Mahavir Education Trust's

SHAH & ANCHOR KUTCHHI ENGINEERING COLLEGE

Chembur, Mumbai - 400 088

Subject: Applied Mathematics – IV **Branch:** Information Technology **Sem** – IV (CBCS)

Time: 1 hour **Max. Marks:** 50

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Sample Question Paper

Insructions:1] All the Questions are compulsory and carry equal marks

2]. All Questions are Multiple Choice Questions

3] Select the correct answer from the Choices

Q1.	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:	$\frac{5}{3}$
Q2.	A connected planar graph has 10 vertices each of degree 3. In how many ways does a representation of this planar graph split the plane?
Option A:	6
Option B:	5
Option C:	7
Option D:	8
Q3.	The simplest form of Boolean Expression $(A + B)(A + C)$ is
Option A:	$A + BC$
Option B:	BC
Option C:	ABC
Option D:	$A + B + C$
Q4.	Small sample test is used when

Option A:	sample size $n < 30$
Option B:	sample size $n \geq 30$
Option C:	sample size $n = 40$
Option D:	sample size $n = 50$
Q5.	By Euclidean Algorithm, the Greatest Common Divisor of 112 and 144 is _____
Option A:	6
Option B:	16
Option C:	4
Option D:	8
Q6.	Given that $G = \{x \mid x = a + \sqrt{2}\, b, a \,\&\, b \; are \; real \; numbers\}$ is a group under usual multiplication. Find the multiplicative identity element of the group.
Option A:	a
Option B:	b
Option C:	ab
Option D:	1
Q7.	Given that $L = \{1, 3, \ 5, 9, 15, 45\}$ is a Bounded Lattice under the relation divisibility. Find the Greatest element of the Lattice L.
Option A:	1
Option B:	45
Option C:	15
Option D:	3
Q8.	If $15x \equiv 6(mod\ 9)$ then $x =$ ____
Option A:	6
Option B:	8
Option C:	4
Option D:	3
Q9.	A Binomial Distribution of a random variable X is $P(X = r) = {}^{6}C_r \left(\frac{1}{4}\right)^r \left(\frac{3}{4}\right)^r$ then find Variance of X
Option A:	$\frac{3}{4}$
Option B:	$\frac{9}{8}$
Option C:	$\frac{1}{4}$
Option D:	$\frac{3}{8}$

Q10.	If $2x + 3y + 8 = 0$ and $x + 2y - 5 = 0$ are regression lines then means of x & y are
Option A:	$\bar{x} = -11 \ \& \ \bar{y} = 8$
Option B:	$\bar{x} = 25 \ \& \ \bar{y} = 13$
Option C:	$\bar{x} = -5 \ \& \ \bar{y} = 7$
Option D:	$\bar{x} = -31 \ \& \ \bar{y} = 18$
Q11.	A connected planar graph has 9 vertices having degrees 2, 2, 2, 3, 3, 3, 4, 4 and 5. How many edges are there in the graph?
Option A:	12
Option B:	13
Option C:	14
Option D:	15
Q12.	Find value of Jacobi's symbol $\left(\frac{102}{37}\right)$
Option A:	-1
Option B:	0
Option C:	-2
Option D:	1
Q13.	Integral solution of the equation $55x + 34y = 36$ is
Option A:	$x = 16 \ \ \& \ \ y = -21$
Option B:	$x = 15 \ \ \& \ \ y = 23$
Option C:	$x = 26 \ \ \& \ \ y = -41$
Option D:	$x = 20 \ \ \& \ \ y = -11$
Q14.	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:	$\frac{15}{17}$
Q15.	The number of pendent vertices in a binary tree with 15 vertices is

Option A:	6
Option B:	7
Option C:	8
Option D:	9
Q16.	Given that $A = \{2, 3, 6, 12, 24, 36, 72\}$ is a poset under the relation divisibility. Find $2 \wedge 3$.
Option A:	6
Option B:	12
Option C:	2
Option D:	Does not exist
Q17.	Let R be the group of all non-zero real numbers under the operation $a * b = 2ab$. The Identity element of the group $(R,*)$ is _____
Option A:	$\frac{1}{2}$
Option B:	3
Option C:	2
Option D:	$\frac{1}{3}$
Q18.	The number of vertices in 5 – Regular Graph with 20 edges is
Option A:	6
Option B:	8
Option C:	10
Option D:	12
Q19.	The remainder when 5 divides $(56)^{111}$ is _____
Option A:	2
Option B:	1
Option C:	0
Option D:	4
Q20.	The correlation coefficient r for the following data is X: 65, 66, 67, 67, 68, 69, 70, 72 Y: 67, 68, 65, 68, 72, 72, 69, 71
Option A:	0.572
Option B:	−0.264
Option C:	0.974
Option D:	0.6030

Q21.	Given that $Z_5 = \{0, 1, 2, 3, 4\}$ is a group under addition modulo 5. Find the inverse of the element 3.
Option A:	0
Option B:	1
Option C:	2
Option D:	4
Q22.	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
Q23.	The equations of the two regression lines are $3x + 2y = 26 \quad \& \quad 6x + y = 31$. Find the correlation coefficient r.
Option A:	0.65
Option B:	0.79
Option C:	-0.5
Option D:	0.87
Q24.	Given that $L = \{1, 2, 3, 4, 12\}$ is a Lattice under the relation divisibility. Find complement of the element 4.
Option A:	1
Option B:	2
Option C:	12
Option D:	3
Q25.	Find x if $5^{31} \equiv x \ (mod\ 31)$
Option A:	31
Option B:	25
Option C:	5
Option D:	15