

Date : 03/11/2007
Time : 9:00 - 12:00 AM

Dept. No.

Max. : 100 Marks

ANSWER ALL QUESTIONS.

I. (a) What is Social Science research? What are the purposes of Social Science research?

(or)

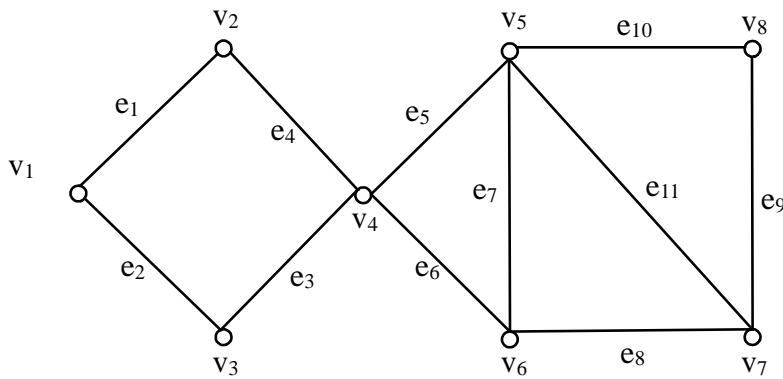
(b) Explain the general qualities of a good researcher. (5 marks)

(c) Discuss the utilities of social science research.

(or)

(d) Define the term 'hypothesis'. Explain the various types and the sources of hypothesis. (15 marks)

II. (a) Find the bonds in the following graph.



(or)

(b) Explain Chinese postman problem with an example. (5 marks)

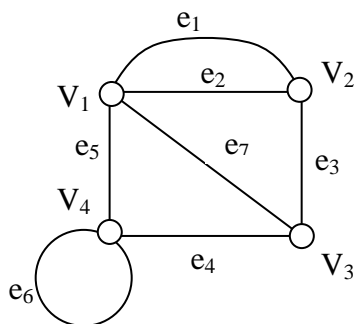
(c) Define the following terms each with an example.

(i) Path (ii) Weighted graph (iii) Edge cut (iv) Cut vertex (v) Cut edge. (15 marks)

(or)

(d) (i) Define adjacency matrix and incidence matrix.

(ii) Find the adjacency matrix and incidence matrix for the following graph



(iii) Define Hamiltonian graph with an example. (4 + 8 + 3 marks)

III. (a) Write brief notes on the types of sampling.

(or)

(b) Certain crosses of pea gave 5321 yellow and 1804 green seeds. The expectation is 25 percent of green seeds on a Mendelian hypothesis. Can the divergence from the expected value have arisen from the fluctuation of simple sampling only? (5 marks)

(c) Calculate the standard deviation of the following two series. Which shows greater deviation?

Series A	192	288	236	229	184	260	348	291	330	243
Series B	83	87	93	109	124	126	126	101	102	108

(or)

(d) In a random sample of 500 persons in a town, 200 are found to be consumers of cheese. In a sample of 400 from another sample B, 200 are found to be consumers of cheese. Does the data reveal that a significant difference between A and B as far as the proportion of cheese consumers is concerned?

(15 marks)

IV. (a) Define general transportation problem.

(or)

(b) What are the rules to be followed for the construction of a network? (5 marks)

(c) The manager of an oil refinery must decide on the optimum mix of two possible blending processes of which the input and output production runs are as follows:

Process	Input		Output	
	Crude A	Crude B	Gasoline X	Gasoline Y
1	6	4	6	9
2	5	6	5	5

The maximum amounts available of crudes A and B are 250 units and 200 units respectively. Market demand shows that at least 150 units of gasoline X and 130 units of gasoline Y must be produced. The profits per production run from process 1 and process 2 are Rs.4 and Rs.5 respectively. Formulate the problem mathematically for maximizing the profit and solve it graphically.

(or)

(d) Solve the following linear programming problem by simplex method.

Maximize $z = 3x + 2y$ subject to constraints $x + y \leq 4$, $x - y \leq 2$, and $x \geq 0$, $y \geq 0$. (15 marks)

V. (a) Solve the following assignment problem.

	E	F	G	H
A	18	26	17	11
B	13	28	14	26
C	38	19	18	15
D	19	26	24	10

(or)

(b) Explain briefly synaptic Connection Matrices. (5 marks)

(c) (i) Describe FAMs as mappings.

(ii) Define Fuzzy Hebb Matrix.

(iii) Construct a fuzzy Hebb matrix M given the input $A = (.3 \ .4 \ .8 \ 1)$ recalled fit vector

$B = (.2 \ .6 \ .5)$ upon max-min composition: $A \circ M = B$. (5 + 4 + 6 marks)

(or)

(d) Obtain Initial Basic Feasible Solution of the transportation problem using all three methods and optimize the solution using the best starting solution by MODI method.

	D ₁	D ₂	D ₃	D ₄	Supply
S ₁	3	7	6	4	5
S ₂	2	4	3	2	2
S ₃	4	3	8	5	3
Demand	3	3	2	2	

(15 marks)
