

ANNA UNIVERSITY , CHENNAI – 600 025
B.E / B.Tech. DEGREE END SEMESTER EXAMINATIONS, APRIL / MAY 2011
MINING ENGINEERING – IV SEMESTER
MA 9268 - STATISTICS AND NUMERICAL METHODS
(Statistical Tables are Permitted)

(19)

Time : 3 Hours

Answer All Questions

Max. Marks : 100

Part – A (10 x 2 = 20)

1. Explain Type I and Type II errors in testing of hypothesis?
2. Explain the terms critical region and acceptance region in testing of hypothesis?
3. Explain the basic principles of experimental design?
4. Compare randomized block design with latin square design?
5. What is the condition for convergence of Newton – Raphson method?
6. What is the condition for convergence of Gauss – Jacobi method?
7. Explain the terms interpolation and extrapolation?
8. What is the order of the error in Simpson's one third rule?
9. Write down the modified Euler's formula and how do you reduce the error in the solution?
10. By Taylor series method, find $y(1.1)$ given that $y' = x + y$, $y(1) = 0$?

PART – B (5 X 16 = 80)

- 11.i). The mean life of 10 electric motors was found to be 1450 hrs with a s.d of 423 hrs. A second sample of 17 motors chosen from a different batch showed a mean life of 1280 hrs with a s.d of 398 hrs. Is there a significant difference between means of the two samples?
- ii). Can vaccination be regarded as preventive measure of small – pox as evidenced by the following data. Of 1482 persons exposed to small pox in a locality , 368 in all were attacked. Of there 1482 persons, 343 were vaccinated and of these only 35 were attacked?

- 12.a). A randomized block experiment was laid out to test 4 varieties of manure A , B , C , D and the yields per acre are given below. Test for the significance of the difference among the 4 varieties of manure.

Block I	A155	B152	C157	D156
Block II	B152	C150	D156	A154
Block III	C156	D153	A161	B162
Block IV	D153	A154	B156	C155

(OR)

- b). Analyse the variance in the following Latin square.

B20	C17	D25	A34
A23	D21	C15	B24
D24	A26	B21	C19
C26	B23	A27	D22

13. a.i). Find the positive root of $2x - \log_{10} x = 7$ correct to three decimal places using Newton's method?

- ii). Find the inverse of the matrix $\begin{bmatrix} 1 & 3 & 7 \\ 4 & 2 & 3 \\ 1 & 2 & 1 \end{bmatrix}$ by Gauss-Jordan method?

(OR)

b.i). Solve the following system of equations using Jacobi's method.

$$30x - 2y + 3z = 75, \quad 2x + 2y + 18z = 30, \quad x + 17y - 2z = 48.$$

ii). Using power method, find the dominant eigen value and the corresponding

eigen vector of the matrix
$$\begin{bmatrix} -15 & 4 & 3 \\ 10 & -12 & 6 \\ 20 & -4 & 2 \end{bmatrix}$$

14.a.i). Use Lagrange's formula to find the value x corresponding to y=100 from the given table;

x :	3	5	7	9	11
y :	6	24	58	108	174

ii). Find f(2), f(8) and f(15) for the following data using Newton's divided difference formula.

x :	4	5	7	10	11	13
f(x) :	48	100	294	900	1210	2028

(OR)

b.i). From the following data find y at x=43 and x=84 by using Newton's interpolation formula.

x :	40	50	60	70	80	90
y :	184	204	226	250	276	304

ii). Evaluate $\int_4^{5.2} \log_e x dx$ by using Simpson's rule.

15.a). Using Runge–Kutta method of fourth order, solve $\frac{dy}{dx} = \frac{1}{2}(1+x)y^2$
with $y(0)=1$ at $x = 0.1, 0.2$ and 0.3 .

(OR)

b). Using Taylor's series method, solve $\frac{dy}{dx} = xy + y^2$, $y(0)=1$ at
 $x=0.1, x=0.2, x=0.3$ and continue the solution at $x=0.4$ by
Milne's method.
