Sample Question Paper

Examination: S.E. Branch: Information Technology Semester -IV(Rev2012)

Course Name: Applied Mathematics – IV(CBGS Time: 1 hour

All the Questions are compulsory and carry equal marks .

Q1.	If the eigen values of A are 1,2,3 then the matrix is
Option A:	derogatory
Option B:	Non derogatory
Option C:	Identity matrix
Option D:	Singular
Q2.	If the geometric multiplicity is same as the algebraic multiplicity of each eigen value of the then the matrix A then A is
Option A:	Non diagonalizable
Option B:	Diagonalizable
Option C:	Null matrix
Option D:	Hermitian matrix
Q3.	The value of the integral $\int_{c}^{\cdot} \frac{cosz}{(z+\pi)^3}\, dz$ where c: $\lvert z \rvert = 2$ is
Option A:	1
Option B:	$2\pi i$
Option C:	-1
Option D:	0
Q4.	If f(z)= $\frac{2z+1}{(z+1)(z+2)^2}$ $then$ he order of the pole Z= -1 and Z=-2 respectively
Option A:	1 and 2
Option B:	-1 and -2
Option C:	0 and 0
Option D:	2 and 1
Q5.	The optimum solution of the LPP Max Z = $x_1 + 4x_2$ subject to the constraints $2x_1 + x_2 \leq 3$ $3x_1 + 5x_2 \leq 9$ and $x_1, x_2 \geq 0$
Option A:	$(0\ , {}^{9}/_{5})$
Option B:	(0,0)
Option C:	$(\frac{6}{7}, \frac{9}{7})$
Option D:	$(\frac{3}{2}, 0)$
Q6.	If f(z) = $z^3 + z^2 + \frac{z}{2!} + \frac{1}{3!} + \frac{1}{4!}\frac{1}{z} + \frac{1}{5!}\frac{1}{z^2} + \cdots$ $then\ residue\ at\ z = 0\ is$

Option A:	$\frac{1}{4!}$
Option B:	2!
Option C:	4!
Option D:	5!
Q7.	If the objective function is of the minimization type then the coefficient of the artificial variable in the big M method is
Option A:	0
Option B:	1
Option C:	M
Option D:	-M
Q8.	The dual of the Primal Max Z=$7x_1 + 2x_2$ subject to $4x_1 + 5x_2 \leq 2$ $3x_1 - x_2 \leq 9 \ where \ x_1, x_2 \geq 0$ is
Option A:	Max W = $2w_1 + 9w_2$ subject to $4w_1 + 3w_2 \geq 7$ $5w_1 - w_2 \geq 2 \quad where \ w_1, w_2 \geq 0$
Option B:	Min W = $2w_1 + 9w_2$ subject to $4w_1 + 3w_2 \geq 7$ $5w_1 - w_2 \geq 2 \quad where \ w_1, w_2 \geq 0$
Option C:	Min W = $2w_1 + 9w_2$ subject to $4w_1 + 3w_2 \leq 7$ $5w_1 - w_2 \leq 2 \quad where \ w_1, w_2 \geq 0$
Option D:	Min W = $2w_1 + 9w_2$ subject to $4w_1 + 3w_2 = 7$ $5w_1 - w_2 = 2 \quad where \ w_1, w_2 \geq 0$
Q9.	If A = $\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ then $A^{-1} \ is$
Option A:	$\begin{bmatrix} 2 & 2 \\ 3 & 8 \end{bmatrix}$
Option B:	$\begin{bmatrix} 1 & 2 \\ 0 & 4 \end{bmatrix}$
Option C:	$\begin{bmatrix} 2 & 2 \\ 3 & 4 \end{bmatrix}$
Option D:	$\begin{bmatrix} 2 & 4 \\ 6 & 8 \end{bmatrix}$
Q10.	The dual of the dual is
Option A:	Dual
Option B:	Doesn’t exist
Option C:	Primal
Option D:	In the canonical form
Q11.	The $\int_{c}^{\cdot}(z + z^2)\, dz$ where $\|z\|$=2
Option A:	$4\pi i$
Option B:	4π
Option C:	$4i$

Option D:	0
Q12.	For the function f(z) = $\frac{1-cosz}{z^3}$, z=0 is
Option A:	Pole of order 1
Option B:	Essential singularity
Option C:	Removable singularity
Option D:	Zero of f(z)
Q13.	Value of the integral $\int_c^{\cdot} \frac{sinz}{z-\frac{\pi}{2}} dz =$
Option A:	$-2\pi i$
Option B:	$2\pi i$
Option C:	$-\pi i$
Option D:	πi
Q14.	In a standard form of a LPP the constraints are of the type
Option A:	$\geq$
Option B:	$\leq$
Option C:	=
Option D:	<
Q15.	The statement “ If f(z) is analytic in a region bounded by a simple closed curve c except at the point z=a , then $\int_c^{\cdot} \frac{f(z)}{z-a} dz = 2\pi i f(a)$” is
Option A:	Cauchy’s theorem
Option B:	Cauchy’s Integral theorem
Option C:	Residue theorem
Option D:	Taylor’s Theorem
Q16.	A continuous random variable has probability density function $f(x) = x - x^2; 0 \leq x \leq 1$. Find Mean
Option A:	$\frac{1}{12}$
Option B:	$\frac{1}{3}$
Option C:	$\frac{1}{6}$
Option D:	$\frac{5}{3}$
Q17.	A Binomial Distribution of a random variable X is $P(X=r) = {}^6C_r \left(\frac{1}{4}\right)^r \left(\frac{3}{4}\right)^r$ then find Variance of X
Option A:	$\frac{3}{4}$
Option B:	$\frac{9}{8}$
Option C:	$\frac{1}{4}$
Option D:	$\frac{3}{8}$

<table>
<tr><td></td><td></td></tr>
<tr><td>Q18.</td><td>The Probability density function of a random variable X is<table><tr><td>X</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr><tr><td>P(X=x)</td><td>4k</td><td>5k</td><td>6k</td><td>9k</td><td>10k</td></tr></table>Find P$(1 < X \leq 4)$</td></tr>
<tr><td>Option A:</td><td>$\frac{10}{17}$</td></tr>
<tr><td>Option B:</td><td>$\frac{12}{17}$</td></tr>
<tr><td>Option C:</td><td>$\frac{13}{17}$</td></tr>
<tr><td>Option D:</td><td>$\frac{15}{17}$</td></tr>
<tr><td></td><td></td></tr>
<tr><td>Q19.</td><td>If a random variable X follows Poisson distribution such that $P(X = 1) = 2P(X = 2)$ then find the value of $P(X = 4)$</td></tr>
<tr><td>Option A:</td><td>0.07754</td></tr>
<tr><td>Option B:</td><td>0.01532</td></tr>
<tr><td>Option C:</td><td>0.08945</td></tr>
<tr><td>Option D:</td><td>0.06879</td></tr>
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<tr><td>Q20.</td><td>The Moment Generating Function about origin of a random variable is $M_0(t) = \frac{3}{3-t}$. Find Mean</td></tr>
<tr><td>Option A:</td><td>$\frac{2}{3}$</td></tr>
<tr><td>Option B:</td><td>$\frac{1}{3}$</td></tr>
<tr><td>Option C:</td><td>$\frac{5}{3}$</td></tr>
<tr><td>Option D:</td><td>$\frac{4}{3}$</td></tr>
<tr><td></td><td></td></tr>
<tr><td>Q21.</td><td>If a sample point lies in the critical region then</td></tr>
<tr><td>Option A:</td><td>Null Hypothesis is Accepted and Alternate Hypothesis is Rejected</td></tr>
<tr><td>Option B:</td><td>Null Hypothesis is Rejected and Alternate Hypothesis is Accepted</td></tr>
<tr><td>Option C:</td><td>Both Null Hypothesis and Alternate Hypothesis are Accepted</td></tr>
<tr><td>Option D:</td><td>Both Null Hypothesis and Alternate Hypothesis are Rejected</td></tr>
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<tr><td>Q22.</td><td>small sample test is used when</td></tr>
<tr><td>Option A:</td><td>sample size $n < 30$</td></tr>
<tr><td>Option B:</td><td>sample size $n \geq 30$</td></tr>
<tr><td>Option C:</td><td>sample size $n = 40$</td></tr>
<tr><td>Option D:</td><td>sample size $n = 50$</td></tr>
<tr><td></td><td></td></tr>
<tr><td>Q23.</td><td>If a random variable X follows Poisson distribution such that $P(X = 0) = 6P(X = 3)$ then find the value of $P(X = 4)$</td></tr>
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Option A:	0.07754
Option B:	0.01532
Option C:	0.08945
Option D:	0.06879
Q24.	A Binomial Distribution of a random variable X is $P(X = r) = {}^{10}C_r \left(\frac{1}{5}\right)^r \left(\frac{4}{5}\right)^r$ then find Variance of X
Option A:	$\frac{3}{5}$
Option B:	$\frac{9}{10}$
Option C:	$\frac{1}{5}$
Option D:	$\frac{8}{5}$
Q25.	The Probability density function of a random variable X is

X	0	1	2	3	4	5	6	7
P(X=x)	k	3k	5k	7k	9k	11k	13k	15k

Find P$(2 < X \leq 5)$

Option A:	$\frac{5}{8}$
Option B:	$\frac{27}{64}$
Option C:	$\frac{1}{2}$
Option D:	$\frac{55}{64}$