

**Program: BE Electronics Engineering**

**Curriculum Scheme: Revised 2016**

**Examination: Second Year Semester IV**

**Course Code: ELX401**

**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	Compute a coefficient of correlation between X & Y												
	<table border="1"> <tbody> <tr> <td>X</td> <td>3</td> <td>6</td> <td>4</td> <td>5</td> <td>7</td> </tr> <tr> <td>Y</td> <td>2</td> <td>4</td> <td>5</td> <td>3</td> <td>6</td> </tr> </tbody> </table>	X	3	6	4	5	7	Y	2	4	5	3	6
X	3	6	4	5	7								
Y	2	4	5	3	6								
Option A:	1												
Option B:	0.7												
Option C:	2												
Option D:	4												
Q.17	Find the extremals of $\int_{x_1}^{x_2} \frac{y'^2}{x^2} dx$												
Option A:	$y = c_1x^3 + c_2$												
Option B:	$y = c_1x + c_2$												
Option C:	$y = c_1x^5 + c_2$												
Option D:	$y = c_1x^6 + c_2$												

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	Find $k$ if pdf of rv $X$ is																
	<table border="1"> <tbody> <tr> <td>X</td> <td>0</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> </tr> <tr> <td>P(X=x)</td> <td>k</td> <td>3k</td> <td>5k</td> <td>7k</td> <td>9k</td> <td>11k</td> <td>13k</td> </tr> </tbody> </table>	X	0	1	2	3	4	5	6	P(X=x)	k	3k	5k	7k	9k	11k	13k
X	0	1	2	3	4	5	6										
P(X=x)	k	3k	5k	7k	9k	11k	13k										
Option A:	1/5																
Option B:	1/49																
Option C:	2																
Option D:	7																
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	Find the binomial distribution if the mean is 4 & variance is 3																
Option A:	${}^{16}C_x \left(\frac{1}{4}\right)^x \left(\frac{3}{4}\right)^{16-x}$																
Option B:	${}^{16}C_x \left(\frac{1}{4}\right)^x$																
Option C:	$\left(\frac{3}{4}\right)^{16-x}$																

Option D:	$\left(\frac{1}{4}\right)^x$
Q.23	If the variance of poisson distribution is 2, find P(0)
Option A:	1
Option B:	$e^{-2}$
Option C:	e
Option D:	0
Q.24	If f(z) is an analytic function and if it's 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:	$\bar{y}(x) = a + bx^2$