Program: FE

Curriculum Scheme: Revised 2012

Examination: Second Year Semester IV

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

Time: 1 hour Max. Marks: 50

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

Q1.	If X is a normal variate with mean 10 and standard deviation 4 then P(5<X<18)=	CORRECT ANSWER
Option A:	0.7128	
Option B:	0.8104	
Option C:	0.8716	C
Option D:	0.9121	
Q2.	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	B
Option C:	Sample	
Option D:	None of these	
Q3.	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	D
Q4.	The "t-statistic" is defined as	
Option A:	$t = \frac{\bar{x}-\mu}{s/\sqrt{n-1}}$	A
Option B:	$t = \frac{\bar{x}-\mu}{s/\sqrt{n}}$	
Option C:	$t = \frac{\bar{x}-\mu}{s}$	
Option D:	None of the above	

Q5.	The test statistic for Chi-squared is defined as	
Option A:	$\sum\left[\frac{(O-E)^2}{E}\right]$	A
Option B:	$\sum\left[\frac{(O-E}{E}\right]$	
Option C:	$\sum\left[\frac{O-E}{E}\right]^2$	
Option D:	None of these	
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: $\begin{pmatrix}1\\0\\0\end{pmatrix}$	A
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.	If $A = \begin{bmatrix}1 & 8\\2 & 1\end{bmatrix}$ Find $2A^3 - A^2 - 35A - 44I$	
Option A:	$A - 4I$	
Option B:	$A + I$	B
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	A
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:	$\begin{bmatrix} 1 & 0 & 0 \\ 25 & 1 & 0 \\ 25 & 0 & 1 \end{bmatrix}$	C
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.	For a complex valued function f to get its Taylor's expansion, the function must be	
Option A:	Analytic inside the circle	
Option B:	Analytic on & inside the circle	B
Option C:	Analytic on the circle	
Option D:	Analytic onside the circle	
Q12.	The residue of a complex valued function f is,	
Option A:	Coefficient of $\frac{1}{(z-z_0)^2}$ in the Laurent's expansion of f about z_0	
Option B:	Coefficient of $z-z_0$ in the Laurent's expansion of f about z_0	
Option C:	Coefficient of $\frac{1}{z-z_0}$ in the Laurent's expansion of f about z_0	C
Option D:	None of these	
Q13.	The singular point of a complex valued function f is the point where	
Option A:	f is not analytic	A
Option B:	f is not integrable	
Option C:	Both A & B	
Option D:	None of these	

Q14.	The Cauchy –Riemann equation for $f = u + iv$ are,	
Option A:	$u_x = -v_y$ and $u_y = v_x$	
Option B:	$u_x = v_y$ and $u_y = v_x$	
Option C:	$u_x = -v_y$ and $u_y = -v_x$	
Option D:	$u_x = v_y$ and $u_y = -v_x$	D
Q15.	The rank correlation coefficient between x&y is given by	
Option A:	$R = 1 - + \frac{6\sum d^2}{n(n^2-1)}$	
Option B:	$R = 1 - \frac{6\sum d^2}{n(n^2+1)}$	
Option C:	$R = 1 - \frac{6\sum d^2}{n(n^2-1)}$	C
Option D:	None of these	
Q16.	From line of regression to find y for given x, we use	
Option A:	Regression of y on x	A
Option B:	Regression of x on y	
Option C:	Any one of these	
Option D:	None of these	
Q17.	If $2x + 3y + 8 = 0$ is regression of y on x then find b_{yx}	
Option A:	-3/2	
Option B:	2/3	
Option C:	-2/3	C
Option D:	3/2	
Q18.	If the following gives the p.d.f. Find k <table><tr><td>X</td><td>1</td><td>2</td><td>3</td><td>4</td></tr><tr><td>P(x)</td><td>4k</td><td>3k</td><td>2k</td><td>K</td></tr></table>	
Option A:	1	
Option B:	0.5	
Option C:	0.2	
Option D:	0.1	D
Q19.	A random variable x has the following probability function.	

	<table><tr><td>X</td><td>0</td><td>1</td><td>2</td><td>3</td></tr><tr><td>P(x)</td><td>$\frac{1}{6}$</td><td>$\frac{1}{2}$</td><td>$\frac{3}{10}$</td><td>$\frac{1}{30}$</td></tr></table> Find the expectation	
Option A:	2/5	
Option B:	4/5	
Option C:	6/5	C
Option D:	3/5	
Q20.	Find k, if x is a continuous random variable with p.d.f. $f(x)=k(x-x^3) \quad 0\le x<1$ $=0 \quad otherwise$	
Option A:	1/4	
Option B:	4	B
Option C:	3	
Option D:	2	
Q21.	Any solution which satisfies the non-negativity restriction is called	
Option A:	Feasible solution	A
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	B
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, $x_1 + 2x_2 + 3x_3 = 4$ $2x_1 + 3x_2 + 5x_3 = 7$ $x_1, x_2, x_3 \ge 0$	
Option A:	2	
Option B:	3	B
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	B
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	A
Option B:	Minimization type	
Option C:	Can be maximization or minimization type	
Option D:	None of these	