Reg. No. ....

Name ....

(3 pages)

K 5148

FINAL YEAR B.Sc. DEGREE EXAMINATION, MARCH/APRIL 2005

Part III—Group (vii)—Statistics (Main)

Paper VI—COMPUTER PROGRAMMING AND LINEAR PROGRAMMING

Time : Three Hours | Maximum : 65 Marks

Not more than 13 marks will be awarded from each unit.

Unit I

1. What is a flowchart ? Draw a flowchart for finding minimum of two values. (3 marks)
2. Distinguish between STOP and END statements. (3 marks)
3. Write BASIC expression for the following algebraic expressions :—

   (i) $ax^2 + \frac{b}{x^2} + e^{-ax}$.

   (ii) $\sin\left(\cos\left(\frac{a - x}{b - y}\right)\right)$.

   (4 marks)
4. Explain different types of constants in BASIC. (4 marks)
5. Discuss the hierarchy of arithmetic and logical operators. (6 marks)
6. Expain the INPUT and PRINT statements. (6 marks)

Unit II

7. Explain the SAVE and LOAD statements. (4 marks)
8. Specify the general syntax of IF statement and explain. (4 marks)
9. How are the subscripted variables declared ? Write down the rules governing the subscripts.

   (4 marks)
10. Explain the OPEN and CLOSE statements. (4 marks)
11. Write down the general form of subroutines in BASIC and explain with an illustration. (5 marks)
12. What is a sequential file ? How is it created ? Illustrate through an example. (5 marks)

Unit III

13. Develop a program to compute the coefficient of variation for a discrete series of n-values, where coefficient of variation $= \frac{\text{standard deviation}}{\text{mean}} * 100$.

    (6 marks)

Turn over

14. Given a set of pair of values (x_i, y_i), $i = 1, 2, \ldots, n$ write a program to fit a straight line of the form $Y = a + bX$.

(6 marks)

15. Write a program for computing the Chi-square value for testing the independence of attributes in a $m \times n$ contingency table.

(7 marks)

16. Develop a program for $\int_0^1 \left(\frac{3x^2 + 5}{2x - 3}\right) dx$ using Simpson's $\frac{1}{3}$rd rule. (7 marks)

Unit IV

17. Discuss the general Linear Programming problem. (3 marks)

18. Define the following terms :—

    (i) Feasible solution.

    (ii) Optimum solution.

(3 marks)

19. What are slack and surplus variables ? For what purposes are they included in a L.P.P. Give illustrations.

(4 marks)

20. Three grades of coal A, B and C contain ash and phosphorus as impurities. In a particular industrial process, a fuel obtained by blending the above grades containing not more than 28 % ash and 0.08 % phosphorus is required. The maximum demand for fuel is 1000 tons. Assuming that there is an unlimited suply of each grade of coal and there is no loss of blending, formulate the blending problem to minimise the cost using the following details :—

Coal Grade		*% Ash*	*% Phosphorus*	*Cost per ton (Rs.)*
A	...	20	0.04	250
B	...	30	0.02	300
C	...	40	0.05	325

(4 marks)

21. Using graphical method, solve the following problem :—

    Maximise : $Z = 2x_1 + 4x_2$

    subject to the constraints :

    $$x_1 + 2x_2 \le 6$$
    $$x_1 + x_2 \le 4$$
    $$x_1, x_2 \ge 0.$$

(6 marks)

22. Solve the following Linear programming problem by the simplex method :—

Maximize : $Z = 3x_1 + 2x_2$

subject to the constraints :

$x_1 + x_2 \le 4$

$x_1 - x_2 \le 2$

$x_1, x_2 \ge 0.$

(6 marks)

Unit V

23. Discuss the problem of degeneracy in L.P.P. (3 marks)

24. What is an artificial variable ? Discuss its role in solving L.P.P. (3 marks)

25. Using Big M method, obtain the solution of the L.P.P. given below :

Maximize : $Z = 12x_1 + 15x_2 + 9x_3$

subject to :

$8x_1 + 16x_2 + 12x_3 \le 250$

$4x_1 + 8x_2 + 10x_3 \ge 80$

$7x_1 + 9x_2 + 8x_3 = 105.$

(10 marks)

26. Five jobs A, B, C, D and E will have to be assigned to five technicians P, Q, R, S and T. The number of hours each technicians would take to perform each job is given below. How should the jobs be assigned to the technicians so that the total time is minimised ?

Technician

		P	Q	R	S	T
	A	3	5	10	15	8
	B	4	7	15	18	8
Job	C	8	12	20	20	12
	D	5	5	8	10	6
	E	10	10	15	25	10

(10 marks)