

Question No.	Questions
1.	<p>The sum of the characteristic roots of the matrix</p> $\begin{bmatrix} 3 & 7 & 6 \\ 2 & 24 & 3 \\ 0 & 1 & -8 \end{bmatrix}$ <p>is</p> <p>(1) 17 (2) 19 (3) 21 (4) 25</p>
2.	<p>If the given matrix A is</p> $A = \begin{bmatrix} 1 & 0 & 1 \\ \sin \theta & \cos \theta & -\sin \theta \\ -\cos \theta & \sin \theta & \cos \theta \end{bmatrix},$ <p>then $\text{Adj } A =$</p> <p>(1) 3 (2) 4 (3) $\sin 2\theta$ (4) 0</p>
3.	<p>Determinant of an orthogonal matrix is</p> <p>(1) -1 (2) 1 (3) 0 (4) ± 1</p>
4.	<p>The quadratic form $ax^2 + 2hxy + by^2$ is positive definite iff</p> <p>(1) $a > 0, b > 0, h > 0$ (2) $a > 0, h^2 - ab > 0$</p> <p>(3) $a > 0, ab - h^2 > 0$ (4) $a > 0, h^2 - ab = 0$</p>
5.	<p>If α, β, γ are the roots of the equation $x^3 - px^2 + qx - r = 0$, then $\sum \alpha^2 \beta^2 =$</p> <p>(1) $q^2 - 2pr$ (2) $p^2 - 2qr$</p> <p>(3) $r^2 - 2pq$ (4) 0</p>

Question No.	Questions
6.	The least number of imaginary roots of the equation $x^8 + 5x^3 + 2x - 3 = 0$ is (1) 6 (2) 4 (3) 2 (4) 0
7.	$\lim_{x \rightarrow -\infty} (\sqrt{9x^2 - x} + 3x) =$ (1) 3 (2) $\frac{1}{3}$ (3) $\frac{1}{4}$ (4) $\frac{1}{6}$
8.	If $f(x) = a \sin x + b e^{ x } + c x ^3$ and $f(x)$ is differentiable at $x = 0$, then (1) $a = 0; b \in \mathbb{R}, c = 0$ (2) $a = 0, b = 0; c \in \mathbb{R}$ (3) $a \in \mathbb{R}; b = 0, c = 0$ (4) $a = 0, b = 0; c = 0$
9.	If a curve of n th degree has n asymptotes, then they cut the curve in how many points? (1) $n(n-1)$ (2) $n-2$ (3) $n(n-2)$ (4) n
10.	For the curve $r = a \sin n\theta$, radius of curvature at the pole is (1) na (2) $\frac{na}{3}$ (3) $2na$ (4) $\frac{na}{2}$

Question No.	Questions
11.	Length of the arc of the curve $x^2 + y^2 - 2ax = 0$ in the first quadrant is (1) $\frac{\pi a}{4}$ (2) $\frac{\pi a}{2}$ (3) πa (4) $2\pi a$
12.	Area between the parabolas $y^2 = 4ax$ and $x^2 = 4ay$ is (1) $\frac{16}{3} a^2$ (2) $\frac{16}{5} a^2$ (3) $\frac{8}{3} a^2$ (4) $\frac{8}{5} a^2$
13.	The number of arbitrary constants in the equation of a sphere are (1) 2 (2) 3 (3) 4 (4) 6
14.	Angle between the lines represented by $x^2 + 2bxy - y^2 = 0$ is (1) π (2) $\frac{\pi}{2}$ (3) $\frac{\pi}{3}$ (4) $\frac{\pi}{4}$
15.	If a right circular cone has three mutually perpendicular generators, then semi-vertical angle of the cone is (1) $\frac{\pi}{4}$ (2) $\tan^{-1} \left(\frac{1}{\sqrt{2}} \right)$ (3) $\frac{\pi}{3}$ (4) $\tan^{-1} (\sqrt{2})$

Question No.	Questions				
16.	If a/bc and $(a, b) = 1$, then a/c is the statement of <ol style="list-style-type: none"> (1) Gauss theorem (2) Wilson theorem (3) Fermat's theorem (4) Chinese Remainder theorem 				
17.	Which of the following congruences have solution ? <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">(1) $x^2 \equiv -2 \pmod{61}$</td> <td style="width: 50%;">(2) $x^2 \equiv 2 \pmod{61}$</td> </tr> <tr> <td>(3) $x^2 \equiv -2 \pmod{59}$</td> <td>(4) $x^2 \equiv 2 \pmod{59}$</td> </tr> </table>	(1) $x^2 \equiv -2 \pmod{61}$	(2) $x^2 \equiv 2 \pmod{61}$	(3) $x^2 \equiv -2 \pmod{59}$	(4) $x^2 \equiv 2 \pmod{59}$
(1) $x^2 \equiv -2 \pmod{61}$	(2) $x^2 \equiv 2 \pmod{61}$				
(3) $x^2 \equiv -2 \pmod{59}$	(4) $x^2 \equiv 2 \pmod{59}$				
18.	The highest power of 2 dividing $ 533 $ is <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">(1) 528</td> <td style="width: 50%;">(2) 529</td> </tr> <tr> <td>(3) 530</td> <td>(4) 532</td> </tr> </table>	(1) 528	(2) 529	(3) 530	(4) 532
(1) 528	(2) 529				
(3) 530	(4) 532				
19.	If $\sin^{-1} x + \sin^{-1} y = \frac{2\pi}{3}$, then $\cos^{-1} x + \cos^{-1} y =$ <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">(1) $\frac{\pi}{2}$</td> <td style="width: 50%;">(2) $\frac{\pi}{3}$</td> </tr> <tr> <td>(3) $\frac{\pi}{6}$</td> <td>(4) $\frac{2\pi}{3}$</td> </tr> </table>	(1) $\frac{\pi}{2}$	(2) $\frac{\pi}{3}$	(3) $\frac{\pi}{6}$	(4) $\frac{2\pi}{3}$
(1) $\frac{\pi}{2}$	(2) $\frac{\pi}{3}$				
(3) $\frac{\pi}{6}$	(4) $\frac{2\pi}{3}$				
20.	If $\cosh x = 2$, then $x =$ <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">(1) $\log(2 - \sqrt{5})$</td> <td style="width: 50%;">(2) $\log(2 - \sqrt{3})$</td> </tr> <tr> <td>(3) $\log(2 + \sqrt{5})$</td> <td>(4) $\log(2 + \sqrt{3})$</td> </tr> </table>	(1) $\log(2 - \sqrt{5})$	(2) $\log(2 - \sqrt{3})$	(3) $\log(2 + \sqrt{5})$	(4) $\log(2 + \sqrt{3})$
(1) $\log(2 - \sqrt{5})$	(2) $\log(2 - \sqrt{3})$				
(3) $\log(2 + \sqrt{5})$	(4) $\log(2 + \sqrt{3})$				

Question No.	Questions
21.	If $x_r = \cos \frac{\pi}{2^r} + i \sin \frac{\pi}{2^r}$, then $x_1 x_2 x_3 \dots x_n \dots \infty =$ (1) $\frac{\pi}{2}$ (2) $-\frac{\pi}{2}$ (3) 1 (4) -1
22.	The value of Wronskian $W(x, x^2, x^3)$ is (1) $3x^3$ (2) $3x^2$ (3) $2x^3$ (4) $2x^2$
23.	Which of the following is not an integrating factor of $x dy = y dx$? (1) $\frac{x}{y}$ (2) $\frac{1}{xy}$ (3) $\frac{1}{x^2}$ (4) $\frac{1}{x^2 + y^2}$
24.	The orthogonal trajectory of the family $x^2 - y^2 = c$ are given by (1) $\frac{x}{y} = c$ (2) $xy = c$ (3) $x - y = c$ (4) $x^2 + y^2 = c$
25.	If $y(x) = x \cos 2x$ is a particular solution of $\frac{d^2y}{dx^2} + ay = -4 \sin 2x$, then $a =$ (1) 2 (2) -4 (3) 4 (4) 3

Question No.	Questions
26.	<p>The magnitude of maximum directional derivative of $\phi(x, y, z) = x^2 - 2y^2 + 4z^2$ at the point $(1, 1, -1)$ is</p> <p>(1) $\sqrt{21}$ (2) $3\sqrt{21}$ (3) $2\sqrt{21}$ (4) 21</p>
27.	<p>If \vec{f} and \vec{g} are irrotational, then $\vec{f} \times \vec{g}$ is</p> <p>(1) 0 (2) solenoidal (3) irrotational (4) constant</p>
28.	<p>If \hat{n} is outward unit normal drawn to a closed surface S, having volume V, then $\iiint_V \text{div}(\hat{n}) dV =$</p> <p>(1) $2V$ (2) V (3) $2S$ (4) S</p>
29.	<p>In an orthogonal curvilinear system, which one of the following statements is correct ?</p> <p>(1) $\text{div}(\text{curl } \vec{f}) = 0$ (2) $\text{curl}(\text{curl } \vec{f}) = \vec{0}$ (3) $\text{curl}(\text{div } \vec{f}) = 0$ (4) $\text{div}(\text{grad } \phi) = 0$</p>
30.	<p>Using Stoke's theorem, $\oint_c (yz dx + xz dy + xy dz)$, where c is the curve $x^2 + y^2 = 1, z = y^2$; is</p> <p>(1) 2 (2) 1 (3) $\frac{1}{2}$ (4) 0</p>

Question No.	Questions
31.	<p>The value of 'c' of Lagrange's mean value theorem for $f(x) = x(x-1)$ in $[1, 2]$ is given by</p> <p>(1) $\frac{2}{3}$ (2) $\frac{3}{4}$ (3) $\frac{3}{2}$ (4) $\frac{4}{3}$</p>
32.	<p>Which of the following functions is not uniformly continuous in $[2, \infty)$,</p> <p>(1) $\sin x$ (2) e^x (3) $\frac{1}{x}$ (4) $\frac{1}{x^2}$</p>
33.	<p>For what value of k, the function</p> $f(x, y) = \begin{cases} \frac{\sin^{-1}(xy-2)}{\tan^{-1}(3xy-6)}, & (x, y) \neq (1, 2) \\ K, & (x, y) = (1, 2) \end{cases}$ <p>is continuous ?</p> <p>(1) 2 (2) $\frac{1}{2}$ (3) $\frac{1}{3}$ (4) $\frac{1}{4}$</p>
34.	<p>The function $f(x, y) = 2x^4 - 3x^2y + y^2$ has</p> <p>(1) maxima at (0, 0) (2) neither maxima nor minima at (0, 0)</p> <p>(3) minima at (0, 0) (4) doubtful case at (0, 0)</p>
35.	<p>A unit vector perpendicular to the tangent and normal at a point of a space curve is called</p> <p>(1) Principal normal (2) Involute</p> <p>(3) Standard normal (4) Binormal</p>

Question No.	Questions
36.	<p>The partial differential equation of all spheres whose centre lies on z-axis is</p> <p>(1) $qx - py = 0$ (2) $px - qy = 0$</p> <p>(3) $qx + py = 0$ (4) $px + qy = 0$</p>
37.	<p>Solution of $px + qy = z$ is</p> <p>(1) $f\left(\frac{x}{y}, \frac{y}{z}\right) = 0$ (2) $f(xy, yz) = 0$</p> <p>(3) $f(x^2, y^2) = 0$ (4) $f(x, y + z) = 0$</p>
38.	<p>The differential equation $f_{xx} + 2f_{xy} + 4f_{yy} = 0$</p> <p>(1) parabolic (2) hyperbolic</p> <p>(3) linear (4) elliptic</p>
39.	<p>The partial differential equation of the transverse vibrations of a string is</p> <p>(1) $\frac{\partial^2 y}{\partial t^2} = c^2 \frac{\partial^2 y}{\partial x^2}$</p> <p>(2) $\frac{\partial^2 y}{\partial t^2} = c^2 \frac{\partial y}{\partial x}$</p> <p>(3) $\frac{\partial^2 y}{\partial t^2} = c^2 \frac{\partial^3 y}{\partial x^3}$</p> <p>(4) $\frac{\partial y}{\partial t} = c^2 \frac{\partial y}{\partial x}$</p>

Question No.	Questions
40.	<p>The solution of $\frac{\partial^2 z}{\partial x^2} + \frac{\partial^2 z}{\partial y^2} = \frac{z}{a}$ is</p> <p>(1) $z = e^{y/a} f(x+y)$ (2) $z = e^{y/a} f(x-y)$ (3) $z = e^a f(x-y)$ (4) $z = e^{x/a} f(x+y)$</p>
41.	<p>Absolute units of moment in S. I. system is</p> <p>(1) Kg. m (2) Dyne centimeter (3) Newton meter (4) gm. cm.</p>
42.	<p>The centre of gravity of a thin uniform triangular lamina divides every median in the ratio</p> <p>(1) 2:1 (2) 1:2 (3) 2:3 (4) 3:2</p>
43.	<p>The line of action of a force such that axis of the couple is coincident with this line, is called</p> <p>(1) screw (2) central line (3) wrench (4) central axis</p>
44.	<p>The constant ratio which the limiting friction bears to the normal reaction is called</p> <p>(1) Limiting Reaction (2) Co-efficient of Friction (3) Statical Friction (4) Saturated Friction</p>

Question No.	Questions
45.	<p>Minimum distance between two forces which are equivalent to given system (R, K) and inclined at a given angle 2α is</p> <p>(1) $\frac{K}{R} \sin \alpha$ (2) $\frac{K}{R} \cos \alpha$ (3) $\frac{K}{R} \cot \alpha$ (4) $\frac{R}{K} \cot \alpha$</p>
46.	<p>If p and q are positive real numbers, then the series $\frac{2p}{1^q} + \frac{3p}{2^q} + \frac{4p}{3^q} + \dots$ is convergent for</p> <p>(1) $p < q + 1$ (2) $p < q - 1$ (3) $p = q$ (4) $p < q$</p>
47.	<p>If $a_n = \frac{\cos(n\pi/2)}{n}$, then the sequence $\{a_n\}$ is</p> <p>(1) Convergent to 0 (2) Convergent to 1 (3) Convergent to $\frac{1}{2}$ (4) diverges</p>
48.	<p>The limit superior and limit inferior of $\left\{\frac{(-1)^n}{n^2}\right\}$ are respectively equal to</p> <p>(1) 1, 0 (2) -1, 1 (3) 0, 0 (4) 0, 1</p>

Question No.	Questions
49.	<p>If δ_n denotes the sum of n terms of the series $1 + \frac{1}{\sqrt{2}} + \frac{1}{\sqrt{3}} + \dots + \frac{1}{\sqrt{n}} + \dots$, then</p> <p>(1) $\delta_n > n$ (2) $\delta_n > n^{3/2}$ (3) $\delta_n > n^2$ (4) $\delta_n > n^{1/2}$</p>
50.	<p>If m is fixed positive integer, then</p> $\lim_{n \rightarrow \infty} \frac{1}{n} [(m+1)(m+2)\dots(m+n)]^{1/n} =$ <p>(1) $\frac{1}{e}$ (2) e (3) $\frac{2}{e}$ (4) $\frac{3}{e}$</p>
51.	<p>$L\{e^{at} t^n\} =$</p> <p>(1) $\frac{n}{(s-a)^{n+1}}$ (2) $\frac{\Gamma(n)}{(s-a)^n}$ (3) $\frac{ n }{(s-a)^n}$ (4) $\frac{ n }{(s-a)^{n+1}}$</p>
52.	<p>$L^{-1}\left\{\frac{1}{(s-4)^3}\right\} =$</p> <p>(1) $t^2 e^{4t}$ (2) $\frac{1}{2} t^2 e^{4t}$ (3) $\frac{1}{2} t e^{4t}$ (4) $t e^{4t}$</p>

Question No.	Questions
53.	Generating function for Bessel function $J_n(x)$ is (1) $e^x \left(\frac{1}{t} - t \right)$ (2) $e^{\frac{x}{2}} \left(\frac{1}{t} - t \right)$ (3) $e^x \left(t - \frac{1}{t} \right)$ (4) $e^{\frac{x}{2}} \left(t - \frac{1}{t} \right)$
54.	$\left\{ J_{\frac{1}{2}}(x) \right\}^2 + \left\{ J_{-\frac{1}{2}}(x) \right\}^2 =$ (1) $\frac{\pi x}{2}$ (2) $\frac{2}{\pi x}$ (3) $\frac{\sqrt{2}}{\pi x}$ (4) $\frac{2}{\sqrt{\pi x}}$
55.	If $P_n(x)$ is Legendre polynomial of degree n , then $P_2(x) =$ (1) $\frac{1}{2} (3x^2 - 1)$ (2) $\frac{1}{2} (3x^2 + 1)$ (3) $\frac{3}{2} x^2 - 1$ (4) $x^2 - \frac{1}{2}$
56.	Maximum size of a float variable is (1) 2 bytes (2) 3 bytes (3) 4 bytes (4) 8 bytes
57.	Which of following Keyword is used for the storage class 2 (1) auto (2) printf (3) external (4) scanf

Question No.	Questions
58.	<p>The continue statement cannot be used with</p> <p>(1) while (2) for</p> <p>(3) switch (4) do</p>
59.	<p>The bitwise AND operator is used for</p> <p>(1) shifting bits (2) sorting</p> <p>(3) comparison (4) masking</p>
60.	<p>Number of real roots of the equation $x^{2n} - 1 = 0$ is</p> <p>(1) 2 (2) n (3) 2n (4) n-1</p>
61.	<p>The integral $\int_0^1 x^{m-1} (1-x)^{n-1} dx$ is convergent, when</p> <p>(1) $n > 0, m = 0$ (2) $m > 0, n = 0$</p> <p>(3) $m > 0, n > 0$ (4) $m = 0, n > 1$</p>
62.	<p>Let f be a bounded function defined on the bounded interval $[a, b]$. Then, f is Riemann integral on $[a, b]$ iff</p> <p>(1) $\int_a^b f \leq \int_a^b f$ (2) $\int_a^b f = \int_a^b f$</p> <p>(3) $\int_a^b f \geq \int_a^b f$ (4) $\int_a^b f + \int_a^b f = 0$</p>
63.	<p>The integral $\int_0^{\infty} x^{n-1} e^{-x} dx$ is divergent, when</p> <p>(1) $n > 0$ (2) $n \leq 0$ (3) $n > 1$ (4) $n = \frac{1}{2}$</p>

Question No.	Questions
64.	<p>If A is an open set and B is a closed set in R^n, then</p> <p>(1) $B-A$ is null set (2) $B-A$ is semi-open set</p> <p>(3) $B-A$ is open set (4) $B-A$ is closed set</p>
65.	<p>Which of the following is not correct about the cantor ternary set ?</p> <p>(1) It is dense (2) It is closed</p> <p>(3) It is uncountable (4) It is perfect set</p>
66.	<p>The complement of non-empty open set of metric space is</p> <p>(1) null set (2) open set</p> <p>(3) closed set (4) semi-open set</p>
67.	<p>If X is a complete metric space, E is non-empty open subset of X, then</p> <p>(1) E is of first category (2) E is of second category</p> <p>(3) E is a null set (4) None of these</p>
68.	<p>If G is a set of integers and $a.b = a - b$, then G is</p> <p>(1) semi-group (2) non-group</p> <p>(3) monoid (4) quasi-group</p>
69.	<p>If $G = \{1, -1, i, -i\}$ is a multiplicative group, then order of $-i$ is</p> <p>(1) 5 (2) 4 (3) 3 (4) 2</p>

Question No.	Questions
70.	Every group of prime order is (1) abelian (2) sub-group (3) normal group (4) cyclic
71.	The number of abelian groups upto isomorphism of order 10^5 is (1) 5 (2) 7 (3) 45 (4) 49
72.	A communicative division ring is (1) group (2) vector space (3) field (4) integral domain
73.	Ring of polynomial over a field is a (1) prime field (2) unique factorization domain (3) irreducible (4) integral domain
74.	If integral domain D is of finite characteristic, then its characteristic is (1) prime number (2) natural number (3) even number (4) odd number
75.	Number of prime ideals of Z_{10} is (1) 4 (2) 3 (3) 2 (4) 1
76.	Starting with $x_0 = 1$, the next approximation x_1 to $2^{1/3}$ obtained by Newton's method is (1) $\frac{4}{3}$ (2) $\frac{5}{3}$ (3) $\frac{5}{4}$ (4) $\frac{6}{5}$

Question No.	Questions
77.	<p>In Simpson's $\frac{1}{3}$rd rule, the curve $y = f(x)$ is assumed to be a</p> <p>(1) circle (2) hyperbola (3) parabola (4) straight line</p>
78.	<p>Gauss quadrature formula is used for</p> <p>(1) Numerical integration (2) Numerical differentiation (3) Interpolation (4) Solution of equations</p>
79.	<p>Let $f(0) = 1$, $f(1) = 2.72$, then the trapezoidal rule gives approximate value of $\int_0^1 f(x) dx$ as</p> <p>(1) 3.72 (2) 1.86 (3) 1.76 (4) 0.92</p>
80.	<p>Normal distribution becomes standard normal distribution when</p> <p>(1) $\mu = 0, \sigma = 0$ (2) $\mu = 1, \sigma = 0$ (3) $\mu = 1, \sigma = 1$ (4) $\mu = 0, \sigma = 1$</p>
81.	<p>In Binomial distribution the parameter n ranges over the</p> <p>(1) positive real numbers (2) positive rational numbers (3) positive integers (4) integers</p>

Question No.	Questions
82.	<p>The Jacobi's iteration method for the set of equations $x_1 + ax_2 = 2$, $ax_1 + x_2 = 7$ ($a \neq \frac{1}{\sqrt{2}}$) converges for</p> <p>(1) $a = 1$ (2) $a < \frac{1}{\sqrt{2}}$</p> <p>(3) $a = \frac{1}{\sqrt{2}}$ (4) $\frac{1}{\sqrt{2}} < a < \frac{3}{\sqrt{2}}$</p>
83.	<p>$\int_0^2 (8 - x^3)^{-\frac{1}{3}} dx =$</p> <p>(1) $\beta\left(\frac{1}{3}, \frac{2}{3}\right)$ (2) $\frac{1}{2} \beta\left(\frac{1}{3}, \frac{2}{3}\right)$</p> <p>(3) $\frac{2}{3} \beta\left(\frac{1}{3}, \frac{2}{3}\right)$ (4) $\frac{1}{3} \beta\left(\frac{1}{3}, \frac{2}{3}\right)$</p>
84.	<p>If $f(x)$ is an even function of x in $[-\pi, \pi]$, then Fourier series of $f(x)$ consists of terms</p> <p>(1) with sines only (2) with cosines only</p> <p>(3) with constants (4) with sines and cosines both</p>
85.	<p>$\sqrt{n} \sqrt{1-n} =$</p> <p>(1) $\frac{\pi}{\sin n\pi}$ (2) $\frac{\sin n\pi}{\pi}$</p> <p>(3) $\frac{2}{\sin n\pi}$ (4) $\frac{\pi}{\sin \frac{n\pi}{2}}$</p>

Question No.	Questions
86.	<p>The function $f(z) = z ^2$ is</p> <p>(1) everywhere analytic (2) nowhere analytic</p> <p>(3) analytic at $z = 0$ (4) not defined at $z = 0$</p>
87.	<p>If $f(z) = u(x, y) + i v(x, y)$ is analytic, then $f'(z) =$</p> <p>(1) $\frac{\partial u}{\partial x} - i \frac{\partial u}{\partial y}$ (2) $\frac{\partial u}{\partial x} - i \frac{\partial v}{\partial x}$</p> <p>(3) $\frac{\partial u}{\partial y} + i \frac{\partial v}{\partial x}$ (4) $\frac{\partial u}{\partial y} - i \frac{\partial v}{\partial x}$</p>
88.	<p>Fixed point of the mapping $w = \frac{3z-4}{z-1}$ is</p> <p>(1) $z = 2$ (2) $z = 4$</p> <p>(3) $z = 3$ (4) $z = 1$</p>
89.	<p>If V is the vector space of all polynomials of degree $\leq n$ over \mathbb{R}, $\dim V$ is</p> <p>(1) $n - 1$ (2) n</p> <p>(3) $n + 1$ (4) n^2</p>
90.	<p>A bijective linear transformation is called</p> <p>(1) monomorphism (2) homomorphism</p> <p>(3) isomorphism (4) epimorphism</p>

Question No.	Questions
91.	Dimension of $\mathbb{Q}(\sqrt{2})$ over \mathbb{Q} is (1) 4 (2) 2 (3) 1 (4) 3
92.	Which of the following is an orthogonal set ? (1) $\{(1, 0, 1), (1, 0, -1), (-1, 0, 1)\}$ (2) $\{(1, 0, 1), (1, 0, -1), (0, 1, 0)\}$ (3) $\{(1, 0, 1), (1, 0, -1), (0, 2, 3)\}$ (4) none of these
93.	Let u, v be orthogonal set in an inner product space V . Then $\ u - v\ $ is (1) 0 (2) $\sqrt{3}$ (3) 2 (4) $\sqrt{2}$
94.	Let $u = (1, 0, i), v = (2, 0, 1 + i)$. Then $\langle u, v \rangle$ is (1) $1 + i$ (2) $1 - i$ (3) $2 + i$ (4) $-1 + i$
95.	Tangential velocity of a particle at a point is (1) $\frac{dx}{dt}$ (2) $\frac{dy}{dt}$ (3) $\frac{dt}{ds}$ (4) $\frac{ds}{dt}$
96.	A person weighing 70 Kg. is in a lift ascending with an acceleration of 1.4 m/sec^2 . The thrust of his feet on the lift is (1) 584 N (2) 780 N (3) 784 N (4) 980 N

Question No.	Questions
97.	<p>A particle is projected at such an angle that the horizontal range is three times the greatest height. Then the angle of projection is</p> <p>(1) $\tan^{-1} \frac{2}{3}$ (2) $\tan^{-1} \frac{4}{3}$</p> <p>(3) $\tan^{-1} \frac{3}{2}$ (4) $\tan^{-1} \frac{5}{3}$</p>
98.	<p>A body of mass m has momentum M. Its Kinetic energy will be</p> <p>(1) $\frac{M^2}{2m}$ (2) $\frac{M^2}{m}$</p> <p>(3) $\frac{1}{2} m M^2$ (4) $\frac{1}{2} m M$</p>
99.	<p>The expression for frequency of a S. H. M. is</p> <p>(1) $n = \frac{m}{\sqrt{2\pi}}$ (2) $n = \frac{\sqrt{m}}{2\pi}$</p> <p>(3) $n = \sqrt{\frac{m}{2\pi}}$ (4) $n = \frac{m}{2\pi}$</p>
100.	<p>The law of force towards the pole under the curve $r^2 = 2ap$ is</p> <p>(1) $F \propto \frac{1}{r^2}$ (2) $F \propto \frac{1}{r^3}$</p> <p>(3) $F \propto \frac{1}{r^5}$ (4) $F \propto \frac{1}{r^{3/2}}$</p>

Sr. No. ...11221

Total No. of Printed pages : 21

(DO NOT OPEN THIS QUESTION BOOKLET BEFORE TIME OR UNTIL YOU ARE ASKED TO DO SO)

PG-EE-2013

Mathematics & Math with Computer Sc.

Code

A

Time : 1¼ hours

Max. Marks : 100

Total Questions : 100

Roll No. _____ (in figure) _____ (in words)

Name _____ Father's Name _____

Mother's Name _____ Date of Examination : _____

(Signature of the candidate)

(Signature of the Invigilator)

CANDIDATES MUST READ THE FOLLOWING INFORMATION / INSTRUCTIONS BEFORE STARTING THE QUESTION PAPER.

1. All questions are compulsory and carry equal marks.
2. The candidate 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 / misbehaviour 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.
3. In case there is any discrepancy in any question(s) in the Question Booklet, the same may be brought to the notice of the Controller of Examinations in writing **within two hours** after the test is over. No such complaint(s) will be entertained thereafter.
4. 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.
5. Use only blue or black **BALL POINT PEN** of good quality in the OMR Answer-Sheet.
6. 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.
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.**

