Rev2016

Examination: S.E. Semester IV (C0MPUTER Engg.)

Course Name: Applied Maths 1V

Time: 2 hours TOTAL :80 MARK

All the Questions in Question 1(MCQ) are compulsory and carry 2 marks each. (Total 40 marks

Question I

1.	Kuhn Tucker's conditions are used to solve	
Option A:	LPP	
Option B:	NLPP	
Option C:	A matrix equation	
Option D:	Linear equations	
2.	If x is a random variable and f(x) is probability function then $E[e^{tx}]$ Is called	
Option A:	Probability generating function	
Option B:	Moments generating function	
Option C:	Probability distribution function	
Option D:	Characteristic function	
3.	If a random variable X follows Poisson distribution such that $P(X=1)=2P(X=2)$ then find the value of $P(X=4)$	
Option A:	0.07754	
Option B:	0.01532	
Option C:	0.08945	
Option D:	0.06879	
4.	What is the value of the cumulative distribution function at 3, i.e. P (X ≤ 3)?	
Option A:	6/16	
Option B:	10/16	
Option C:	11/16	
Option D:	15/16	
5.	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	
6.	The optimum solution of the LPP Max Z = x_1+4x_2 subject to the constraints $2x_1+x_2\le 3$, $3x_1+5x_2\le 9$ and $x_1,x_2\ge 0$	
Option A:	$(0, {}^{9}/_{5})$	
Option B:	(0,0)	
Option C:	$(\frac{6}{7},\frac{9}{7})$	
Option D:	$(\frac{3}{2},0)$	

7.	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!
8.	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
9.	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 $4w_1 + 3w_2 \geq 7$ $5w_1 - w_2 \geq 2$ $where\ w_1, w_2 \geq 0$
Option B:	Min W = $2w_1 + 9w_2$ subject to $4w_1 + 3w_2 \geq 7$ $5w_1 - w_2 \geq 2$ $where\ w_1, w_2 \geq 0$
Option C:	Min W = $2w_1 + 9w_2$ subject to $4w_1 + 3w_2 \leq 7$ $5w_1 - w_2 \leq 2$ $where\ w_1, w_2 \geq 0$
Option D:	Min W = $2w_1 + 9w_2$ subject to $4w_1 + 3w_2 = 7$ $5w_1 - w_2 = 2$ $where\ w_1, w_2 \geq 0$
10.	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:	$\begin{bmatrix} 2 & 4 \\ 6 & 8 \end{bmatrix}$
11.	The Probability density function of a random variable X is X | 1 | 2 | 3 | 4 | 5 P(X=x) | 4k | 5k | 6k | 9k | 10k Find P($1 < X \leq 4$)

Option A:	$\frac{10}{17}$
Option B:	$\frac{12}{17}$
Option C:	$\frac{13}{17}$
Option D:	$\frac{15}{17}$
12.	The $\int_c (z + z^2)\, dz$ where $\lvert z\rvert$=2
Option A:	$4\pi i$
Option B:	4π
Option C:	$4i$
Option D:	0
13.	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)
14.	Value of the integral $\int_c \frac{sinz}{z-\frac{\pi}{2}}\, dz\ =$
Option A:	$-2\pi i$
Option B:	$2\pi i$
Option C:	$-\pi i$
Option D:	πi
15.	In a standard form of a LPP the constraints are of the type
Option A:	$\geq$
Option B:	$\leq$
Option C:	=
Option D:	<
16.	A random sample of 50 items gives the mean 6.2 and SD 10.24. Then the value of test statistic Z is
Option A:	1.74
Option B:	2.74
Option C:	-1.74
Option D:	4.04
17.	What characteristic of a random variable is described by the expected value?
Option A:	Standard deviation
Option B:	Mean

Option C:	Most likely value
Option D:	Maximum value
18.	What is the expected value of X, E(X)?
Option A:	3
Option B:	0
Option C:	Cannot be determined
Option D:	2
19.	If P(x) = 0.5 and x = 1, then the value of first raw moment is = ?
Option A:	1
Option B:	0.5
Option C:	4
Option D:	2
20.	The eigen values of the Matrix A= $\begin{bmatrix} 1 & 2 & 3 \\ 0 & 2 & 3 \\ 0 & 0 & 3 \end{bmatrix}$ are
Option A:	1,2,3
Option B:	3,3,3
Option C:	1.0.0
Option D:	2,2,0
Question 2	**Answer any 4 questions from 6 questions** **Total : 20 marks**
1.	Find the Eigen values and eigen vectors of A = $\begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$
2.	Find k and E(X) for the p.d.f. f(x) = $\begin{cases} k(x-x^2), 0 \le x \le 1 \\ \quad 0, \quad elsewhere \end{cases}$
3.	Write the dual of the primal Max. Z= $3x_1 + 4x_2$ subject to $x_1 - x_2 \le 1$ $x_1 + x_2 \ge 4$ $x_1 - 3x_2 \le 3$ where $x_1, x_2 \ge 0$
4.	A die was thrown 132 times and the following frequencies were observed No. obtained : 1 2 3 4 5 6 Total Frequency : 15 20 25 15 29 28 132 Test the hypothesis that the die is unbiased.
5.	Evaluate $\int_c \frac{2z-1}{(z+2)(z-6)} dz$ where c is |z|= 4
6.	A discrete random variable has the probability density function given by X : -2 -1 0 1 2 3 P(X=x) : 0.2 k 0.1 2k 0.1 2k Find k, mean and variance.

Question 3	**Answer any 4 questions from 6 questions** **Total : 20 marks**
1.	Find the Laurents series for f(z)=$\frac{z-1}{z^2-2z-3}$ in the region 1<|z|<3
2.	Verify the Cayley Hamilton theorem for A=$\begin{bmatrix} 2 & 3 \\ -2 & -1 \end{bmatrix}$
3.	Find the Binomial distribution if the mean is 4 and variance is 3.
4.	Solve using the Simplex method the LPP Max. Z= $3x_1 + 2x_2$ subject to $x_1 + x_2 \leq 4$ $x_1 - x_2 \leq 2$ Where $x_1, x_2 \geq 0$
5	Evaluate using residue theorem $\int_c \frac{z^2}{(2z+1)(z+1)^2} dz$ where c is |z|=2
6.	Using Normal distribution , find the probability of getting 55 heads in the toss of 100 fair coins.