University of Mumbai

Examination 2020

Program: COMPUTER Engineering

Curriculum Scheme: Rev2016/2012

Examination: Second Year Semester IV

Course Code: E401 and Course Name: Applied Mathematics IV

Time: 1 hour   Max. Marks: 50

===

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

Q1.	Consider a dice with the property that that probability of a face with n dots showing up is proportional to n. The probability of face showing 4 dots is?
Option A:	1/7
Option B:	5/42
Option C:	1/21
Option D:	4/21
Q2.	What would be the probability of an event 'G' if H denotes its complement, according to the axioms of probability?
Option A:	P (G) = 1 / P (H)
Option B:	P (G) = 1 – P (H)
Option C:	P (G) = 1 + P (H)
Option D:	P (G) = P (H)
Q3.	If E(x) = 2 and E(z) = 4, then E(z – x) =?
Option A:	2
Option B:	6
Option C:	0
Option D:	-2
Q4.	Find the expectation of a random variable X?
Option A:	0.5
Option B:	1.5
Option C:	2.5
Option D:	3.5
Q5.	For a Poisson Distribution, if mean(m) = 1, then P(1) is?
Option A:	e

Option B:	1/e
Option C:	e/2
Option D:	0
Q6.	For a standard normal variate, the value of Standard Deviation is
Option A:	0
Option B:	1
Option C:	∞
Option D:	1.5
Q7.	Choose the correct completion of the following statement: If A and B are square matrices such that AB = I, then zero is an eigenvalue of
Option A:	A but not of B
Option B:	B but not of A
Option C:	Both A and B
Option D:	Neither A nor B
Q8.	The shortest distance between two points in a plane is
Option A:	straight line
Option B:	a curve
Option C:	parabola
Option D:	circle
Q9.	Find the population proportion p for an IPL team having total 30 players with 10 overseas players.
Option A:	1/2
Option B:	1/3
Option C:	2/3
Option D:	1/4
Q10.	If 40% of boys opted for maths and 60% of girls opted for maths, then what is the probability that maths is chosen if half of the class's population is girls?
Option A:	0.5
Option B:	0.6
Option C:	0.7
Option D:	0.4
Q11.	Find the Eigenvalue for the given matrix. $A=\begin{bmatrix} 4 & 1 & 3 \\ 1 & 3 & 1 \\ 2 & 0 & 5 \end{bmatrix}$.
Option A:	13, 1, 1
Option B:	-3, 1,3

Option C:	7.1, 3
Option D:	8.3,1
Q12.	Which of the following is not a necessary condition for a matrix, say A, to be diagonalizable?
Option A:	A must have n linearly independent eigen vectors
Option B:	All the eigen values of A must be distinct
Option C:	A can be an idempotent matrix
Option D:	A must have n linearly dependent eigen vectors
Q13.	If F(z) is single valued and analytic everywhere within and on a closed contour then the value of is
Option A:	$-2\pi i$
Option B:	0
Option C:	1
Option D:	-1
Q14.	The line integral of function $f = \int dz$ in the counterclockwise direction, along the circle $x^2+y^2=1$ at $z=1$ is
Option A:	-2π
Option B:	2π
Option C:	π
Option D:	$-\pi$
Q15.	Find the residue at z=0 of the function $$f(z) = \frac{z^2 - sin(z)}{z^2}.$$
Option A:	7/9
Option B:	0
Option C:	1
Option D:	-1
Q16.	The expected value of a discrete random variable 'x' is given by _____
Option A:	P(x)
Option B:	$\Sigma P(x)$
Option C:	$\Sigma x\, P(x)$
Option D:	1
Q17.	Find the Eigenvalues and the type of the given matrix. $$A= \begin{bmatrix} 3 & 10 & 5 \\ -2 & -3 & -4 \\ 3 & 5 & 7 \end{bmatrix}$$

Option A:	3, 1, 3 Non Derogatory
Option B:	2, 2, 2 Derogatory
Option C:	3, 2, 2 Derogatory
Option D:	1, 2, 3 Non Derogatory
Q18.	If a particle in absence of friction will slide from one point to another in the shortest time under the action of gravity then the path is
Option A:	a right circular cone
Option B:	a cone
Option C:	a cylinder
Option D:	a cycloid
Q19.	A bag contains 80 chocolates. This bag has 4 different colors of chocolates in it. If all four colors of chocolates were equally likely to be put in the bag, what would be the expected number of chocolates of each color?
Option A:	12
Option B:	11
Option C:	20
Option D:	9

Q20.

Refer to the discrete probability distribution provided in the table below.

X=x	0	1	2	3	4
P(X=x)	0.040	0.110	0.450	0.230	?

Find the probability that x is equal to 0 or 4. Round to 3 decimal places.

Option A:	0.040
Option B:	0.210
Option C:	0.007
Option D:	1.000
Q21.	The subset { (1,-2), (2,9), (-4,3 } of R^2 is
Option A:	Linearly independent
Option B:	Basis
Option C:	Linearly dependent
Option D:	Conditional Basis
Q22.	The dimension of subspace W = { (x,y,z) / x+y+z = 0 } of R^3 is
Option A:	1
Option B:	3
Option C:	2
Option D:	0
Q23.	The set {1, x, x^2 } is
Option A:	Linearly Independent
Option B:	Linearly Dependent
Option C:	Spans P2
Option D:	Linearly Independent and Spans of P2

Q24.	X is a variate between 0 and 3. The value of E(X2) is
Option A:	8
Option B:	7
Option C:	9
Option D:	27
Q25.	A dice is tossed 120 times with the following results * 2 points
Option A:	Dice is unbiased, 11.3
Option B:	Dice is biased, 12.9
Option C:	Dice is unbiased, 10.9
Option D:	Dice is biased, 12.3