

BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: BTECH
BRANCH: CSE/ECE/EEE/CIVIL/MEC/CHE/C&P

SEMESTER: VI
SESSION: SP/2023

SUBJECT: MA428 NUMERICAL AND STATISTICAL METHODS

TIME: 3 Hours

FULL MARKS: 50

INSTRUCTIONS:

1. The question paper contains 5 questions each of 10 marks and total 50 marks.
 2. Attempt all questions.
 3. The missing data, if any, may be assumed suitably.
 4. Before attempting the question paper, be sure that you have got the correct question paper.
 5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.
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		CO	BL
Q.1(a)	Explain Newton Raphson method. When does it fail?	[5]	1 1.10
Q.1(b)	Find a real root of $x^3+x^2+x+7=0$ using bisection method (show three iterations).	[5]	1 1.25
Q.2(a)	Given $f(3)=168$, $f(7)=120$, $f(9)=72$ and $f(10)=63$, estimate $f(6)$.	[5]	2 1.25
Q.2(b)	Explain Gauss-Jordan method for solving a system of linear equations.	[5]	2 1.12
Q.3(a)	What problems are tackled in numerical differentiation and numerical integration?	[5]	3 1.20
Q.3(b)	Evaluate $\int_0^1 (1-x^2)dx$ between the limits 0 and 1 using Trapezoidal rule.	[5]	3 1.25
Q.4(a)	An integer is chosen randomly from the set $\{1, 2, 3, \dots, 200\}$. Find the chance that it is divisible by 6 or 8.	[5]	4 1.25
Q.4(b)	Find the condition under which Binomial distribution has additivity property.	[5]	4 1.30
Q.5(a)	Distinguish between unbiased estimator and consistent estimator. Give an example of an unbiased estimator which is not consistent and a consistent estimator which is not unbiased.	[5]	5 1.23
Q.5(b)	Define the terms null hypothesis, level of significance and power of the test. A die is thrown 63 times and an odd prime occurs 16 times. Is the die fair? Test at 5% level of significance.	[5]	5 1.11

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