

**Program: BE Electronics and Telecommunication Engineering**

**Curriculum Scheme: Revised 2012**

**Examination: Second Year Semester IV**

**Course Code: ECC401**

**Course Name: Applied Mathematics-IV**

**Time: 1 hour**

**Max. Marks: 50**

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**Note: All the questions are compulsory and carry equal marks.**

Q.1	Is $S = \{(a,1,1) / a \text{ is real}\}$ is Subspace?
Option A:	Yes
Option B:	No
Option C:	Sometimes yes
Option D:	Sometimes no
Q.2	The eigen values for $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$ are
Option A:	1, 2, 3
Option B:	-1, -1, 5
Option C:	0, 3, 5
Option D:	1, 3, 6
Q.3	If $\lambda$ is the eigen value of matrix A then $1/\lambda$ is eigen value of
Option A:	$A^{-1}$
Option B:	$A^2$
Option C:	$A-I$
Option D:	$ A $
Q.4	Evaluate $\int_A^B (2y + ix) dz$ along $y = x$ from A(0,0) to B(2,2)
Option A:	1
Option B:	6
Option C:	-1
Option D:	None
Q.5	If (5, 8, 10) is a linear combination of (1, 2, 2) & (3, 4, 6) then
Option A:	$(5, 8, 10) = 2(1, 2, 2) + 1(3, 4, 6)$
Option B:	$(5, 8, 10) = 3(1, 2, 2) + 1(3, 4, 6)$

Option C:	$(5, 8, 10) = (1, 2, 2) + 5(3, 4, 6)$
Option D:	$(5, 8, 10) = 1(1, 2, 2) + 10(3, 4, 6)$
Q.6	Evaluate $\int_0^{1+i} (x^2 - i y) dz$ along $y = x$
Option A:	1
Option B:	6
Option C:	-1
Option D:	None
Q.7	Check whether the vectors $u=(-2, 3, 4)$ and $v=(3, -2, 3)$ are orthogonal?
Option A:	Yes
Option B:	No
Option C:	Sometimes yes
Option D:	Sometimes no
Q.8	Evaluate $\int_C \frac{dz}{z^3(z+4)}$ where C is the circle $ z =2$
Option A:	0
Option B:	$\pi i/32$
Option C:	1
Option D:	4
Q.9	If a square matrix A is non derogatory then it's eigen values are
Option A:	Same
Option B:	Distinct
Option C:	Inverse
Option D:	Transpose
Q.10	Check whether the Cauchy-Schwartz inequality is verified or not for $(2,3,0)$ and $(4,2,1)$
Option A:	Yes
Option B:	No
Option C:	Sometimes yes
Option D:	Sometimes no
Q.11	Find the poles of the function $f(z) = \frac{z-1}{z^2+2z+5}$
Option A:	$-1-2i$ & $-1+2i$
Option B:	$-1-2i$
Option C:	$-2i$
Option D:	$-1+2i$

Q.12	What is the residue of $f(z) = \frac{3z^2 + z}{z^2 - 1}$ at $z=1$
Option A:	1
Option B:	3
Option C:	2
Option D:	0
Q.13	Verify whether the Pythagorean theorem is applicable for $u = (3,4)$ and $v = (-4, 3)$
Option A:	Yes
Option B:	No
Option C:	Sometimes yes
Option D:	Sometimes no
Q.14	If 1, 2 & 3 are eigen values of matrix A then eigen values of matrix $A^3$ are
Option A:	2, 3 & 9
Option B:	1, 4 & 9
Option C:	2, 3 & 2
Option D:	0, 3 & 9
Q.15	If the vectors $(2, -1, 3)$ , $(4, 1, 2)$ and $(8, -1, 8)$ determinant is not zero then these vectors
Option A:	Span vector space $R^3$
Option B:	Do not Span vector space $R^3$
Option C:	Span I
Option D:	Do not Span I
Q.16	Find the extremals of $\int_0^1 (xy + y^2 - 2y^2 y') dx$
Option A:	$y = -x / 2$
Option B:	$y = x$
Option C:	$y = 3x$
Option D:	$y = 0$
Q.17	Find the extremals of $\int_{x_1}^{x_2} \frac{y'^2}{x^2} dx$
Option A:	$y = c_1 x^3 + c_2$
Option B:	$y = c_1 x + c_2$
Option C:	$y = c_1 x^5 + c_2$
Option D:	$y = c_1 x^6 + c_2$
Q.18	Every square matrix satisfies its own

Option A:	Transpose equation
Option B:	Identical equation
Option C:	Characteristic equation
Option D:	Linear equation
Q.19	If $f(z)$ is analytic inside and on a closed curve $C$ of a simply connected region $R$ and if $z_0$ is any point within $C$ then $f(z_0)$ is
Option A:	$\frac{1}{2\pi i} \int_C \frac{f(z)}{z - z_0} dz$
Option B:	$\frac{1}{2\pi i}$
Option C:	$\int_C \frac{f(z)}{z - z_0} dz$
Option D:	0
Q.20	If $c_1$ & $c_2$ are two concentric circles of radii $r_1$ & $r_2$ with the centre $z_0$ and if $f()$ is analytic on $C_1$ & $C_2$ and in the annular region $R$ between the circles, then for any point $z$ in $R$ we express it in
Option A:	Taylor series
Option B:	Laurent series
Option C:	Exponential series
Option D:	Trigonometric series
Q.21	If the geometric multiplicity of each its eigen values coincides with the algebraic multiplicity then the matrix is
Option A:	Inverse
Option B:	Diagonalisable
Option C:	Transpose
Option D:	Derogatory
Q.22	What is the order of pole of $f(z) = \frac{z^2}{(z-1)^2(z+2)}$ at $z = 1$
Option A:	4
Option B:	3
Option C:	2
Option D:	1
Q.23	Evaluate $\int_0^{2\pi} \frac{d\theta}{5 + 3\sin \theta}$
Option A:	$\Pi / 2$

Option B:	$\Pi$
Option C:	1
Option D:	0
Q.24	If $f(z)$ is an analytic function and if its derivative $f'(z)$ is continuous at each point within and on a simple closed curve $C$ then the integral of $f(z)$ along the closed curve $C$ is
Option A:	1
Option B:	0
Option C:	2
Option D:	5
Q.25	Which trial equation Raleigh-Ritz method assume?
Option A:	$\bar{y}(x) = a + bx + cx^2$
Option B:	$\bar{y}(x) = ax + bx^2$
Option C:	$\bar{y}(x) = a + bx$
Option D:	$\bar{y}(x) = a + bx^2$