	If $\tan^{-1} \frac{2x}{1-x^2} + \cot^{-1} \frac{1-x^2}{2x} = \frac{\pi}{3}$, the value of x is equal to:				
	(1) $3 + \sqrt{2}$	(2)	$2-\sqrt{3}$		
	(3) $3 - \sqrt{2}$	(4)	None of these		
11.	A Car weighing 250 kg travelling a	t 19.6	m/sec. is brought to rest in 4.9 m		
	by application of brakes. Then the	force of	resistance of brakes is :		
	(1) 7800 Newtons	(2)	8800 Newtons		
	(3) 9800 Newtons	(4)	None of these		
12.	The central force is defined as:				
f .	(1) A force whose line of action always passes through a fixed point				
	(2) A force whose line of action does not pass through a fixed point				
	(3) A force whose line of action a	always	passes through variable point		
	(4) None of these				

Question	Code-B		
No.	Questions		
13.	Polar equation of ellipse referred to focus as pole is:		
	(1) $\frac{l}{r} = 1 + e \cos \theta$ (2) $\frac{l}{r} = 1 - e \cos \theta$		
	(3) $\frac{l}{r} = e \cos \theta - 1$ (4) None of these		
14.	If $r = \sqrt{x^2 + y^2}$, $\theta = \tan^{-1}(\sqrt[y]{x})$, then $\frac{\partial(r,\theta)}{\partial(x,y)}$ is:		
	(1) $\frac{x}{x^2 + y^2}$ (2) $\frac{y}{x^2 + y^2}$		
	(3) $\frac{1}{x^2 + y^2}$ (4) $\frac{1}{\sqrt{x^2 + y^2}}$		
15.	$\int_{0}^{\alpha} e^{-x^{2}} dx \text{ is equal to :}$		
	(1) $\pi/_4$ (2) $\sqrt{\pi}/_4$ (3) $\sqrt{\pi}/_2$ (4) None of these		
	(3) $\sqrt{\pi}/2$ (4) None of these		
16.	The Fourier co-efficient a_n for the function $f(x) = x$ in $[-\pi, \pi]$ is:		
	(1) 1 (2) 0		
	(3) $-1/2$ (4) None of these		
17.	Polar form of C-R equations are :		
	(1) $\frac{\partial u}{\partial \theta} = \frac{1}{r} \frac{\partial v}{\partial r}$, $\frac{\partial v}{\partial r} = \frac{r}{\partial \theta}$ (2) $\frac{\partial u}{\partial r} = \frac{1}{r} \frac{\partial v}{\partial \theta}$, $\frac{\partial v}{\partial r} = \frac{1}{r} \frac{\partial v}{\partial \theta}$		
	(3) $\frac{\partial u}{\partial r} = \frac{r}{\partial \theta} \frac{\partial v}{\partial \theta}$, $\frac{\partial u}{\partial \theta} = \frac{-r}{\partial r} \frac{\partial v}{\partial r}$ (4) $\frac{\partial u}{\partial r} = \frac{1}{r} \frac{\partial v}{\partial \theta}$, $\frac{\partial u}{\partial \theta} = \frac{-r}{\partial r} \frac{\partial v}{\partial r}$		

Question No.	Qu	estions	3
18.	The function $f(z) = r^2 \cos 2\theta + ir$	$^2 \sin k\theta$	is analytic then the value of k
	is equal to:		
	(1) 0	(2)	2
	(3) 4	(4)	None of these
19.	The point on the Complex plane corresponding to the point $(\frac{1}{3}, \frac{2}{3}, \frac{2}{3})$		
	on the Riemann sphere $X^2 + Y^2 +$	$Z^2=1$	is:
,	(1) 1+2i	(2)	3 + 2i
	(3) 4 + 3i	(4)	None of these
20.	The angle of rotation at $z = 2$	+ i for	the transformation $w = z^2$ is
	equal to:		
	(1) $\tan^{-1} \frac{1}{3}$	(2)	$\tan^{-1} \frac{1}{2}$
	(3) tan ⁻¹ 2	(4)	None of these
21.	21. If a be any integer and p be any prime number, then $a^p \equiv a \mod p$		
	the statement of :		
	(1) Fermat's theorem	(2)	Wilson theorem
	(3) Lagrange's theorem	(4)	None of these
22.	An ideal of a ring of integers is n	naximal	iff it is generated by some
	(1) Natural number	(2)	Prime integer
, .	(3) Real number	(4)	None of these

Question No.		uestions		
23.	Let f be a ring isomorphism of R onto R'. If R' is an integral domain,			
	then R is			
	(1) Not an integral domain	(2)	An integral domain	
	(3) Both (1) and (2)	(4)	None of these	
24.	If 'a' is an irreducible element of	a uniqu	e factorization domain R, then	
	'a' must be			
	(1) Natural number	(2)	Real number	
	(3) Prime number	(4)	None of these	
25.	The order of convergence of Regu	ula Falsi	Method is:	
	(1) 1	(2)	1.618	
	(3) 2	(4),	none of these	
26.	$\Delta f(x) g(x)$ is equal to:			
	(1) $f(x) \Delta g(x) + g(x) \Delta f(x)$	(2)	$f(x+h) \Delta g(x) + g(x) \nabla f(x)$	
	(3) $f(x+h) \Delta g(x) + g(x) \Delta f(x)$) (4)	None of these	
27.	$\mu - \frac{\delta}{2}$ is equal to:			
	_1/	(2)	E	
			$E^{-1/2}$	
	(3) E ⁻¹	(4)	E '2	
28.	Runge-Kutta method is used for	÷		
	(1) Interpolation			
	(2) Numerical differentiation			
	(3) Numerical Integration			
	(4) Numerical solution of ordin	ary diffe	rention equation	

Question No.	Qu	estions	S	
29.	Milne-Simpron's method is a:		9. 1 7.7	7
	(1) Multiple step method	(2)	Single step method	
	(3) Both (1) and (2)	(4)	None of these	
30.	Which of the following is also kno	wn as i	method of false position?	
	(1) Bisection method	(2)	Newton Raphson method	
	(3) Regula-falsi method	(4)	None of these	
31.	The radius of convergence of pow	er serie	$\sin \sum_{m=0}^{\alpha} \frac{(-1)^m}{5^m} (x+1)^{3m} \text{ is :}$	
,	$(1) 5^{1/5}$	(2)	5 ¹ / ₃	
	(3) 5	(4)	None of these	
32.	The value of $H_{2n}(0)$ is:		A	
	$(1) \frac{(-1)^n}{n!} \frac{(2n)!}{n!}$	(2)	$(-1)^n \frac{(2n-1)!}{(n-1)!}$	
-	$(3) \frac{(2n)!}{n!}$	(4)	None of these	
33.	The value of $L^{-1}\left(\frac{s}{4s^2+15}\right)$ is:		· · · · · · · · · · · · · · · · · · ·	
	$(1) \frac{1}{2} \sin \frac{\sqrt{15}}{2} t$	(2)	$\frac{1}{4} \cos \frac{\sqrt{15}}{2} t$	
	$(3) \frac{1}{4} \tan \frac{\sqrt{15}}{2} t$	(4)	None of these	
34.	The finite sine transform of $f(x)$	= 2x, y	where $0 < x < 4$, is equal to	
	$(1) \frac{16}{n\pi}$	(2)	$\frac{32}{n\pi}$	
	$(3) \frac{-32}{n\pi} \ (-1)^n$	(4)	None of these	

Question No.	-		estions	
35.	$(1, 0 \le x < 1)$ is equal $(1, 0 \le x < 1)$		1, $0 \le x < 1$ is equal to: 0, $x > 1$	
	(1)	$\frac{\sin s}{s}$	(2)	$\frac{\cos s}{s}$
	(3)	sec s s	(4)	None of these
36.	Ср	rogramming language was dev	eloped	by:
	(1)	Bill Gates	(2)	Ken Thompson
# . 9	(3)	Dennis Ritchie	(4)	None of these
37.	Wh	ich of the following key word i	s used	for the storage class?
	(1)	print f	(2)	external
	(3)	auto	(4)	scan f
38.	The	bitwise AND operator is used	for:	7
	(1)	Masking	(2)	Comparison
	(3)	Division	(4)	Shifting bits
39.	Whi	ch of the following statements	s is true	e?
	(1)	C library functions provide I/	O facili	ities
	(2)	C inherent I/O facilities		
	(3)	C does not have I/O facilities		
	(4)	Both (1) and (3)		
40.	40. Which of the following variable names is NOT valid?		NOT valid?	
	(1)	go-cart	(2)	go 4 it
	(3)	4 reason	(4)	run 4

Question No.	Que	stion	S
41.	$If \lim_{x \to 0} \frac{x(1+a\cos x) - b\sin x}{x^3} = 1 \text{ then then}$	ne val	ues of a and b are:
	(1) 2,3	(2)	$\frac{5}{2}$, $\frac{3}{2}$
	(3) $\frac{-5}{2}$, $\frac{-3}{2}$	(4)	None of these
42.	If $u = \log(x^3 + y^3 + z^3 - 3xyz)$, then	$1 x \frac{\partial u}{\partial x}$	$+y\frac{\partial u}{\partial y}+z\frac{\partial u}{\partial z}$ is equal to:
	(1) $3u$	(2)	3
· · · · · · · · · · · · · · · · · · ·	$(3) \frac{3}{x+y+z}$	(4)	None of these
43.	The radius of curvature of helix $x = x$	= <i>a</i> cos	$st, y = a \sin t, z = at \tan \alpha is$:
	(1) $a \sec^2 \alpha$	(2)	$a \csc^2 \alpha$
	(3) $a \cot \alpha$	(4)	None of these
44.	The point (0,0) for $f(x,y) = x^3 - 3$	axy +	y^3 is:
	(1) A maximum point	(2)	A minimum point
3 7	(3) A saddle point	(4)	None of these
45.	The necessary and sufficient con	dition	for the curve to be a plane
	curve is:		
	$(1) \left[\overrightarrow{r} \ \overrightarrow{r}' \ \overrightarrow{r}'' \right] = 0$	(2)	$\left[\overrightarrow{r}\ \overrightarrow{r}^{"}\ \overrightarrow{r}^{"'}\right]=0$
	$(3) \left[\overrightarrow{r}^{"} \overrightarrow{r}^{"} \overrightarrow{r}^{"} \right] = 0$	(4)	$\left[\overrightarrow{r}'\overrightarrow{r}''\overrightarrow{r}'''\right]=0$
46.	A partial differential equation by	elim	inating the arbitrary function
	from $z = f(x^2 - y^2)$ is given by:		
	$(1) x\frac{\partial z}{\partial x} + y\frac{\partial z}{\partial y}$	(2)	$x\frac{\partial z}{\partial x} - y\frac{\partial z}{\partial y}$
	$(3) y\frac{\partial z}{\partial x} - x\frac{\partial z}{\partial y}$	(4)	$y\frac{\partial z}{\partial x} + x\frac{\partial z}{\partial y}$

Question No.	Questions
47.	The partial differential equation $\frac{\partial^2 z}{\partial x^2} + 6 \frac{\partial^2 z}{\partial x \partial y} + 9 \frac{\partial^2 z}{\partial y^2} = 0$ is:
	(1) Hyperbolic (2) Parabolic
	(3) Elliptic (4) None of these
48.	The particular integral of the equation $\frac{\partial^2 z}{\partial x^2} - 2 \frac{\partial^2 z}{\partial x \partial y} = \sin x \cos 2y$ is:
-	(1) $\sin(x+3y) + \sin(x-3y)$ (2) $\sin(x+2y) + \frac{1}{10}\sin(x-2y)$
	(3) $\frac{1}{6}\sin(x+2y) - \frac{1}{10}\sin(x-2y)$ (4) None of these
49.	Two dimensional wave equation is given by:
,	(1) $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = \frac{1}{c^2} \frac{\partial u}{\partial t}$ (2) $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = \frac{1}{c^2} \frac{\partial^2 u}{\partial t^2}$
	(3) $\frac{\partial^2 u}{\partial x^2} + \frac{\partial u}{\partial y} = \frac{1}{c^2} \frac{\partial^2 u}{\partial t^2}$ (4) None of these
50.	The partial differential equation $x \frac{\partial^2 z}{\partial x^2} + 2 \frac{\partial^2 z}{\partial y \partial x} + y \frac{\partial^2 z}{\partial y^2} + \frac{\partial z}{\partial x} = 0$ is
*	hyperbolic in nature if:
	$(1) xy < 1 \qquad (2) xy = 1$
	(3) $xy > 1$ (4) None of these
51.	The differential equation of first order and first degree is homogeneous
	if:
	(1) $\frac{dy}{dx} = \phi(y/x)$ (2) $\frac{dy}{dx} = \text{constant}$ (3) $\frac{dy}{dx} = \phi(x)$ (4) None of these
	(3) $\frac{dy}{dx} = \phi(x)$ (4) None of these

			Coue-D
Question No.	Que	stions	
52.	The general solution of the differential equation		
	$e^{y}\frac{dy}{dx} + (e^{y} + 1)\cot x = 0 \text{ is :}$		
	$(1) (e^y + 1)\cos x = K$	(2)	$(e^y + 1) \csc x = K$
	$(3) (e^y + 1)\sin x = K$	(4)	None of these
53.	What is order and degree of the di	ferent	ial equation
	$\frac{d^2y}{dx^2} + \sqrt{1 + \left(\frac{d^3y}{dx^3}\right)^4} = 0$		
-	(1) First order, second degree	(2)	Second order, first degree
. •	(3) Second order, second degree	(4)	None of these
54.	Particular integral of the different	ial equ	ation
	$x^2 \frac{d^2 y}{dx^2} - x \frac{dy}{dx} + y = 2 \log x \text{ is :}$		
	$(1) 2\log x + 4$	(2)	$4\log x - 2$
	$(3) 4\log x - 4$	(4)	None of these
55.	For $a, b, c \in R$, if the differential eq	uation	1
	$(ax^2 + b xy + y^2)dx + (2x^2 + c xy + c x$	$+y^2)dy$	y = 0 is exact, then:
	(1) $b = a, c = 20$	(2)	b=4, c=2
	(3) $b = 2, c = 2$	(4)	None of these
56.	The points whose position vector	s are	$60\hat{i} + 3\hat{j} ; 40\hat{i} - 8\hat{j} ; a\hat{i} - 52\hat{j}$
	are collinear if:		
	(1) $a = 40$	(2)	a = 20
	(3) $a = -40$	(4)	None of these

Question No.	Questions	
57.		
	(1) 1 (2)	
	(3) -1 (4) None of these	
58.	The value of $\oint_c [(\cos x \sin y - xy) dx + \sin x \cos y \ dy]$, where c is circle	
	$x^2 + y^2 = 1$ is:	
	(1) π (2) $\pi/2$	
	(3) 1	
59.	If $\vec{F} = 3xy \ \hat{i} - y^2 \ \hat{j}$, then the value of $\int_C \vec{F} \cdot d\vec{r}$, where C is the curve in	
	XY-plane, $y = 2x^2$ from (0,0,) to (1,2) is:	
	(1) $\frac{7}{6}$ (2) $\frac{6}{7}$	
	(3) $\frac{-7}{6}$ (4) None of these	
60.	If $\vec{f} = (x + 3y)\hat{i} + (y - 2z)\hat{j} + (x + az)\hat{k}$ is solenoidal, then a is equal to:	
	(1) 1 (2) 2	
	(3) 0 (4) -2	
61.	One Joule is equal to :	
	(1) 10^3 ergs (2) 10^5 ergs	
	(3) 10^8 ergs (4) None of these	

Question No.	Questions
62.	The magnitude and direction of the resultant of two forces of
	magnitudes 12 N and 14 N, acting at a point and inclined to each other
	at an angle of 45° is :
	(1) $R = 42.3 \text{ N}, \ \theta = 45^{\circ}$ (2) $R = 4.2 \text{ N}, \ \theta = 90^{\circ}$
	(3) $R = 0.45 \text{ N}, \ \theta = \tan^{-1}(24.03)$ (4) $R = 24.03 \text{ N}, \ \theta = \tan^{-1}(0.45)$
63.	If ABCD is a square of side 2m. Forces of magnitude 5, 3, 4 and 6
	Newtons act along CB, BA, DA and DB respectively. Then the
	algebraic sum of moments of the forces about vertex C is:
	(1) $3(1+2\sqrt{2})$ Nm (2) $[3(1-2\sqrt{2})]$ Nm
	(3) $2(4-3\sqrt{2}) \text{ Nm}$ (4) $2(1+3\sqrt{2}) \text{ Nm}$
64.	The constant ratio which the limiting friction bears to the normal
	reaction is called:
	(1) Limiting friction (2) Angle of friction
	(3) Cone of friction (4) Co-efficient of friction
65.	The centre of gravity of the area of the position of the parabola
	$\sqrt{\frac{x}{a}} + \sqrt{\frac{y}{b}} = 1$ between the curve and the axes is:
	(1) $\left(\frac{a}{2}, \frac{a}{2}\right)$ (2) $\left(\frac{a}{5}, \frac{b}{5}\right)$
	(3) $\left(\frac{a}{3}, \frac{b}{3}\right)$ (4) None of these

Question No.	Questions
66.	The greatest lower bound of a set, if it exists, is:
	(1) Two (2) Three
	(3) Four (4) None of these
67.	The interior of a set A is the largest subset of A, which is:
	(1) Open (2) Closed
	(3) Both (4) None of these
68.	The sequence $< n^{1/n} >$ converges to the limit:
	(1) 0 (2) 1
	(3) α (4) None of these
69.	The series $\sum_{n=1}^{\alpha} a_n$, where $a_n = \frac{1}{\sqrt{n}} \sin \frac{1}{n}$ is:
	(1) Oscillating (2) Divergent
	(3) Convergent (4) None of these
70.	If $\sum_{n=1}^{\alpha} a_n$ is a series of real numbers whose sequence $\langle S_n \rangle$ of partial
	sums is bounded and if $\langle b_n \rangle$ is a non-negative monotonically
	decreasing sequence tending to zero, then the series $\sum_{n=1}^{\alpha} a_n b_n$ converges.
	This statement is known as :
	(1) Abel's test (2) Abel's lemma
	(3) Dirichlet's test (4) None of these

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Question No.	Questions		
71.	If f is integrable on $[0,1]$, then $\int_0^1 f(x) dx$ is equal to :		
	(1) $\lim_{n \to \alpha} \sum_{r=1}^{n} f\left(\frac{r}{n}\right)$ (2) $\lim_{n \to \alpha} \frac{1}{n} \sum_{r=1}^{n} f\left(\frac{r}{n}\right)$		
	(3) $\lim_{n \to \alpha} \sum_{r=1}^{n} f\left(\frac{n}{r}\right)$. r (4) None of these		
72.	The improper integral $\int_0^1 \frac{dx}{x^2 - 3x + 2}$ is:		
-	(1) Convergent (2) Oscillating		
	(3) Divergent (4) None of these		
73.	Which one is not a complete metric space:		
	(1) The usual metric space (R,d)		
	(2) The space of complex numbers		
	(3) Any discrete metric space		
	(4) None of these		
74.	Energy complete metric space is of the second category as a subset of		
	itself is the statement of		
	(1) Banach's fixed point theorem		
	(2) Baire's category theorem		
	(3) Cantor's intersection theorem		
	(4) None of these		

Question No.	Questions
75 .	If $f(x) = x$, $x \in [0,1]$ and $P = \{0, \frac{1}{3}, \frac{1}{2}, \frac{2}{3}, 1\}$ be the partition of $[0,1]$,
	then $L(f, P)$ is equal to :
·.	$(1) 8/_{26} $ $(2) \frac{7}{16}$
	(3) $\frac{13}{36}$ (4) none of these
76.	Which one is not a compact subset?
	(1) Any finite subset of a metric space
	(2) $A = [-50, 50]$ of R
	(3) Set $\left\{\frac{1}{n}: n \in N\right\} \cup \{0\}$ in R
	(4) Usual metric space (R, d)
77.	Which one is a dense set?
	(1) Q in R
	(2) Set of natural numbers in R
	(3) The subset $A = \left\{\frac{1}{n}, n \in N\right\}$ in R
	(4) None of these
78.	The number of non-isomorphic abelian groups of order 8 is:
	(1) 1 (2) 2
	(3) 3 (4) none of these

Question No.	Questions Code-E
79.	Number of Sylow 2-subgroups of S ₃ is:
	(1) 2 (2) 3
	(3) 6 (4) None of these
80.	Energy subgroup of a finite cyclic group is:
	(1) Characteristic subgroup (2) Normal subgroup
	(3) Cyclic subgroup (4) None of these
81.	If $u = \frac{y}{z} + \frac{z}{x} + \frac{x}{y}$, then $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} + z \frac{\partial u}{\partial z}$ is equal to:
•	$(1) u \qquad \qquad (2) 2u$
	(3) 1 (4) None of these
82.	$\lim_{x \to 0^-} \frac{e^{1/x} - 1}{e^{1/x} + 1} \text{ is :}$
	(1) -1 (2) 0
	(3) 1 (4) None of these
83.	Taylor's Theorem is also known as:
	(1) Ist mean value theorem of differential equation
	(2) IInd mean value theorem of differential equation
	(3) Generalised mean value theorem of differential equation
	(4) None of these

Question No.	Questions
84.	Equation of evolute of parabola $y^2 = 4ax$ is given by:
	(1) $27ay^2 = 4(x-2a)^3$ (2) $27ay^2 = 4(x-2a)^2$
	(3) $27y^2 = 4(x-2a)^3$ (4) None of these
85.	The length of a loop of the curve $r = a(Q^2 - 1)$ is:
	(1) $\frac{79}{3}$ (2) $\frac{89}{3}$
	(3) $\frac{16}{3}$ (4) None of these
86.	The sum of the eigen values of a matrix is equal to:
	(1) A
	(2) The sum of the elements of the principal diagonal
	(3) The product of the elements on the principal diagonal
	(4) None of these
87.	If A is a matrix of order n and A^2 is a null matrix, then what is the
	maximum possible rank of A :
	$(1) n \qquad \qquad (2) \qquad n^2$
	(3) n^3 (4) None of these
88.	The eigen values of a nilpotent matrix are:
	(1) 2 (2) 1
	(3) 0 (4) None of these

Questions	
The quadratic form $9x^2 + y^2 + 4z^2$	$z^2 + 6xy - 12xz - 4yz$ is:
(1) Positive definite	(2) Positive semi-definite
(3) Negative definite	(4) Negative semi-definite
Let $x^4 - 3x^3 - 5x^2 + 2x - 1 = 0$	
(1) All the roots of equation are	real.
(2) All the roots of equation are	purely imaginary.
(4) None of these	
If T is one-one linear transforms	ation, then dim Ker T is:
(1) 0	(2) 1
(3) 2	(4) None of these
The linear transformation T:	$R^2 \to R^2$ defined by T (1, 0) = (2, 3),
T(0, 1) = (5, 6) is:	
(1) One-one and onto	(2) One-one but not onto
(3) Onto but not one-one	(4) None of these
Let R be the field of real num	bers. Which of the following is not a
sub-space of $V_3(R)$:	
(1) $\{(x,2y,3z): x,y,z \in R\}$	A Company of the Comp
(2) $\{(x,x,x):x\in R\}$	
(3) $\{(x,y,z):x,y,z \text{ are rational }$	number}
(4) None of these	•
	The quadratic form $9x^2 + y^2 + 4z^2$ (1) Positive definite (3) Negative definite Let $x^4 - 3x^3 - 5x^2 + 2x - 1 = 0$ (1) All the roots of equation are (2) All the roots of equation are (3) Two real and the two imagin (4) None of these If T is one—one linear transforms (1) 0 (3) 2 The linear transformation T: T(0, 1) = (5, 6) is: (1) One-one and onto (3) Onto but not one-one Let R be the field of real num sub-space of $V_3(R)$: (1) $\{(x, 2y, 3z) : x, y, z \in R\}$ (2) $\{(x, x, x) : x \in R\}$ (3) $\{(x, y, z) : x, y, z \text{ are rational}$

Question No.	Questions		
94.	If W is a subspace of $V = V_3(R)$ generated by $\{(1,0,0),(1,1,0)\}$. Then		
	basis of V_W is:		
	(1) $\{W + (0, 8, 8)\}\$ (2) $\{W + (0, 0, 1)\}\$		
	(3) $\{W + (a, 0, a) : a \in R\}$ (4) None of these		
95.	Let the linear transformation $T_1: \mathbb{R}^2 \to \mathbb{R}^2$ such that $T_1(x,y) = (0,4x)$		
	and $T_2: \mathbb{R}^2 \to \mathbb{R}^2$ such that $T_2(x,y) = (x,0)$. Then $T_1T_2(x,y)$ is equal to:		
	(1) $(0,6x)$ (2) $(3x,y)$		
	$(3) (0,0) \qquad (4) (0,4x)$		
96.	Let $T: U \to V$ be a homomorphism, then Ker T is a subspace of:		
	$(1) V \qquad \qquad (2) \qquad U$		
*	(3) $T(U)$ (4) None of these		
97.	Let u, v be normal vectors in an inner product space V s.t. $ u + v = 1$.		
	Then $ u-v $ is:		
	(1) $\sqrt{3}$ (2) 1		
	(3) $\sqrt{2}$ (4) None of these		
98.	The radial and transverse components of velocity of a particle moving		
	along a plane curve $r = f(\theta)$ are :		
	(1) $\frac{d^2y}{dt^2}$, $r\frac{d^2\theta}{dt^2}$ (2) $\frac{dr}{dt}$, $\left(\frac{d\theta}{dt}\right)^2$		
	(3) $\frac{d\theta}{dt}$, $r^2 \frac{d\theta}{dt}$ (4) $\frac{dr}{dt}$, $r \frac{d\theta}{dt}$		

Questions Code-B
A particle of mass 2 grammes is moving with a S.H.M. If its maximum
velocity is 2π cm/sec. and the amplitude of the vibration is 20 cm., then
the period of vibration is:
(1) 5 seconds (2) 10 seconds
(3) 20 seconds (4) None of these
A particle is projected with a velocity of 24.5 m/sec. in a direction
making an angle 60° with the horizontal. Then the greatest height
attained by the particle is:
(1) 22.96 m (2) 11.96 m
(3) 36.84 m (4) None of these

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Control of 16/07/2021 SET-"X" (Total No. of printed pages: 21) (DO NOT OPEN THIS QUESTION BOOKLET BEFORE TIME OR UNTIL YOU ARE ASKED TO DO SO) g. Row PG-EE-July, 2025 (Mathematics) 10011 Sr. No.__ Code Max. Marks: 100 **Total Questions: 100** Roll No. ______ (in figure)_____ (in words) Time: 11/4 Hours Date of Birth : _____ Name:_____ Mother's Name:_____ Father's Name: Date of Examination: (Signature of the Invigilator) CANDIDATES MUST READ THE FOLLOWING INFORMATION/ INSTRUCTIONS BEFORE STARTING THE QUESTION PAPER. The candidates must return the Question book-let as well as OMR 1. All questions are compulsory. answer-sheet to the Invigilator concerned before leaving the Examination Hall, failing which a case of use of unfair-means / mis-behaviour will be registered 2. against him / her, in addition to lodging of an FIR with the police. Further the answer-sheet of such a candidate will not be evaluated. Keeping in view the transparency of the examination system, carbonless OMR

Sheet is provided to the candidate so that a copy of OMR Sheet may be kept by

Question Booklet along-with answer key of all the A,B,C and D code shall be got uploaded on the University Website immediately after the conduct of Entrance Examination. Candidates may raise valid objection/complaint if any, with regard to discrepancy in the question booklet/answer key within 24 hours of uploading the same on the University website. The complaint be sent by the students to the Controller of Examinations by hand or through email. Thereafter, no complaint in any case will be considered.

The candidate MUST NOT do any rough work or writing in the OMR Answer-Sheet. Rough work, if any, may be done in the question book-let itself. Answers

MUST NOT be ticked in the Question book-let.

There will be no negative marking. Each correct answer will be awarded one full mark. Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer.

Use only Black or Blue BALL POINT PEN of good quality in the OMR Answer-7.

BEFORE ANSWERING THE QUESTIONS, THE CANDIDATES SHOULD ENSURE THAT THEY HAVE BEEN SUPPLIED CORRECT AND COMPLETE BOOK-LET. COMPLAINTS, IF ANY, REGARDING MISPRINTING ETC. WILL NOT BE ENTERTAINED 30 MINUTES AFTER STARTING OF THE EXAMINATION.



Question No.	Qu	estions	Code-C
1.	One Joule is equal to:		.0/
	(1) 10^3 ergs	(2)	10 ⁵ ergs
	(3) 10 ⁸ ergs	(4)	None of these
2.	The magnitude and direction magnitudes 12 N and 14 N, actin at an angle of 45° is:		
	(1) $R = 42.3 \text{ N}, \ \theta = 45^{\circ}$	(2)	$R = 4.2 \text{ N}, \ \theta = 90^{\circ}$
	(3) $R = 0.45 \text{ N}, \ \theta = \tan^{-1}(24.03)$	(4)	$R = 24.03 \text{ N}, \ \theta = \tan^{-1}(0.45)$
3.	If ABCD is a square of side 2n	n. Forces	s of magnitude 5, 3, 4 and 6
	Newtons act along CB, BA, 1	DA and	DB respectively. Then the
	algebraic sum of moments of the		
. ((1) $3(1+2\sqrt{2})$ Nm	(2)	$[3(1-2\sqrt{2})]$ Nm
(3) $2(4-3\sqrt{2})$ Nm	(4)	$2(1+3\sqrt{2})\mathrm{Nm}$
	The constant ratio which the leaction is called:	imiting	friction bears to the norma
(1	l) Limiting friction	(2)	Angle of friction
(3	3) Cone of friction	(4)	Co-efficient of friction
5. T	he centre of gravity of the a	area of	the position of the parabol
	$\frac{x}{a} + \sqrt{\frac{y}{b}} = 1$ between the cur		
(1)	$\left(\frac{a}{2}, \frac{a}{2}\right)$ $\left(\frac{a}{3}, \frac{b}{3}\right)$	(2)	$\left(\frac{a}{5},\frac{b}{5}\right)$
(3)	$\left(\frac{a}{2},\frac{b}{2}\right)$	· (4)	None of these

Question No.	•	Questions	
6. The greatest lower bound of a set, if it exists, is:			ists, is:
	(1) Two	(2)	Three
	(3) Four	(4)	None of these
7.	The interior of a set A is the	largest subs	set of A, which is:
	(1) Open	(2)	Closed
	(3) Both	(4)	None of these
8.	The sequence $< n^{1/n} > $ conve	erges to the l	imit:
	(1) 0	(2)	1
	(3) α	(4)	None of these
	The series $\sum_{n=1}^{\alpha} a_n$, where $a_n =$		
	(1) Oscillating	(2)	Divergent
	(3) Convergent	(4)	None of these
0.	If $\sum_{n=1}^{\alpha} a_n$ is a series of real 1	numbers wh	nose sequence $\langle S_n \rangle$ of parti-
8	sums is bounded and if	$< b_n >$ is	a non-negative monotonical
C	lecreasing sequence tending	to zero, the	on the series $\sum_{n=1}^{\alpha} a_n b_n$ converge
r	This statement is known as:		
(1) Abel's test	(2)	Abel's lemma
1			

			Code-C
Question No.		stions	Garage Control of the
11.	The differential equation of first or	der an	d first degree is homogeneous
	if :		
	$(1) \frac{dy}{dx} = \phi(^{y}/_{x})$	(2)	$\frac{dy}{dx} = \text{constant}$
	$(3) \frac{dy}{dx} = \phi(x)$	(4)	None of these
12.	The general solution of the differen	ntial e	quation
	$e^{y}\frac{dy}{dx} + (e^{y} + 1)\cot x = 0 \text{ is :}$		
	$(1) (e^y + 1)\cos x = K$	(2)	$(e^y + 1) \csc x = K$
	$(3) (e^y + 1)\sin x = K$	(4)	None of these
13.	What is order and degree of the di	fferent	tial equation
	$\frac{d^2y}{dx^2} + \sqrt{1 + \left(\frac{d^3y}{dx^3}\right)^4} = 0$		
	(1) First order, second degree	(2)	Second order, first degree
	(3) Second order, second degree	(4)	None of these
14.	Particular integral of the different	ial eq	uation
	$x^2 \frac{d^2 y}{dx^2} - x \frac{dy}{dx} + y = 2 \log x \text{ is :}$		
	$(1) 2\log x + 4$	(2)	$4\log x - 2$
	(3) $4 \log x - 4$	(4)	None of these

2			Code-C
Question No.		Questions	
15.	For $a, b, c \in R$, if the difference of the dif	erential equation	
	$(ax^2 + bxy + y^2)dx + (2x^2 + bxy + y^2)dx$	$x^2 + c xy + y^2)dy$	= 0 is exact, then:
	(1) $b = a, c = 20$	(2)	b=4, c=2
	(3) $b = 2, c = 2$	(4)	None of these
16.	The points whose positi	on vectors are 6	$0\hat{i} + 3\hat{j} ; 40\hat{i} - 8\hat{j} ; a\hat{i} - 52\hat{j}$
	are collinear if :		
	(1) a = 40	(2)	a = 20
	(3) $a = -40$	(4)	None of these
17.	$f\phi$ is a scalar point fund	ction, then curl (grad ϕ) is equal to :
(1) 1	(2)	0
(:	3) -1	(4)	None of these
18. T	he value of $\oint [(\cos x \sin x)]$	$(x - xy)dx + \sin x$	$(x\cos y dy]$, where c is circle
x.	$x^2 + y^2 = 1$ is:		
(1) π	(2)	$\pi/2$
(3) 1	(4)	0
9. If	$\vec{F} = 3xy \ \hat{i} - y^2 \ \hat{j} \ , \text{ then}$	the value of \int_{C}	$\vec{F} \cdot d\vec{r}$, where C is the curve in
X	Y-plane, $y = 2x^2$ from (0,0,) to (1,2) is	
(1)	$\frac{7}{6}$	(2)	$\frac{6}{7}$
(3)	-7	(4)	None of these

20. If $\vec{f} = (x + 3y)\hat{i} + (y - 2z)\hat{j} + (x + az)\hat{k}$ is solenoidal, then a is equal to 1. (2) 2. (3) 0. (4) -2. (4) -2. (1) $u = \frac{y}{z} + \frac{z}{x} + \frac{x}{y}$, then $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} + z \frac{\partial u}{\partial z}$ is equal to 1. (1) $u = (2) - 2u = (3) - 2u = (4)$ None of these. (1) $u = (2) - 2u = (4)$ None of these. (22. $\lim_{x \to 0^-} \frac{e^{1/x} - 1}{e^{1/x} + 1}$ is 1. (2) 0. (3) 1. (4) None of these. (1) Ist mean value theorem of differential equation. (2) IInd mean value theorem of differential equation. (3) Generalised mean value theorem of differential equation. (4) None of these. (4) None of these. (4) None of evolute of parabola $y^2 = 4ax$ is given by 1. (1) $27ay^2 = 4(x - 2a)^3$ (2) $27ay^2 = 4(x - 2a)^3$ (3) $27y^2 = 4(x - 2a)^3$ (4) None of these. (1) $\frac{79}{2}$ (6) $\frac{89}{2}$		Questions	Code-C
(1) 1 (2) 2 (3) 0 (4) -2 21. If $u = \frac{y}{z} + \frac{z}{x} + \frac{x}{y}$, then $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} + z \frac{\partial u}{\partial z}$ is equal to: (1) u (2) $2u$ (3) 1 (4) None of these 22. $\lim_{x \to 0-} \frac{e^{1/x} - 1}{e^{1/x} + 1}$ is: (1) -1 (2) 0 (3) 1 (4) None of these 23. Taylor's Theorem is also known as: (1) Ist mean value theorem of differential equation (2) IInd mean value theorem of differential equation (3) Generalised mean value theorem of differential equation (4) None of these 24. Equation of evolute of parabola $y^2 = 4ax$ is given by: (1) $27ay^2 = 4(x - 2a)^3$ (2) $27ay^2 = 4(x - 2a)^3$ (3) $27y^2 = 4(x - 2a)^3$ (4) None of these 25. The length of a loop of the curve $r = a(Q^2 - 1)$ is:	If $\vec{f} = (x + 3y)\hat{i} + (y$	$(-2z)\hat{j} + (x + az)\hat{k}$ is solenoids	1 thon a is a series
21. If $u = \frac{y}{z} + \frac{z}{x} + \frac{x}{y}$, then $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} + z \frac{\partial u}{\partial z}$ is equal to: (1) u (2) $2u$ (3) 1 (4) None of these 22. $\lim_{x \to 0^-} \frac{e^{1/x} - 1}{e^{1/x} + 1}$ is: (1) -1 (2) 0 (3) 1 (4) None of these 23. Taylor's Theorem is also known as: (1) Ist mean value theorem of differential equation (2) IInd mean value theorem of differential equation (3) Generalised mean value theorem of differential equation (4) None of these 24. Equation of evolute of parabola $y^2 = 4ax$ is given by: (1) $27ay^2 = 4(x - 2a)^3$ (2) $27ay^2 = 4(x - 2a)^3$ (3) $27y^2 = 4(x - 2a)^3$ (4) None of these 25. The length of a loop of the curve $r = a(Q^2 - 1)$ is:	(1) 1	(0)	u, then a is equal to:
(1) u (2) $2u$ (3) 1 (4) None of these 22. $\lim_{x\to 0-} \frac{e^{1/x}-1}{e^{1/x}+1}$ is: (1) -1 (2) 0 (3) 1 (4) None of these 23. Taylor's Theorem is also known as: (1) Ist mean value theorem of differential equation (2) IInd mean value theorem of differential equation (3) Generalised mean value theorem of differential equation (4) None of these 24. Equation of evolute of parabola $y^2 = 4ax$ is given by: (1) $27ay^2 = 4(x-2a)^3$ (2) $27ay^2 = 4(x-2a)^3$ (3) $27y^2 = 4(x-2a)^3$ (4) None of these 25. The length of a loop of the curve $r = a(Q^2 - 1)$ is:	(3) 0		
(3) 1 (4) None of these 22. lim _{x→0-e^{1/x}+1} is: (1) -1 (2) 0 (3) 1 (4) None of these 23. Taylor's Theorem is also known as: (1) Ist mean value theorem of differential equation (2) IInd mean value theorem of differential equation (3) Generalised mean value theorem of differential equation (4) None of these 24. Equation of evolute of parabola y² = 4ax is given by: (1) 27ay² = 4(x - 2a)³ (2) 27ay² = 4(x - 2a)³ (3) 27y² = 4(x - 2a)³ (4) None of these 25. The length of a loop of the curve r = a(Q² - 1) is:	If $u = \frac{y}{z} + \frac{z}{x} + \frac{x}{y}$, then	$\int x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} + z \frac{\partial u}{\partial z}$ is equal to:	
22. $\lim_{x \to 0^-} \frac{e^{1/x} - 1}{e^{1/x} + 1} \text{ is :}$ (1) -1 (2) 0 (3) 1 (4) None of these 23. Taylor's Theorem is also known as : (1) Ist mean value theorem of differential equation (2) IInd mean value theorem of differential equation (3) Generalised mean value theorem of differential equation (4) None of these 24. Equation of evolute of parabola $y^2 = 4ax$ is given by : (1) $27ay^2 = 4(x - 2a)^3$ (2) $27ay^2 = 4(x - 2a)^3$ (3) $27y^2 = 4(x - 2a)^3$ (4) None of these 25. The length of a loop of the curve $r = a(Q^2 - 1)$ is :	(1) u	(2) $2u$	
(1) -1 (2) 0 (3) 1 (4) None of these 23. Taylor's Theorem is also known as: (1) Ist mean value theorem of differential equation (2) IInd mean value theorem of differential equation (3) Generalised mean value theorem of differential equation (4) None of these 24. Equation of evolute of parabola $y^2 = 4ax$ is given by: (1) $27ay^2 = 4(x - 2a)^3$ (2) $27ay^2 = 4(x - 2a)^3$ (3) $27y^2 = 4(x - 2a)^3$ (4) None of these 25. The length of a loop of the curve $r = a(Q^2 - 1)$ is:	(3) 1	(4) None of t	these
(3) 1 (4) None of these 23. Taylor's Theorem is also known as: (1) Ist mean value theorem of differential equation (2) IInd mean value theorem of differential equation (3) Generalised mean value theorem of differential equation (4) None of these 24. Equation of evolute of parabola $y^2 = 4ax$ is given by: (1) $27ay^2 = 4(x - 2a)^3$ (2) $27ay^2 = 4(x - 2a)^3$ (3) $27y^2 = 4(x - 2a)^3$ (4) None of these 25. The length of a loop of the curve $r = a(Q^2 - 1)$ is:	$\lim_{x \to 0^-} \frac{e^{1/x} - 1}{e^{1/x} + 1}$ is:		
 Taylor's Theorem is also known as: (1) Ist mean value theorem of differential equation (2) IInd mean value theorem of differential equation (3) Generalised mean value theorem of differential equation (4) None of these Equation of evolute of parabola y² = 4ax is given by: (1) 27ay² = 4(x - 2a)³ (2) 27ay² = 4(x - 2a)³ (3) 27y² = 4(x - 2a)³ (4) None of these The length of a loop of the curve r = a(Q² - 1) is: 	(1) -1	(2) 0	
 (1) Ist mean value theorem of differential equation (2) IInd mean value theorem of differential equation (3) Generalised mean value theorem of differential equation (4) None of these 24. Equation of evolute of parabola y² = 4ax is given by: (1) 27ay² = 4(x - 2a)³ (2) 27ay² = 4(x - 2a)³ (3) 27y² = 4(x - 2a)³ (4) None of these 25. The length of a loop of the curve r = a(Q² - 1) is: 	(3) 1	(4) None of	these
 (1) Ist mean value theorem of differential equation (2) IInd mean value theorem of differential equation (3) Generalised mean value theorem of differential equation (4) None of these 24. Equation of evolute of parabola y² = 4ax is given by: (1) 27ay² = 4(x - 2a)³ (2) 27ay² = 4(x - 2a)³ (3) 27y² = 4(x - 2a)³ (4) None of these 25. The length of a loop of the curve r = a(Q² - 1) is: 	Taylor's Theorem is	also known as :	
 (2) IInd mean value theorem of differential equation (3) Generalised mean value theorem of differential equation (4) None of these 24. Equation of evolute of parabola y² = 4ax is given by: (1) 27ay² = 4(x - 2a)³ (2) 27ay² = 4(x - 2a)³ (3) 27y² = 4(x - 2a)³ (4) None of these 25. The length of a loop of the curve r = a(Q² - 1) is: 		그녀는 지금 회사에 되었습니다. 그런 그런 보고 그리는 이 생각	on
 (3) Generalised mean value theorem of differential equation (4) None of these 24. Equation of evolute of parabola y² = 4ax is given by: (1) 27ay² = 4(x - 2a)³ (2) 27ay² = 4(x - 2a)³ (3) 27y² = 4(x - 2a)³ (4) None of these 25. The length of a loop of the curve r = a(Q² - 1) is: 			
(4) None of these 24. Equation of evolute of parabola $y^2 = 4ax$ is given by: (1) $27ay^2 = 4(x-2a)^3$ (2) $27ay^2 = 4(x-2a)^3$ (3) $27y^2 = 4(x-2a)^3$ (4) None of these 25. The length of a loop of the curve $r = a(Q^2 - 1)$ is:	and the second second second second	French State Comment of the Comment	
Equation of evolute of parabola $y^2 = 4ax$ is given by: (1) $27ay^2 = 4(x - 2a)^3$ (2) $27ay^2 = 4(x - 2a)^3$ (3) $27y^2 = 4(x - 2a)^3$ (4) None of these 25. The length of a loop of the curve $r = a(Q^2 - 1)$ is:		one of the order of the ent	sial equation
(1) $27ay^2 = 4(x - 2a)^3$ (2) $27ay^2 = 4(x - 2a)^3$ (3) $27y^2 = 4(x - 2a)^3$ (4) None of these 25. The length of a loop of the curve $r = a(Q^2 - 1)$ is:		$\frac{1}{\text{of parabola } v^2 = 4ax \text{ is given}}$	by:
(3) $27y^2 = 4(x - 2a)^3$ (4) None of these 25. The length of a loop of the curve $r = a(Q^2 - 1)$ is:	었는 이 바다다 내려가 되었다. 하다		
The length of a loop of the curve $r = a(Q^2 - 1)$ is:			
$\frac{1}{2} \frac{1}{2} \frac{1}$			resortion A sign
$(1) \frac{79}{}$	The length of a loop	of the curve $r = a(Q^2 - 1)$ is	3:
$(2) \frac{3}{3}$	1) $\frac{79}{3}$	(2) $\frac{89}{3}$	
(3) $\frac{16}{3}$ (4) None of these	3) $\frac{16}{3}$	(4) None	of these

Question No.	Questions
26.	The sum of the eigen values of a matrix is equal to:
	(1) A
	(2) The sum of the elements of the principal diagonal
	(3) The product of the elements on the principal diagonal
27.	If A is a matrix of order n and A^2 is a null matrix, then what is the
	maximum possible rank of A:
	$(1) n \qquad \qquad (2) \qquad n^2$
	(3) n^3 (4) None of these
28. T	The eigen values of a nilpotent matrix are :
(1	1) 2 (2) 1
(3	3) 0 (4) None of these
29. T	he quadratic form $9x^2 + y^2 + 4z^2 + 6xy - 12xz - 4yz$ is:
(1) Positive definite (2) Positive semi-definite
(3	Negative definite (4) Negative semi-definite
0. Le	$et x^4 - 3x^3 - 5x^2 + 2x - 1 = 0$
(1)) All the roots of equation are real.
(2)	All the roots of equation are purely imaginary.
(3)	Two real and the two imaginary roots.
(4)	None of these

Ouertien	Questions Code-C
Question No.	
31.	A Car weighing 250 kg travelling at 19.6 m/sec. is brought to rest in 4.9 m
	by application of brakes. Then the force of resistance of brakes is:
	(1) 7800 Newtons (2) 8800 Newtons
	(3) 9800 Newtons (4) None of these
32.	The central force is defined as:
	(1) A force whose line of action always passes through a fixed point
	(2) A force whose line of action does not pass through a fixed point
	(3) A force whose line of action always passes through variable poin
	(4) None of these
33.	Polar equation of ellipse referred to focus as pole is:
50.	하네요. 하는 아니는 그렇게 무슨 사람들이 되었다면 하는 것이 없는데 하는데 그렇게 하면 없다.
	$(1) \frac{l}{r} = 1 + e \cos \theta \qquad (2) \frac{l}{r} = 1 - e \cos \theta$
	(3) $\frac{l}{r} = e \cos \theta - 1$ (4) None of these
34.	If $r = \sqrt{x^2 + y^2}$, $\theta = \tan^{-1}(y/x)$, then $\frac{\partial(r,\theta)}{\partial(x,y)}$ is:
	$\partial(x,y)$
	(1) $\frac{x}{x^2 + y^2}$ (2) $\frac{y}{x^2 + y^2}$
	스마마 왕인 하면 하는 사람들은 아니라 하는 것 같아. 그는 그리고 있다면 하는 것이 되었다.
	(3) $\frac{1}{x^2 + y^2}$ (4) $\frac{1}{\sqrt{x^2 + y^2}}$
	ν τ
35.	$\int_{0}^{\alpha} e^{-x^{2}} dx$ is equal to:
	(1) $\pi/_4$ (2) $\sqrt{\pi}/_4$
	(1) $\pi/_4$ (2) $\sqrt{\pi}/_4$ (3) $\sqrt{\pi}/_2$ (4) None of these
	(3) $\sqrt{\pi}/2$ (4) None of these

Question		estions	oV.
No. 36.	The Fourier co-efficient a_n for the (1) 1 (3) $-1/2$	function (2) (4)	on $f(x) = x$ in $[-\pi, \pi]$ is: None of these
37.	Polar form of C-R equations are: $(1) \frac{\partial u}{\partial \theta} = \frac{1}{r} \frac{\partial v}{\partial r}, \frac{\partial v}{\partial r} = \frac{r}{\partial \theta}$	(2)	$\frac{\partial u}{\partial r} = \frac{1}{r} \frac{\partial v}{\partial \theta} , \frac{\partial v}{\partial r} = \frac{1}{r} \frac{\partial v}{\partial \theta}$
	(3) $\frac{\partial u}{\partial r} = \frac{r}{\partial \theta} \frac{\partial v}{\partial \theta}, \frac{\partial u}{\partial \theta} = \frac{-r}{\partial r} \frac{\partial v}{\partial r}$		$\frac{\partial u}{\partial r} = \frac{1}{r} \frac{\partial v}{\partial \theta} , \frac{\partial u}{\partial \theta} = \frac{-r}{\partial r} \frac{\partial v}{\partial r}$
38.	The function $f(z) = r^2 \cos 2\theta + ir^2$ is equal to:		
	(1) 0(3) 4	(2) (4)	None of these
	The point on the Complex plane on the Riemann sphere $X^2 + Y^2 +$		[[[[[[[[[[[[[[[[[[[
	(1) 1+2i		3+2i
	$(3) \cdot 4 + 3i$	(4)	None of these
10. T	The angle of rotation at $z = 2$ equal to:	+ i for	the transformation $w = z^2$
10. T		+ <i>i</i> for (2)	the transformation $w = z^2$ $tan^{-1} \frac{1}{2}$

Question		Questions		Code-C
No.				and the second
41.	If f is integrable on $[0,1]$, the	$\operatorname{en} \int_0^1 f(x) dx$	is equal to:	
	(1) $\lim_{n \to \alpha} \sum_{r=1}^{n} f\left(\frac{r}{n}\right)$	(2)	$\lim_{n \to \alpha} \frac{1}{n} \sum_{r=1}^{n} f\left(\frac{r}{n}\right)$	
	(3) $\lim_{n \to \alpha} \sum_{r=1}^{n} f\left(\frac{n}{r}\right) \cdot r$	(4)	None of these	
42.	The improper integral $\int_{0}^{1} \frac{1}{x^2}$.	$\frac{dx}{-3x+2}$ is:		
	(1) Convergent	(2)	Oscillating	
	(3) Divergent	(4)	None of these	
43.	Which one is not a complete	metric space	e:	
	(1) The usual metric space	(R,d)		
	(2) The space of complex n	umbers		
	(3) Any discrete metric spa	ace		
	(4) None of these			
14.	Energy complete metric sp	ace is of the	e second catego	ry as a subset
	itself is the statement of			
	(1) Banach's fixed point th	neorem		
	(2) Baire's category theore	em		
	(3) Cantor's intersection t	heorem		
	(4) None of these			

Question No.		Questions	30%	
45.	If $f(x) = x$, $x \in [0,1]$ and	d $P = \{0, \frac{1}{3}, \frac{1}{2}, \frac{2}{3}, 1\}$ be the partition of [0,	,1],	
	then $L(f, P)$ is equal to:			
	(1) 8/26	(2) $\frac{7}{16}$		
	(3) 13/36	(4) none of these		
46.	Which one is not a compa	act subset?		
	(1) Any finite subset of a	(1) Any finite subset of a metric space		
	(2) $A = [-50, 50]$ of R			
	(3) Set $\left\{\frac{1}{n}: n \in N\right\} \cup \{0\}$	} in R		
	(4) Usual metric space ((R, d)		
47.	Which one is a dense set	?		
	(1) Q in R	보이 있다면 하는 말이라고 있는 물론이 되었다. 일 하는 한 동이로 보이는 것이 있다면 하는 것이다.		
	(2) Set of natural numb	ers in R		
	(3) The subset $A = \left\{\frac{1}{n}, \right\}$	$n \in N$ in R		
	(4) None of these			
48.	The number of non-isom	orphic abelian groups of order 8 is:		
	(1) 1	(2) 2		
	(3) 3	(4) none of these		

Question	Qu	lestions
No.		
49.	Number of Sylow 2-subgroups of	S ₃ is:
	(1) 2	(2) 3
	(3) 6	(4) None of these
50.	Energy subgroup of a finite cycli	c group is:
	(1) Characteristic subgroup	(2) Normal subgroup
	(3) Cyclic subgroup	(4) None of these
51.	$\lim_{x \to 0} \frac{x(1+a\cos x) - b\sin x}{x^3} = 1 \text{ then}$	n the values of a and b are:
	(1) 2,3	(2) $\frac{5}{2}, \frac{3}{2}$
	(3) $\frac{-5}{2}$, $\frac{-3}{2}$	(4) None of these
52.	If $u = \log(x^3 + y^3 + z^3 - 3xyz)$,	then $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} + z \frac{\partial u}{\partial z}$ is equal to:
	(1) 3 <i>u</i>	(2) 3
	$(3) \frac{3}{x+y+z}$	(4) None of these
33.	The radius of curvature of heli	$x x = a \cos t, y = a \sin t, z = at \tan a$
	(1) $a \sec^2 \alpha$	(2) $a \csc^2 \alpha$
	(3) $a \cot \alpha$	(4) None of these
4.	The point $(0,0)$ for $f(x,y) = x^3$	$-3axy + y^3$ is:
	(1) A maximum point	(2) A minimum point
4		

Question	Question	1 200
No.	lition	for the curve to be a plane
55.	The necessary and sufficient condition	
	curve is:	
	$[1]$ $[r \ r \ r \] = 0$	$\left[\overrightarrow{r}\ \overrightarrow{r}''\ \overrightarrow{r}'''\right] = 0$
	(3) ['	$\left[\overrightarrow{r}'\overrightarrow{r}''\overrightarrow{r}'''\right] = 0$
56.	A partial differential equation by elin	ninating the arbitrary function
	from $z = f(x^2 - y^2)$ is given by:	
	$(1) x \frac{\partial z}{\partial x} + y \frac{\partial z}{\partial y} $ (2)	$x\frac{\partial z}{\partial x} - y\frac{\partial z}{\partial y}$
	$(3) y\frac{\partial z}{\partial x} - x\frac{\partial z}{\partial y} \tag{4}$	$y\frac{\partial z}{\partial x} + x\frac{\partial z}{\partial y}$
57.	The partial differential equation $\frac{\partial^2 z}{\partial x^2}$ +	$6\frac{\partial^2 z}{\partial x \partial y} + 9\frac{\partial^2 z}{\partial y^2} = 0 \text{ is :}$
	(1) Hyperbolic (2) Parabolic
azv	(3) Emptic) None of these
58.	The particular integral of the equation	$\ln \frac{\partial^2 z}{\partial x^2} - 2 \frac{\partial^2 z}{\partial x \partial y} = \sin x \cos 2y \text{ is}$
	(1) $\sin(x + 3y) + \sin(x - 3y)$ (5)	2) $\sin(x + 2y) + \frac{1}{10}\sin(x - 2y)$
	(3) $\frac{1}{6}\sin(x+2y) - \frac{1}{10}\sin(x-2y)$ (4) None of these

Onaction	0		Code-C
Question No.		estions	
59.	Two dimensional wave equation	is given	by:
	(1) $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = \frac{1}{c^2} \frac{\partial u}{\partial t}$		$\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = \frac{1}{c^2} \frac{\partial^2 u}{\partial t^2}$
	(3) $\frac{\partial^2 u}{\partial x^2} + \frac{\partial u}{\partial y} = \frac{1}{c^2} \frac{\partial^2 u}{\partial t^2}$	(4)	None of these
60.	The partial differential equa	tion $x^{\frac{6}{6}}$	$\frac{\partial^2 z}{\partial x^2} + 2 \frac{\partial^2 z}{\partial y \partial x} + y \frac{\partial^2 z}{\partial y^2} + \frac{\partial z}{\partial x} = 0 \text{ is}$
	hyperbolic in nature if:		
	(1) xy < 1	(2)	xy = 1
	(3) $xy > 1$	(4)	None of these
	If a be any integer and p be an the statement of: (1) Fermat's theorem	(2)	Wilson theorem
	(3) Lagrange's theorem	(4)	None of these
co .	(3) Lagrange's theorem		None of these
62.	(3) Lagrange's theorem An ideal of a ring of integers is r		
	An ideal of a ring of integers is r	naximal	iff it is generated by some
63.	An ideal of a ring of integers is r (1) Natural number	(2) (4)	iff it is generated by some Prime integer None of these
63.	An ideal of a ring of integers is r (1) Natural number (3) Real number Let f be a ring isomorphism of	(2) (4)	Prime integer None of these R'. If R' is an integral domai

Question	Que	stions	Catorization domain R, then
No. 64.	If 'a' is an irreducible element of a 'a' must be (1) Natural number (3) Prime number The order of convergence of Regular (1) 1	(2) (4) Falsi (2)	Real number None of these
66.	(3) 2 $\Delta f(x) g(x) \text{ is equal to :}$		$f(x+h) \Delta g(x) + g(x) \nabla f(x)$
	(1) $f(x) \Delta g(x) + g(x) \Delta f(x)$ (3) $f(x+h) \Delta g(x) + g(x) \Delta f(x)$	(2) (4)	None of these
67.	$\mu - \frac{\delta}{2}$ is equal to:		
	(1) $E^{1/2}$ (3) E^{-1}	(2) (4)	$E^{-1/2}$
	Runge-Kutta method is used for: (1) Interpolation (2) Numerical differentiation (3) Numerical Integration (4) Numerical solution of ordinar	y diffe	rention equation
	Milne-Simpron's method is a:		9x 10 0 1
	(1) Multiple step method	(2)	Single step method
	(3) Both (1) and (2)	(4)	None of these

Question No.		Questions	Code-(
70.	Which of the following is also (1) Bisection mothers	beauti	
	(1) D	known as i	nethod of false position?
Carrier	, ,	(2)	Newton Raphson method
	(3) Regula-falsi method	(4)	None of these
71.	If T is one-one linear transfor	mation, the	en dim Kon Tio
			on dim Ref 1 is .
	(1) 0	(2)	1
	(3) 2	(4)	None of these
72.	The linear transformation T	$: \mathbb{R}^2 \to \mathbb{R}^2$	defined by $T(1,0) = (0,0)$
	T(0, 1) = (5, 6) is:		30 Interest by 1 (1, 0) - (2, 3)
	(1) One-one and onto	(2)	One-one but not onto
	(3) Onto but not one-one	(4)	None of these
73.	Let R be the field of real numbers S be the field of S because S be the field of S because S be the field of S because	mbers. Wh	ich of the following is not
	1) $\{(x,2y,3z): x,y,z \in R\}$		
	$2) \{(x,x,x):x\in R\}$		
	3) $\{(x,y,z): x,y,z \text{ are rationa}\}$	l number}	
	None of these		
4. If	W is a subspace of $V = V_3$ (R	?) generate	ed by {(1,0,0), (1,1,0)}. The
7. 11		and the Physical	
1	asis of V/W is:		
ba		(2)	$\{W + (0,0,1)\}$

Question No.		Questions	n^2 such that $T_*(x,y) = (0,4x)$
75.	Let the linear transformation	$T_1: R^2 \to I$	T T (x x) is social to:
	Let the linear transformation and $T_2: \mathbb{R}^2 \to \mathbb{R}^2$ such that $T_2(x)$	(x,y)=(x,0)	1. Then 1112(x,y) to oquat or
	(1) (0,6x)	(2)	(3%,7)
	(3) (0,0)		(0,4x)
76.	Let $T: U \to V$ be a homomorph	ism, then I	Ker T is a subspace of:
70.		(2)	U
	(1) V(3) T(U)		None of these
-	Let u, v be normal vectors in a	and the second of the second	oduct space V s.t. $ u + v = 1$.
	그리스 하는 사람이 그리고 함께 그는 그리는 그 모양이 그 점점 모르는 일시하다.	III IIIIICI P	
	Then $ u-v $ is:		
	(1) $\sqrt{3}$	(2)	1
	$(3) \sqrt{2}$	(4)	None of these
78.	The radial and transverse cor	nponents o	of velocity of a particle movin
	along a plane curve $r = f(\theta)$ a		
	$(1) \frac{d^2y}{dt^2}, \frac{r}{dt^2}$	(2)	$\frac{dr}{dt}$, $\left(\frac{d\theta}{dt}\right)^2$
	$(3) \frac{d\theta}{dt}, r^2 \frac{d\theta}{dt}$	(4)	$\frac{dr}{dt}$, $r \frac{d\theta}{dt}$
79.	A particle of mass 2 grammes	is moving	with a S.H.M. If its maximu
	velocity is 2π cm/sec. and the		
	the period of vibration is:		
1			
	(1) 5 seconds	(2)	10 seconds

Fig. 1 Sept. Sant.	Questions	Code-C
Question No.		Actions Quetient
80.	A particle is projected with a	velocity of 24.5 m/sec. in a direction
	making an angle 60° with the	horizontal. Then the greatest height
	attained by the particle is:	
	(1) 22.96 m	(2) 11.96 m
	(3) 36.84 m	(4) None of these
81.	The pole of the line $2x + y + 12$	$= 0 \text{ w.r.t. circle } x^2 + y^2 - 4x + 3y - 1 = 0$
	is:	
	(1) (1,3)	(2) $(2,-2)$
		(4) None of these
	(3) (1,-2)	
82.	What is the nature of the curve	$13x^2 - 18xy + 37y^2 + 2x + 14y - 2 = 0$
	(1) Circle	(2) Sphere
	(3) Ellipse	(4) None of these
83.	The latus rectum of the conic 1	$6x^2 - 24xy + 9y^2 - 104x - 172y + 44 =$
	(1) 2	(2) 4
	(3) 6	(4) 8
	A series are	
84.	The length of the major axis of	the ellipse $36x^2 + 24xy + 29y^2 - 180 =$
	is:	
	(1) 2	(2) 4
	(3) 6	(4) None of these

Question No.	Questions The centre of the conicoid $3x^2$		$-z^2 - 6x + 6y - 2z - 2 = 0$
85.	The centre of the conicoid $3x^2$	$+6yz-y^2$	
der.	(1) (1,0,-1)	(2)	(2,0,-2)
	(3) (3, 0, -3)	(4)	None of these
86.	The highest power of 7 contai	ned in 1000)! is :
	(1) 160	(2)	163
	(3) 164	(4)	None of these
87.	If $(a, b) = 1$, then (ac, b) is equ	ıal to:	
	(1) (a,b)	(2)	(c,b)
	(3) 1	(4)	None of these
88.	The quadratic residue of 17 a	re:	
(1) 1, 2, 4, 8, 9, 13, 15, 16	(2)	1, 3, 5, 7, 9, 14, 16
- (3) 1, 2, 4, 6, 8, 9, 13, 15	(4)	None of these
9. T	The real part of $\sin h (x + iy)$	is:	
(1) $\sin h x \cos y$	(2)	$\sin x \cos h y$
(3) $\cos h x \sin y$	(4)	None of these
0. I	$f \tan^{-1} \frac{2x}{1-x^2} + \cot^{-1} \frac{1-x^2}{2x} = \pi$	$\frac{1}{3}$, the val	ue of x is equal to :
	1) $3 + \sqrt{2}$	(2)	$2-\sqrt{3}$
	3) $3 - \sqrt{2}$	(4)	None of these

Question No.	Questions		Code-C
91.	The radius of convergence of power	series	$\sum_{m=0}^{\alpha} \frac{(-1)^m}{5^m} (x+1)^{3m} \text{ is :}$
	(1) 5^{-75}	(2)	5 ¹ / ₃
92.	(3) 5	(4)	None of these
92.	The value of H_{2n} (0) is: (1) $\frac{(-1)^n (2n)!}{n!}$	(2)	$(-1)^n \frac{(2n-1)!}{(n-1)!}$
	$(3) \frac{(2n)!}{n!}$	(4)	None of these
93.	The value of $L^{-1}\left(\frac{s}{4s^2+15}\right)$ is:		
	$(1) \frac{1}{2} \sin \frac{\sqrt{15}}{2} t$	(2)	$\frac{1}{4}\cos\frac{\sqrt{15}}{2}t$
	$(3) \frac{1}{4} \tan \frac{\sqrt{15}}{2} t$	(4)	None of these
94.	The finite sine transform of $f(x) =$	2x, v	where $0 < x < 4$, is equal to
	$(1) \frac{16}{n\pi}$	(2)	$\frac{32}{n\pi}$
	(3) $\frac{-32}{n\pi} (-1)^n$	(4)	None of these
95.	The Fourier cosine transform of f	(x) =	$\begin{cases} 1, & 0 \le x < 1 \\ 0, & x > 1 \end{cases}$ is equal to:
	$(1) \frac{\sin s}{s}$	(2)	$\frac{\cos s}{s}$
	$(3) \frac{\sec s}{s}$	(4)	None of these

Question No.	Questions		Ler ·	
96.	C programming language was de	veloped	by:	
. 00.	(1) Bill Gates	(2)	Ken Thompson	
	(3) Dennis Ritchie	(4)	None of these	
97.	Which of the following key word is used for the storage class?			
	(1) print f	(2)	external	
	(3) auto	(4)	scan f	
98.	The bitwise AND operator is use	ed for:		
	(1) Masking	(2)	Comparison	
	(3) Division	(4)	Shifting bits	
99.	Which of the following statemen	ts is tru	e?	
	(1) C library functions provide	I/O facil	ities	
•	(2) C inherent I/O facilities			
	(3) C does not have I/O facilities	es		
121	(4) Both (1) and (3)			
100.	Which of the following variable	names i	s NOT valid?	
	(1) go-cart	(2)	go 4 it	
	(3) 4 reason	(4)	run 4	

Opened at 02: 25 Pm for scanning and then upleading on University Website,

ON SET-"X" (Total No. of printed pages: 21)

ON NOT OPEN THIS QUESTION BOOKLET BEFORE TIME OR UNTIL YOU ARE ASKED TO DO SO) PG-EE-July, 2025 (Mathematics) 10080 Sr. No.____ Code Max. Marks: 100 **Total Questions: 100** Time: 14 Hours (in words) Roll No. _____ (in figure)____ Date of Birth: Name : _____ Mother's Name:_____ Father's Name:_____ Date of Examination : (Signature of the Invigilator) (Signature of the candidate) CANDIDATES MUST READ THE FOLLOWING INFORMATION/ INSTRUCTIONS BEFORE STARTING THE QUESTION PAPER. All questions are compulsory. The candidates must return the Question book-let as well as OMR 2. answer-sheet to the Invigilator concerned before leaving the Examination Hall, failing which a case of use of unfair-means / mis-behaviour will be registered against him / her, in addition to lodging of an FIR with the police. Further the answer-sheet of such a candidate will not be evaluated. Keeping in view the transparency of the examination system, carbonless OMR Sheet is provided to the candidate so that a copy of OMR Sheet may be kept by the candidate. Question Booklet along-with answer key of all the A,B,C and D code shall be got uploaded on the University Website immediately after the conduct of Entrance Γ Examination. Candidates may raise valid objection/complaint if any, with regard to discrepancy in the question booklet/answer key within 24 hours of uploading the same on the University website. The complaint be sent by the students to the Controller of Examinations by hand or through email. Thereafter, no complaint in any case will be considered. The candidate MUST NOT do any rough work or writing in the OMR Answer-Sheet. Rough work, if any, may be done in the question book-let itself. Answers MUST NOT be ticked in the Question book-let. There will be no negative marking. Each correct answer will be awarded 6. one full mark. Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer.

Use only Black or Blue BALL POINT PEN of good quality in the OMR Answer-7.

Sheet. BEFORE ANSWERING THE QUESTIONS, THE CANDIDATES SHOULD 8. ENSURE THAT THEY HAVE BEEN SUPPLIED CORRECT AND COMPLETE BOOK-LET. COMPLAINTS, IF ANY, REGARDING MISPRINTING ETC. WILL NOT BE ENTERTAINED 30 MINUTES AFTER STARTING OF THE EXAMINATION.

Question			Code-D
No	Que	stions	
1.	If a be any integer and p be any the statement of: (1) Fermat's theorem (3) Lagrange's theorem	(2) (4)	Wilson theorem None of these
2.	An ideal of a ring of integers is ma	avim al	ice
	(1) Natural number (3) Real number	(2) (4)	Prime integer
3.	Let f be a ring isomewal:	. ,	None of these
.	Let f be a ring isomorphism of R then R is	onto F	R'. If R' is an integral domain,
	(1) Not an integral domain	(2)	An integral domain
	(3) Both (1) and (2)	(4)	None of these
4.	If 'a' is an irreducible element of 'a' must be	a uniqu	ue factorization domain R, then
0.00	(1) Natural number	(2)	Real number
b les	(3) Prime number	(4)	None of these
5.	The order of convergence of Regu	ıla Fals	si Method is :
	(1) 1	(2)	1.618
l of	(3) 2	(4)	none of these
6.	$\Delta f(x) g(x)$ is equal to:		
	(1) $f(x) \Delta g(x) + g(x) \Delta f(x)$	(2)	$f(x+h) \Delta g(x) + g(x) \nabla f(x)$
	(3) $f(x+h) \Delta g(x) + g(x) \Delta f(x)$	(4)	None of these

Question No.	Q	uestions	The state of the s
7.	$\mu - \frac{\delta}{2}$ is equal to:		
	(1) $E^{1/2}$	(2) E	
	(3) E^{-1}	(4) E	-1/2
8.	Runge-Kutta method is used for		
	(1) Interpolation		
	(2) Numerical differentiation		
	(3) Numerical Integration		god Land
	(4) Numerical solution of ordin	ary differen	tion equation
9.	Milne-Simpron's method is a:		dio8
	(1) Multiple step method	(2) Si	ngle step method
	(3) Both (1) and (2)	(4) N	one of these
0.	Which of the following is also kn	own as met	hod of false position?
	(1) Bisection method	(2) N	ewton Raphson method
(3) Regula-falsi method	(4) N	one of these
· T	The radius of convergence of pow	er series \sum_{m}^{6}	$\sum_{m=0}^{\infty} \frac{(-1)^m}{5^m} (x+1)^{3m} \text{ is :}$
) 5 1/5		1/3
(3)		(4) N	one of these

Question	Questions
No.	The value of $H_{2n}(0)$ is:
	(1) $(-1)^n \frac{(2n)!}{n!}$ (2) $(-1)^n \frac{(2n-1)!}{(n-1)!}$
	(3) $\frac{(2n)!}{n!}$ (4) None of these
13.	The value of $L^{-1}\left(\frac{s}{4s^2+15}\right)$ is:
•	(1) $\frac{1}{2} \sin \frac{\sqrt{15}}{2} t$ (2) $\frac{1}{4} \cos \frac{\sqrt{15}}{2} t$
	(3) $\frac{1}{4} \tan \frac{\sqrt{15}}{2} t$ (4) None of these
14.	The finite sine transform of $f(x) = 2x$, where $0 < x < 4$, is equal to
	$(1) \frac{16}{n\pi} \qquad (2) \frac{32}{n\pi}$
	(3) $\frac{-32}{n\pi} (-1)^n$ (4) None of these
15.	The Fourier cosine transform of $f(x) = \begin{cases} 1, & 0 \le x < 1 \\ 0, & x > 1 \end{cases}$ is equal to:
	$(1) \frac{\sin s}{s} \qquad (2) \frac{\cos s}{s}$
	(3) $\frac{\sec s}{s}$ (4) None of these
16.	C programming language was developed by :
	(1) Bill Gates (2) Ken Thompson
	(3) Dennis Ritchie (4) None of these

1 1 1			Code	
Question No.		Question	S	
17.	Which of the following key w	ord is used	for the storage class?	
	(1) print f	(2)	external	
	(3) auto	(4)	scan f	
18.	The bitwise AND operator is	used for:		
	(1) Masking	(2)	Comparison	
	(3) Division	(4)	Shifting bits	
19.	Which of the following stater	nents is tru	e?	6
	(1) C library functions provi	ide I/O facil	ities	
	(2) C inherent I/O facilities			
(3) C does not have I/O facil	ities		
(4) Both (1) and (3)			
20. V	Which of the following variab	le names is	NOT valid?	
()) go-cart	(2)	go 4 it	
(3	d) 4 reason	(4)	run 4	
1. If	$\lim_{x \to 0} \frac{x(1+a\cos x) - b\sin x}{x^3} = 1 \text{ th}$	nen the valu	ues of a and b are:	
	A-70			
(1)	2,3	(2)	$\frac{5}{2}$, $\frac{3}{2}$	
, (1)	2, 3	_/_/	2 2	
ı				
	_5 _3			
(3)	$\frac{-5}{2}, \frac{-3}{2}$	(4)	None of these	

SET-X Code-D
Questions
If $u = \log(x^3 + y^3 + z^3 - 3xyz)$, then $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} + z \frac{\partial u}{\partial z}$ is equal to: (1) $3u$ (2) 3
(3) $\frac{3}{x+y+z}$ (4) None of these
The radius of curvature of helix $x = a \cos t$, $y = a \sin t$, $z = at \tan \alpha$ is:
(1) $a \sec^2 \alpha$ (2) $a \csc^2 \alpha$
(3) $a \cot \alpha$ (4) None of these
The point (0,0) for $f(x,y) = x^3 - 3axy + y^3$ is:
(1) A maximum point (2) A minimum point
(3) A saddle point (4) None of these
The necessary and sufficient condition for the curve to be a placurve is:
(1) $\left[\overrightarrow{r}\ \overrightarrow{r}'\ \overrightarrow{r}''\right] = 0.$ (2) $\left[\overrightarrow{r}\ \overrightarrow{r}''\ \overrightarrow{r}'''\right] = 0$
(3) $\left[\overrightarrow{r}''\overrightarrow{r}'''\overrightarrow{r}''v\right] = 0$ (4) $\left[\overrightarrow{r}'\overrightarrow{r}''\overrightarrow{r}'''\right] = 0$
A partial differential equation by eliminating the arbitrary fur
A partial differential equation by eliminating the arbitrary fur- from $z = f(x^2 - y^2)$ is given by:
. 기업 등 전 시간 시간 경험에 가장하는 사용. 그런 보고 있는 것이 되었다. 이번 보고 있는 것이 되었다. 기업 등 기업 및

	Code-D
Question No.	Witestions
27.	22-
	(1) Hyperbolic (2) Parabolic
	(3) Elliptic (4) None of these
28.	The particular integral of the equation $\frac{\partial^2 z}{\partial x^2} - 2 \frac{\partial^2 z}{\partial x \partial y} = \sin x \cos 2y$ is:
	(1) $\sin(x+3y) + \sin(x-3y)$ (2) $\sin(x+2y) + \frac{1}{10}\sin(x-2y)$
7.00	(3) $\frac{1}{6}\sin(x+2y) - \frac{1}{10}\sin(x-2y)$ (4) None of these
29.	Two dimensional wave equation is given by:
	(1) $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = \frac{1}{c^2} \frac{\partial u}{\partial t}$ (2) $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = \frac{1}{c^2} \frac{\partial^2 u}{\partial t^2}$
	(3) $\frac{\partial^2 u}{\partial x^2} + \frac{\partial u}{\partial y} = \frac{1}{c^2} \frac{\partial^2 u}{\partial t^2}$ (4) None of these
30.	The partial differential equation $x \frac{\partial^2 z}{\partial x^2} + 2 \frac{\partial^2 z}{\partial y \partial x} + y \frac{\partial^2 z}{\partial y^2} + \frac{\partial z}{\partial x} = 0$ is
•	hyperbolic in nature if:
	$(1) xy < 1 \qquad (2) xy = 1$
	(3) $xy > 1$ (4) None of these
31.	The pole of the line $2x + y + 12 = 0$ w.r.t. circle $x^2 + y^2 - 4x + 3y - 1 = 0$
	is:
	(1) (1,3) (2) (2,-2)
	(1) (1,3) (2) (2,-2) (3) (1,-2) (4) None of these

Qu	nestions
Martin Comment Series Comments and a series of the series	
	$13x^2 - 18xy + 37y^2 + 2x + 14y - 2 = 0$
	(2) Sphere
	(4) None of these
The latus rectum of the conic $16x$	$x^2 - 24xy + 9y^2 - 104x - 172y + 44 = 0$
is:	
(1) 2	(2) 4
(3) 6	(4) 8
The length of the major axis of t	the ellipse $36x^2 + 24xy + 29y^2 - 180 =$
is:	
(1) 2	(2) 4
	$-6yz - y^2 - z^2 - 6x + 6y - 2z - 2 = 0$
(1) $(1,0,-1)$	(2) $(2,0,-2)$
(3) $(3,0,-3)$	(4) None of these
The highest power of 7 contained	ed in 1000! is:
(1) 160	(2) 163
(3) 164	(4) None of these
(1) (a,b)	$(2) \qquad (c,b)$
(3) 1	(4) None of these
The quadratic residue of 17 ar	'e:
The quadratic residue of 17 ar	
(1) 1, 2, 4, 8, 9, 13, 15, 16	(2) 1, 3, 5, 7, 9, 14, 16
	What is the nature of the curve (1) Circle (3) Ellipse The latus rectum of the conic 16: is: (1) 2 (3) 6 The length of the major axis of the is: (1) 2 (3) 6 The centre of the conicoid $3x^2 + (1)$ (1, 0, -1) (3) (3, 0, -3) The highest power of 7 contains (1) 160 (3) 164 If $(a,b) = 1$, then (ac,b) is equal (1) (a,b)

Question No.	Sitorto	Questions	I the though
39.	The real part of $\sin h (x + iy)$		To should be salid to a
	$(1) \sin h x \cos y$	(2)	$\sin x \cos h y$
	(3) $\cos h x \sin y$	(4)	None of these
40.	If $\tan^{-1} \frac{2x}{1-x^2} + \cot^{-1} \frac{1-x^2}{2x} = \pi$	$\frac{r}{3}$, the value	ue of x is equal to:
	(1) $3 + \sqrt{2}$	(2)	$2-\sqrt{3}$
	(3) $3 - \sqrt{2}$	(4)	None of these
41.	A Car weighing 250 kg travell	ing at 19.6 n	n/sec. is brought to rest in 4.9 r
	by application of brakes. Then	the force of	resistance of brakes is:
	(1) 7800 Newtons	(2)	8800 Newtons
	(3) 9800 Newtons	(4)	None of these
42.	The central force is defined as	s:	
	(1) A force whose line of acti	on always p	passes through a fixed point
	(2) A force whose line of acti	on does not	pass through a fixed point
	(3) A force whose line of acti		passes through variable point
	(3) A force whose line of acti(4) None of these		
		on always p	passes through variable point
43.	(4) None of these	on always p	passes through variable point

O				Code-D
Question No.		arin ta	Questions	The state of the s
44.	If $r = \sqrt{x^2 + y^2}$,	$\theta = \tan^{-1}(\frac{y}{x})$	(x) , then $\frac{\partial(r,\theta)}{\partial(x,y)}$	$\frac{\theta}{y}$ is:
	$(1) \frac{x}{x^2 + y^2}$		(2)	$\frac{y}{x^2+y^2}$
	$(3) \frac{1}{x^2 + y^2}$		(4)	$\frac{1}{\sqrt{x^2+y^2}}$
45.	$\int_{0}^{\alpha} e^{-x^{2}} dx \text{ is equal}$	l to:		
	$(1) \pi/_4$	(A)	(2)	$\sqrt{\pi}/4$
	(3) $\sqrt{\pi}/_2$		(4)	None of these
46.	The Fourier co-e	fficient a_n f	or the function	on $f(x) = x$ in $[-\pi, \pi]$ is:
	(1) 1		(2)	0
	(3) -1/2		(4)	None of these
47.	Polar form of C-	R equations	are:	
	$(1) \frac{\partial u}{\partial \theta} = \frac{1}{r} \frac{\partial v}{\partial r} \; ,$	$\frac{\partial v}{\partial r} = \frac{r}{\partial \theta}$	(2)	$\frac{\partial u}{\partial r} = \frac{1}{r} \frac{\partial v}{\partial \theta} , \frac{\partial v}{\partial r} = \frac{1}{r} \frac{\partial v}{\partial \theta}$
	$(3) \frac{\partial u}{\partial r} = \frac{r}{\partial \theta} ,$	$\frac{\partial u}{\partial \theta} = \frac{-r}{\partial r} \frac{\partial u}{\partial r}$		$\frac{\partial u}{\partial r} = \frac{1}{r} \frac{\partial v}{\partial \theta} , \frac{\partial u}{\partial \theta} = \frac{-r}{\partial r} \frac{\partial v}{\partial r}$
48.	The function $f(z)$	$z) = r^2 \cos 2$	$\theta + ir^2 \sin k\theta$	g is analytic then the value of
	is equal to :			
A 1	(1) 0		(2)	2
	(3) 4		(4)	None of these

Question	Questions				
No.	$\frac{1}{2}$ ing to the point $\left(\frac{1}{2}, \frac{2}{3}, \frac{2}{3}\right)$				
49.	The point on the Complex plane corresponding to the point $(\frac{1}{3}, \frac{2}{3}, \frac{2}{3})$				
	on the Riemann sphere $X^2 + Y^2 + Z^2 = 1$ is:				
	(1) $1+2i$ (2) $3+2i$				
	(4) None of these				
50.	The angle of rotation at $z = 2 + i$ for the transformation $w = z^2$ is				
	equal to:				
	(1) $\tan^{-1} \frac{1}{3}$ (2) $\tan^{-1} \frac{1}{2}$				
	(3) $tan^{-1} 2$ (4) None of these				
51.	If f is integrable on [0,1], then $\int_0^1 f(x) dx$ is equal to:				
	(1) $\lim_{n \to \alpha} \sum_{r=1}^{n} f\left(\frac{r}{n}\right)$ (2) $\lim_{n \to \alpha} \frac{1}{n} \sum_{r=1}^{n} f\left(\frac{r}{n}\right)$				
	(3) $\lim_{n \to \alpha} \sum_{r=1}^{n} f\left(\frac{n}{r}\right)$. r (4) None of these				
52.	The improper integral $\int_0^1 \frac{dx}{x^2-3x+2}$ is:				
	(1) Convergent (2) Oscillating				
	(3) Divergent (4) None of these				
53.	Which one is not a complete metric space:				
	(1) The usual metric space (R,d)				
	(2) The space of complex numbers				
	(3) Any discrete metric space				
	(4) None of these				

Question No.	Questions A.	-
54.	Energy complete metric space is of the second category as a subset of	İ
	itself is the statement of	
,	(1) Banach's fixed point theorem	
	(2) Baire's category theorem	
	(3) Cantor's intersection theorem	
	(4) None of these	
55.	If $f(x) = x$, $x \in [0,1]$ and $P = \{0, \frac{1}{3}, \frac{1}{2}, \frac{2}{3}, 1\}$ be the partition of $[0, \frac{1}{3}, \frac{1}{2}, \frac{2}{3}, 1]$	1],
	then $L(f, P)$ is equal to:	,
# -##	(1) $\frac{8}{26}$ (2) $\frac{7}{16}$	
	(3) $\frac{13}{36}$ (4) none of these	
56.	Which one is not a compact subset?	
7. (2) =	(1) Any finite subset of a metric space	
	(2) $A = [-50, 50]$ of R	
	(3) Set $\left\{\frac{1}{n}: n \in N\right\} \cup \{0\}$ in R	
	(4) Usual metric space (R, d)	
57.	Which one is a dense set?	
	(1) Q in R	
	(2) Set of natural numbers in R	
	(3) The subset $A = \left\{\frac{1}{n}, n \in N\right\}$ in R	
	(4) None of these	

Question No.		tions				
58.	The number of non-isomorphic abelian groups of order 8 is:					
00.	(1) 1	(2)	2			
	(3) 3	(4)	none of these			
59.	Number of Sylow 2-subgroups of S ₃	is:				
	(1) 2	(2)	3			
	(3) 6	(4)	None of these			
60.	Energy subgroup of a finite cyclic g	roup i	s :			
	(1) Characteristic subgroup	(2)	Normal subgroup			
	(3) Cyclic subgroup	(4)	None of these			
61.	If T is one-one linear transformation	on, the	en dim Ker T is:			
	(1) 0	(2)	1			
	(3) 2	(4)	None of these			
62.	The linear transformation T: R2	$\rightarrow R^2$	2 defined by T (1, 0) = (2, 3)			
	T(0, 1) = (5, 6) is:					
	(1) One-one and onto	(2)	One-one but not onto			
	(3) Onto but not one-one	(4)	None of these			
63.	Let R be the field of real numbers. Which of the following is not					
	sub-space of $V_3(R)$:					
	$(1) \{(x,2y,3z): x,y,z \in R\}$					
	(2) $\{(x, x, x) : x \in R\}$					
	(3) $\{(x,y,z):x,y,z \text{ are rational not}\}$	ımber	}			
	(4) None of these					
to the second			and the second s			

	al rad	Code-D			
Question No.	Que	stions			
64.	If W is a subspace of $V = V_3(R)$ generated by $\{(1,0,0),(1,1,0)\}$. Then				
la s	basis of $V_{/W}$ is: (1) $\{W + (0, 8, 8)\}$	bys a type 81			
	(3) $\{W + (a, 0, a) : a \in R\}$	$(2) \{W + (0,0,1)\}$			
65.		(4) None of these $R^2 \to R^2$ such that $T_1(x, y) = (0, 4x)$			
	and $T_2: \mathbb{R}^2 \to \mathbb{R}^2$ such that $T_2(x, y)$	$= (x,0). \text{ Then } T_1T_2(x,y) \text{ is equal to :}$			
	(1) (6,611)	(2) (3x,y)			
g. d. 5	(3) (0,0)	$(4) \qquad (0,4x)$			
66.	Let $T: U \to V$ be a homomorphism	, then Ker T is a subspace of:			
	(1) <i>V</i>	(2) <i>U</i>			
	(3) T(U)	(4) None of these			
67.	Let u, v be normal vectors in an i	nner product space V s.t. $ u+v =$			
	Then $ u-v $ is:				
	(1) $\sqrt{3}$	(2) 1			
	$(3) \sqrt{2}$	(4) None of these			
68.	The radial and transverse compo	onents of velocity of a particle movi			
	along a plane curve $r = f(\theta)$ are				
	$(1) \frac{d^2y}{dt^2}, \frac{r}{dt^2}$	(2) $\frac{dr}{dt}$, $\left(\frac{d\theta}{dt}\right)^2$			
	(3) $\frac{d\theta}{dt}$, $r^2 \frac{d\theta}{dt}$	(4) $\frac{dr}{dt}$, $r\frac{d\theta}{dt}$			

	A particle of mass 2 grammes is velocity is 2π cm/sec. and the at the period of vibration is: (1) 5 seconds (3) 20 seconds A particle is projected with a	(2) (4) velocity	g with a S.H.M. If its maximum of the vibration is 20 cm., then the the vibration is 20 cm.,
70.	 velocity is 2π cm/sec. and the athe period of vibration is: (1) 5 seconds (3) 20 seconds A particle is projected with a making an angle 60° with the 	(2) (4) velocity	10 seconds None of these of 24.5 m/sec. in a direction
	the period of vibration is: (1) 5 seconds (3) 20 seconds A particle is projected with a making an angle 60° with the	(2) (4) velocity	10 seconds None of these of 24.5 m/sec. in a direction
	 (1) 5 seconds (3) 20 seconds A particle is projected with a making an angle 60° with the 	(4)	None of these of 24.5 m/sec. in a direction
	(3) 20 seconds A particle is projected with a making an angle 60° with the	(4)	None of these of 24.5 m/sec. in a direction
	A particle is projected with a making an angle 60° with the	velocity	of 24.5 m/sec. in a direction
	making an angle 60° with the		
		horizon	ntal. Then the greatest heigh
	attained by the particle is:		
			일다. 1 전 경기 기계 경기 그렇게 다 됐다.
1.	(1) 22.96 m	(2)	11.96 m
((3) 36.84 m	(4)	None of these
1. 0	One Joule is equal to :		<u> </u>
(1	$1)$ 10^3 ergs	(2)	$10^5 { m ergs}$
(3)	3) 10 ⁸ ergs	(4)	None of these
Th	he magnitude and direction	of the	resultant of two forces of
ma	agnitudes 12 N and 14 N, actin	g at a po	oint and inclined to each other
at a	an angle of 45° is :		
(1)	$R = 42.3 \text{ N}, \ \theta = 45^{\circ}$	(2)	R = 4.2 N
(3)	$R = 0.45 \text{ N}, \ \theta = \tan^{-1}(24.03)$		$R = 4.2 \text{ N}, \ \theta = 90^{\circ}$ $R = 24.03 \text{ N}, \ \theta = \tan^{-1}(0.45)$

Question	Code D
No.	If ARCD: Questions
73.	If ABCD is a square of side 2m. Forces of magnitude 5, 3, 4 and 6 Newtons act along CB, BA, DA and DB respectively. Then the algebraic sum of moments of the forces about vertex C is: (1) $3(1+2\sqrt{2})$ Nm (2) $[3(1-2\sqrt{2})]$ Nm
74.	The constant ratio which the limiting friction bears to the normal reaction is called:
75.	(1) Limiting friction (2) Angle of friction
	The centre of gravity of the area of the position of the parabola $\sqrt{\frac{x}{a}} + \sqrt{\frac{y}{b}} = 1 \text{ between the curve and the axes is :}$ (1) $\left(\frac{a}{2}, \frac{a}{2}\right)$ (2) $\left(\frac{a}{5}, \frac{b}{5}\right)$
	(3) $\left(\frac{a}{3}, \frac{b}{3}\right)$ (4) None of these
76.	The greatest lower bound of a set, if it exists, is:
	(1) Two (2) Three
	(3) Four (4) None of these
77.	The interior of a set A is the largest subset of A, which is:
	(1) Open (2) Closed
	(3) Both (4) None of these

	T		Code-D
Question No.	G	uestion	ıs
78.	The sequence $< n^{1/n} > $ converge	es to the	limit:
	(1) 0	(2)	
	(3) α	(4)	None of these
79.	The series $\sum_{n=1}^{\alpha} a_n$, where $a_n = \frac{1}{\sqrt{n}}$	$\sin\frac{1}{n}$ is:	mix (System in the system)
	(1) Oscillating	(2)	Divergent
	(3) Convergent	(4)	None of these
80.	If $\sum_{n=1}^{\alpha} a_n$ is a series of real num		(10)10) F A F F F F F F F F F F F F F F F F F
	sums is bounded and if $< b$	$_n > $ is	a non-negative monotonical
	decreasing sequence tending to z	zero, the	n the series $\sum_{n=1}^{\alpha} a_n b_n$ converge
	This statement is known as:		
.(1) Abel's test	(2)	Abel's lemma
(3) Dirichlet's test	(4)	None of these
31. T	he differential equation of first	order a	nd first degree is homogeneou
if		•	
(1	$\frac{dy}{dx} = \phi(^{y}/_{x})$ $\frac{dy}{dx} = \phi(x)$	(2)	$\frac{dy}{dx} = \text{constant}$
(3)	$\frac{dy}{dx} = \phi(x)$	(4)	None of these
. Th	e general solution of the differ	ential e	quation
1	$\frac{dy}{dx} + (e^y + 1)\cot x = 0 \text{ is :}$		
	$(e^y + 1)\cos x = K$	(2)	$(e^y + 1) \operatorname{cosec} x = K$
(3)	$(e^y + 1)\sin x = K$	(4)	None of these

Question	Questi	tions Code-D		
Na 83.	What is order and degree of the differential equation			
	$\frac{d^2y}{dx^2} + \sqrt{1 + \left(\frac{d^3y}{dx^3}\right)^4} = 0$	erential equation		
	(3) Second order, second degree	(2) Second order, first degree(4) None of these		
84.	Particular integral of the differential	al equation		
	$x^2 \frac{d^2 y}{dx^2} - x \frac{dy}{dx} + y = 2 \log x \text{ is :}$			
		$(2) 4\log x - 2$		
		(4) None of these		
85.	For $a, b, c \in R$, if the differential equation			
-0	$(ax^2 + bxy + y^2)dx + (2x^2 + cxy + y^2)$			
		(2) $b = 4, c = 2$		
	(3) $b = 2, c = 2$	(4) None of these		
86.	The points whose position vectors	rs are $60\hat{i} + 3\hat{j}$; $40\hat{i} - 8\hat{j}$; $a\hat{i} - 52$		
	are collinear if:			
	(1) $a = 40$	(2) a=20		
	(3) $a = -40$	(4) None of these		
87.	If ϕ is a scalar point function, then	en curl (grad ϕ) is equal to :		
	(1) 1	(2) 0		

Question No.		Question	
88.	The value of $\oint_{C} [(\cos x \sin y)]$	$(y-xy)dx + \sin^2 x$	$(x \cos y dy]$, where c is circle
	$x^2 + y^2 = 1$ is:		
	(1) π	(2)	$\pi/2$
	(3) 1	(4)	0
89.	If $\vec{F} = 3xy \ \hat{i} - y^2 \ \hat{j}$, then the	ne value of \int_{C}	$\vec{F} \cdot d\vec{r}$, where C is the curve
	XY-plane, $y = 2x^2$ from (0,0)		
	(1) $\frac{7}{6}$. (2)	$\frac{6}{7}$
	3) $\frac{-7}{6}$	(4)	None of these
90. If	$f\vec{f} = (x + 3y)\hat{i} + (y - 2z)\hat{j}$	$+(x+az)\hat{k}$ i	s solenoidal, then a is equal t
(1) 1	(2)	2
(3)) 0	(4)	-2
I. If	$u = \frac{y}{z} + \frac{z}{x} + \frac{x}{y}$, then $x \frac{\partial u}{\partial x} + \frac{1}{2}$	$y\frac{\partial u}{\partial y} + z\frac{\partial u}{\partial z}$ is	equal to:
(1)	u	(2)	2u
(3)		(4)	None of these
$\lim_{x\to 0^-}$	$-\frac{e^{1/x}-1}{e^{1/x}+1}$ is:		
(1)	-1	(2)	0
(3)	1	(4)	None of these

Question	Questions Code-D
93.	Taylor's Theorem is also known as:
	(1) Ist mean value theorem of differential equation (2) IInd mean value theorem of the
	mean value theorem of differential equation
	(3) Generalised mean value theorem of differential equation
	(4) None of these
94.	Equation of evolute of parabola $y^2 = 4ax$ is given by:
	(1) $27ay^2 = 4(x-2a)^3$ (2) $27ay^2 = 4(x-2a)^2$
	그리는 그 그는 그는 그를 보고 있는 것이 되었다. 그 그들은 그는 그들은 그들은 그들은 그를 보고 있는 것이다. 그를 받는 것이다는 그를 보고 있다면 그를 보고 있다면 그를 보고 있다면 그를 보고 있다.
	(3) $27y^2 = 4(x-2a)^3$ (4) None of these
95.	The length of a loop of the curve $r = a(Q^2 - 1)$ is:
	$(1) \frac{79}{3} \qquad (2) \frac{89}{3}$
	(1) 3
	$(3) \frac{16}{3} \qquad \qquad (4) \text{None of these}$
96.	The sum of the eigen values of a matrix is equal to:
	(1) $ A $
	fals sloments of the principal diagonal
	(2) The sum of the elements of the principal diagonal (3) The product of the elements on the principal diagonal
	(3) The product of the elements on the principal
	(4) None of these
0=	(4) None of these If A is a matrix of order n and A^2 is a null matrix, then what is the
97.	
	maximum possible rank of A :
	(1) n
	(4) None of the
•	(3) n^3

Question No.	Questions			
98.	The eigen values of a nilpotent matrix are:			
ř.	(1) 2	(2)		
	(3) 0	(4)	None of these	
99.	The quadratic form $9x^2 + y^2 + 4$	$z^2 + 6xy$	-12xz - 4yz is:	
	(1) Positive definite	(2)	Positive semi-definite	
	(3) Negative definite	(4)	Negative semi-definite	
	 Let x⁴ - 3x³ - 5x² + 2x - 1 = 0 (1) All the roots of equation are real. (2) All the roots of equation are purely imaginary. 			
(6	3) Two real and the two imagin	nary root	s.	
(4	1) None of these			

			der SFS entrance exam	
Q. NO.	Α	В	С	D
1	4	3	4	1
2	1	3	4	2
3	3	4	4	2
4	1	2	4	3
5	2	1	2	2
6	2	3	4	3
7	4	2	1	4
8	3	1	2	4
9	2	1	3	1
10	1	2	3	3
11	3	3	1	2
12	3	1	3	1
13	4	1	4	2
14	2	4	1	3
			2	1
15	1	3		
16	3	2	3	1
17	2	4	2	3
18	1	2	4	1
19	1	1	3	4
20	2	2	4	3
21	1	1	4	3
22	3	2	1	2
23	4	2	3	1
24	1	3	1	3
25	2	2	2	4
26	3	3	2	4
27	2	4	4	2
28	4	4	3	3
29	3	1	2	2
30	4	3	1	1
31	3	2	3	3
32	2	1	1	3
33	1	2	1	4
34	3	3	4	2
35	4	1	3	1
		1	2	3
36	4	3	4	2
37	2			
38	3	1	2	1
39	2	4	1	1
40	1	3	2	2
41	4	3	2	3
42	4	2	3	1
43	4	1	4	1
44	4	3	2	4
45	2	4	3	3
46	4	4	4	2
47	1	2	1	4
48	2	3	3	2
49	3	2	2	1
50	3	1	1 1	2

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Q. NO.	Sc.(Mathematics)/N A	В	С	D
51	2	1	3	2
52	1	3	2	3
	2	4	1	4
53			3	2
54	3	1		3
55	1	2	4	
56	1	3	4	4
57	3	2	2	1
58	1	4	3	3
59	4	3	2	2
60	3	4	1	1
61	2	4	1	1
62	3	4	2	1
63	4	4	2	3
64	2	4	3	2
65	3	2	2	4
66	4	4	3	2
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70	1	3	3	1
71	1	2	1	4
72	2	3	1	4
	2	4	3	4
73		2	2	4
74	3		4	2
75	2	3		4
76	3	4	2	
77	4	1	2	1
78	4	3	4	2
79	1	2	3	3
80	3	1	1	3
81	1	4	3	11
82	1	1	3	3
83	3	3	4	4
84	2	1	2	1
85	4	2	1	2
86	2	2	3	3
87	2	4	2	2
88	4	3	1	4
89	3	2	1	3
90	1	1	2	4
91	3	1	2	4
92	1	1	1	1
93	1	3	2	3
94	4	2	3	1
95	3	4	1	2
	2	2	1	2
96	4	2	3	4
97			1	3
98	2	4		2
99	2	3	3	1

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