Curriculum Scheme: Revised 2016

Examination: Second Year Semester IV

Course Code: CSC401 **Course Name: Applied Mathematics-IV**

Time: 1 hour Max. Marks: 50

===

Note to the students:- All the Questions are compulsory and carry equal marks .

Q1.	The poles of $f(z) = \frac{z^2+1}{1-z^2}$ is
Option A:	1
Option B:	-1
Option C:	± 1
Option D:	0
Q2.	The poles of $f(z) = \frac{z-2}{z^2} \sin\left(\frac{1}{z-1}\right)$ is z = 0 is of order _____
Option A:	2
Option B:	0
Option C:	1
Option D:	-1
Q3.	The singularity of $f(z) = \frac{(z+4)}{(z-2)(z-3)}$ are
Option A:	z = 2 , 3
Option B:	z = 1 , 3
Option C:	z = 1 , 2
Option D:	z = 1 , 1
Q4.	The residue of $f(z) = \frac{z^2}{(z-1)^2(z+2)}$ at the pole z = 1 is
Option A:	0
Option B:	1
Option C:	4/9
Option D:	5/9
Q5.	If $f(z)$ is a single valued and analytic within and on a closed curve C and if ‘a’ is any point interior to C , then $\oint \frac{f(z)}{z-a} dz =$
Option A:	$2\pi i$
Option B:	$3\pi i$
Option C:	$2\pi i f(a)$
Option D:	$2\pi i f'(a)$

Q6.	The eigenvalues and eigenvectors of the following matrix are $$\begin{bmatrix} 2 & 1 & 0 \\ 0 & 2 & 1 \\ 0 & 0 & 2 \end{bmatrix}$$
Option A:	Eigen values :2,2,2 eigen vector: $\begin{pmatrix} 1 \\ 0 \\ 0 \end{pmatrix}$
Option B:	Eigen values :2,1,1 eigen vectors: $\begin{pmatrix} 2 \\ 0 \\ 0 \end{pmatrix}, \begin{pmatrix} 1 \\ 0 \\ 0 \end{pmatrix}$
Option C:	Eigen values :2,1,0 eigen vectors: $\begin{pmatrix} 2 \\ 0 \\ 0 \end{pmatrix}, \begin{pmatrix} 1 \\ 0 \\ 0 \end{pmatrix}, \begin{pmatrix} 1 \\ 1 \\ 0 \end{pmatrix}$
Option D:	Eigen values :1,1,0 eigen vectors: $\begin{pmatrix} 2 \\ 0 \\ 1 \end{pmatrix}, \begin{pmatrix} 1 \\ 0 \\ 0 \end{pmatrix}, \begin{pmatrix} 1 \\ 1 \\ 0 \end{pmatrix}$
Q7.	$\text{If } A = \begin{bmatrix} 1 & 8 \\ 2 & 1 \end{bmatrix} \text{ Find}$ $$2A^3 - A^2 - 35A - 44I$$
Option A:	$A - 4I$
Option B:	$A + I$
Option C:	$5A + 3I$
Option D:	$15A + 7I$
Q8.	If $A = \begin{bmatrix} 1 & 2 \\ 0 & 1 \end{bmatrix}$ & B= $\begin{bmatrix} 2 & 0 \\ 1/2 & 2 \end{bmatrix}$ then
Option A:	A and B both are not diagonalisable
Option B:	A and B both are diagonalisable
Option C:	A is diagonalizable but B is not diagonalisable
Option D:	A isnot diagonalizable but B is diagonalisable
Q9.	If $A = \begin{bmatrix} 1 & 0 & 0 \\ 1 & 0 & 1 \\ 0 & 1 & 0 \end{bmatrix}$ then A^{50} is
Option A:	$$\begin{bmatrix} 1 & 0 & 0 \\ 25 & 0 & 0 \\ 25 & 0 & 1 \end{bmatrix}$$
Option B:	$$\begin{bmatrix} 1 & 0 & 0 \\ 25 & 1 & 0 \\ 25 & 0 & 0 \end{bmatrix}$$
Option C:	$$\begin{bmatrix} 1 & 0 & 0 \\ 25 & 1 & 0 \\ 25 & 0 & 1 \end{bmatrix}$$
Option D:	$$\begin{bmatrix} 0 & 0 & 0 \\ 25 & 1 & 0 \\ 25 & 0 & 1 \end{bmatrix}$$

Q10.	Consider the following statements i)The eigenvalues of Hermitian matrix are real ii)Eigenvalues of skew Hermitian matrix are either purely imaginary or zero iii) Eigen values of unitary matrix are of unit modulus. Then
Option A:	statement i , ii are correct and iii is not correct
Option B:	statement i , is correct and ii, iii are not correct
Option C:	Statement i,ii,iii are not correct
Option D:	Statement i,ii,iii are correct statements.
Q11.	A random variable X has p.d.f. $f(x) = \begin{cases} k(1-x^2), & 0 \le x \le 1 \\ 0, & otherwise \end{cases}$, then P(0.1<x<0.2) is
Option A:	0.1465
Option B:	0.1824
Option C:	0.2812
Option D:	0.1218
Q12.	A discrete random variable X has following probability distribution X: -2, -1, 0, 1, 2, 3 p: 0.2, k, 0.1, 2k, 0.1, 2k Then then mean of X is
Option A:	$\frac{15}{26}$
Option B:	$\frac{16}{25}$
Option C:	$\frac{16}{27}$
Option D:	None of these
Q13.	The p.d.f. of a random variable X is given by $f(x) = kx^2e^{-x};\ x \ge 0$ then the variance of X is
Option A:	12
Option B:	9
Option C:	3
Option D:	4
Q14.	If X is a discrete random variable that follows Binomial Distribution with parameters n=12 and p=$\frac{1}{2}$ then E(X)=
Option A:	3
Option B:	12
Option C:	6
Option D:	2

Q15.	If a random variable X follows Poisson Distribution such that P(X=1)=2P(X=2) then P(X=3) is
Option A:	0.6134
Option B:	0.0613
Option C:	0.0512
Option D:	0.5123
Q16.	If X is a normal variate with mean 10 and standard deviation 4 then P(5<X<18)=
Option A:	0.7128
Option B:	0.8104
Option C:	0.8716
Option D:	0.9121
Q17.	A statistical measure such as mean μ or standard deviation σ calculated on the basis of population values is called
Option A:	Statistic
Option B:	Parameter
Option C:	Sample
Option D:	None of these
Q18.	t-distribution is used when
Option A:	Sample size is small
Option B:	Sample size is 30 or less
Option C:	Population std. deviation is not known
Option D:	All of the above
Q19.	The “t-statistic” is defined as
Option A:	$t = \frac{\bar{x}-\mu}{s/\sqrt{n-1}}$
Option B:	$t = \frac{\bar{x}-\mu}{s/\sqrt{n}}$
Option C:	$t = \frac{\bar{x}-\mu}{s}$
Option D:	None of the above
Q20.	The test statistic for Chi-squared is defined as
Option A:	$\sum\left[\frac{(O-E)^2}{E}\right]$
Option B:	$\sum\left[\frac{(O-E}{E}\right]$

Option C:	$\sum \left[\frac{O-E}{E}\right]^2$
Option D:	None of these
Q21.	Any solution which satisfies the non-negativity restriction is called
Option A:	Feasible solution
Option B:	Basic solution
Option C:	Degenerate solution
Option D:	None of these
Q22.	For a standard form of an LPP, the right hand side of each equation must be
Option A:	Negative
Option B:	Non-negative
Option C:	Can be negative or non-negative
Option D:	None of the above
Q23.	How many basic solutions will the following LPP have? Maximize $z = x_1 + 3x_2 + 3x_3$ Subject to, $x_1 + 2x_2 + 3x_3 = 4$ $2x_1 + 3x_2 + 5x_3 = 7$ $x_1, x_2, x_3 \geq 0$
Option A:	2
Option B:	3
Option C:	1
Option D:	0
Q24.	In Quadratic programming problems , if all the principal minor determinants of the Hessian matrix at X_0 are positive then X_0 is a
Option A:	Maxima
Option B:	Minima
Option C:	Neither maxima nor minima
Option D:	None of these
Q25.	In Canonical form of LPP the objective function is of
Option A:	Maximization type
Option B:	Minimization type
Option C:	Can be maximization or minimization type
Option D:	None of these