2 NOV - Dec - 15 (Regular)

Total No. of Questions :12]

NOV-15

SEAT No. : 5293

P1933

[Total No. of Pages :6

[4861]-305
S.Y. M.C.A. (Engg.)
OPERATIONS RESEARCH
(2013 Course) (Semester - III) (410905)

Time : 3 Hours] *[Max. Marks :50*

Instructions to the candidates:

1) ***Attempt Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8, Q9 or Q10, Q11 or Q12.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***All questions are compulsory.***
4) ***Figures to the right side indicate full marks.***
5) ***Use of electronic pocket calculator is allowed.***
6) ***Assume suitable data, if necessary.***

Q1) a) Solve the following LPP by the Simplex method. **[6]**

Max $z = 11x_1 + 4x_2$

Subject to constraint

$7x_1+6x_2<=84$

$4x_1+2x_2<=32$

$x_1,x_2>=0$

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b) Discuss the properties of LP model. **[3]**

OR

Q2) a) Explain **[3]**

i) Slack Variable

ii) Feasible solution

iii) Optimum Solution

b) Solve the following LPP by the Graphical method. **[6]**

Max $z = 9x + 13y$

Subject to constraint

$2X + 3Y <=18$

$2X + Y<=10$

$x_1,x_2>=0$

P.T.O.

Q3) Find basic feasible solution by using **[8]**

a) North West corner method

b) VAM

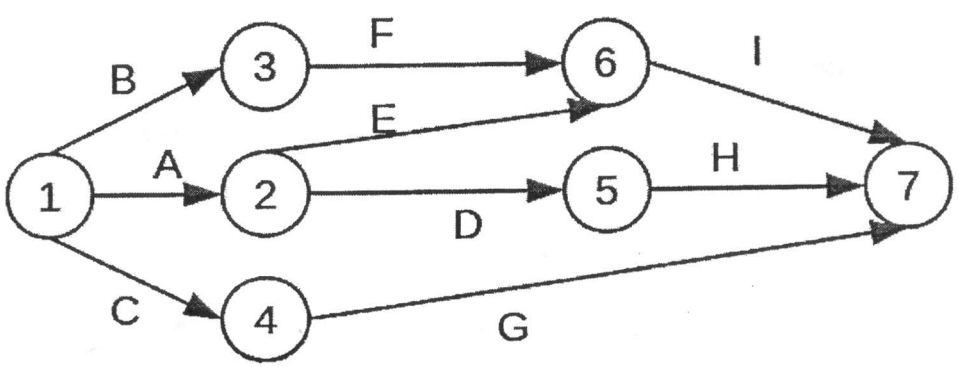
	1	2	3	4	Supply
	10	2	20	11	15
	12	7	9	20	25
	4	14	16	18	10
Demand	5	15	15	15	

OR

Q4) Solve the given problem of Assignment using Hungarian method. **[8]**

	A	B	C	D
1	1	4	6	3
2	9	7	10	9
3	4	5	11	7
4	8	7	8	5

Q5) A project is represented by the network. **[8]**



Task	a	m	b
A	5	8	10
B	18	20	22
C	26	33	40
D	16	18	20
E	15	20	25
F	6	9	12
G	7	10	12
H	7	8	9
I	3	4	5

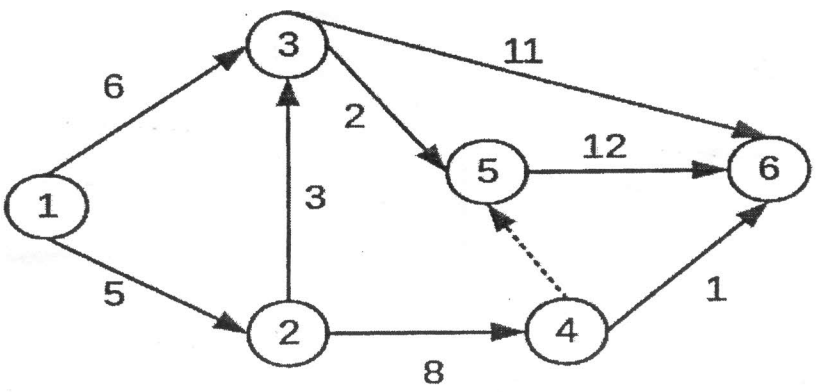
a) Determine Expected time & Variance

b) The critical path

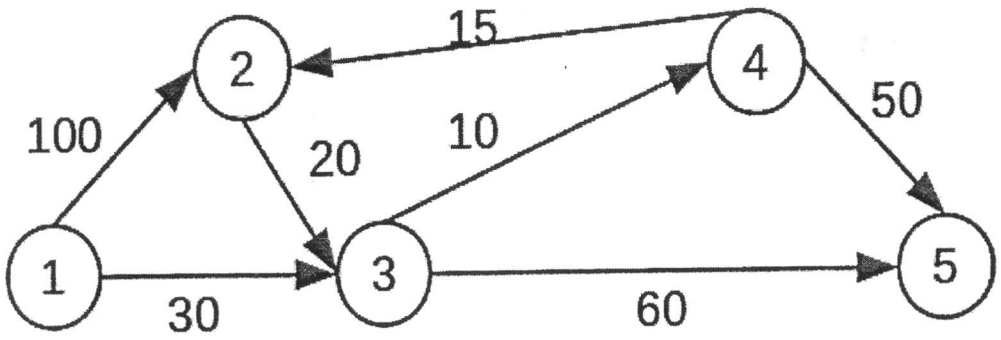
c) The possibility of node occurring at the proposed completion date if the original contract time of the completing project is 41.5 weeks.

OR

Q6) Determine critical path for the project network using forward & backward pass. **[8]**

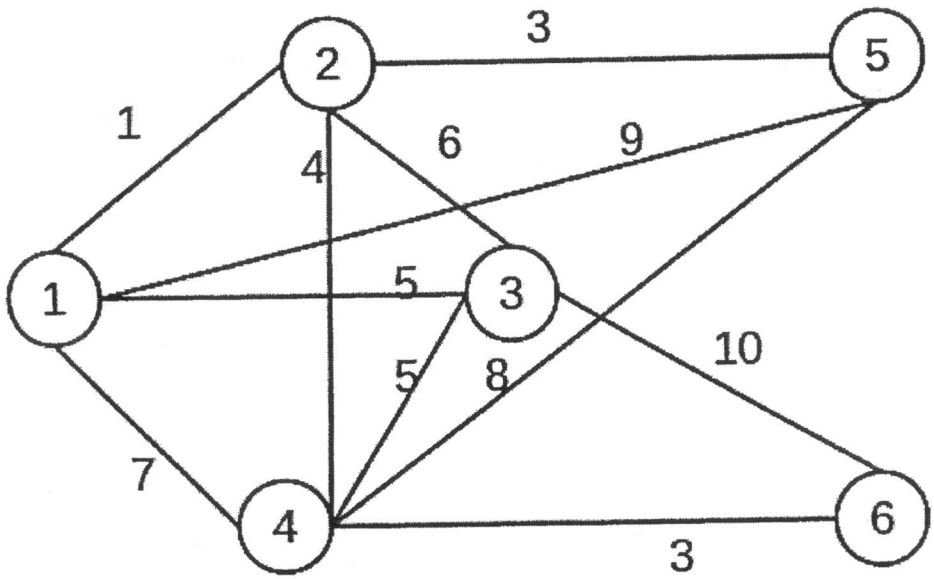


Q7) The network in following figure gives the permissible routes & their lengths in miles between city (node 1) and four other cities (nodes 2 to 5). Determine the shortest routes between city 1 and each of the reaming four cities. Find the shortest route using Dijkstra's algorithm. [9]



OR

Q8) Midwest TV cable company is in the process of providing cable service to 5 new housing development areas. The following figure depicts possible TV linkages among the 5 areas. The cable miles shown on each arc. Determine the most economical cable network. Draw minimum spanning tree & calculate shortest path. [9]



Q9) a) What are the characteristics of decision making? **[4]**

b) **[4]**

	S1	S2	S3	S4
a1	5	10	18	25
a2	8	87	12	23
a3	21	18	12	21
a4	30	22	19	15

Find decision using

i) Laplace

ii) Hurwicz

iii) Regret

iv) Maximin

OR

*Q10)*a) What is decision under risk? **[4]**

b) Suppose that following weights are specified for the simulation of Rahul & Rekha. **[4]**

p=0.5, p1=0.17, p2=0.83, p11=0.129, p12=0.277, p13=0.594, p21=0.545, p22=0.273, p23=0.182

q=0.5, q1=0.3, q2=0.7, q11=0.2, q12=0.3, q13=0.5, q21=0.5, q22=0.2, q23=0.3

Based on this information find the ranking.

*Q11)*a) Write steps in Monte Carlo simulation. **[4]**

b) Generate 4 random numbers **[4]**

b = 17, c=111, m = 103, seed =7

OR

Q12) a) A bakery keeps a stock of popular brand of coke. Previous experience shows that the daily demand pattern for the item with associated probabilities is given below. **[6]**

Daily Demand	0	10	20	30	40	50
Probability	0.01	0.20	0.15	0.50	0.12	0.02

Simulate the demand for next 10 days. Also find the average demand/ day.

Random numbers- 25, 39, 65, 76, 12, 5, 73, 89, 19, 49

b) What is simulation? What are the factors affecting simulation? **[2]**