B.Com. (Hons) DEGREE EXAMINATION,NOVEMBER 2018
I Year II Semester
Core Major- Paper VII
OPERATIONS RESEARCH

Time : 3 Hours **Max.marks :75**

Section A $(10 \times 2 = 20)$ Marks

Answer **ALL** the questions

1. Define OR.
2. List out the uses of transportation problem.
3. What do you mean by critical path
4. List out the features of queuing model.
5. What is saddle point?
6. The following table gives the activities of a construction project and duration (in days).

Activity	1-2	1-3	2-3	2-4	3-4	4-5
Duration	20	25	10	12	6	10

   Draw the network diagram and find the critical path.

7. Solve the transportation problem

	D1	D2	D3	D4	Supply
Q1	1	2	1	4	30
Q2	3	3	2	1	50
Q3	4	2	5	9	20
Demand	20	40	30	10	100

8. What do you mean by dominance property- explain with example
9. For a single server with Poisson arrival and exponential service time, the arrival rate is 12 per hour. Which one of the following services rates will provide a steady finite queue length?
10. Solve the game, whose payoff matrix is given below.

		Player-B		
		I	II	III
Player A	I	-2	15	-2
	II	-5	-6	-4
	III	-5	20	-8

Section B $(5 \times 5 = 25)$ Marks

Answer any **FIVE** questions

11. What are the steps in solving LPP using graphical method.
12. Mark the feasible regions represented by constraints in equations.

    $X_1 + X_2 \leq 1;$

    $3X_1 + X_2 \geq 3$

    $X_1, X_2 \geq 0$

    $Z = x_1 + X_2$
13. Solve the following minimal assignment problem.

		Worker			
		A	B	C	D
	1	41	72	39	52
Job	2	22	29	49	65
	3	27	39	60	51
	4	45	50	48	52

14. Solve the following transportation problem.

	W1	W2	W3	W4	Supply
F1	48	60	56	58	140
F2	45	55	53	60	260
F3	50	65	60	62	360
F4	52	64	55	61	220
Demand	200	320	250	210	

15. Draw the network diagram from the following

Activity	1-2	1-3	2-3	2-4	3-4	4-5
Duration -days	20	25	10	12	6	10

16. Solve the following game.

$$\begin{bmatrix} 3 & -2 \\ -2 & 5 \end{bmatrix}$$

17. The cost of making an item is Rs.25 and selling price is Rs.30. If it is not sold with in a week and it can be disposed for Rs.20 at the end of the week.

    Fond the optimum number of units to be produsd per week.

Weekly sales	≤ 3	4	5	6	7	≥ 8
No.of weeks	0	10	20	40	30	0

18. Following are the records of demand for the past 300 days.

Demand in('000) units	Probability
10	0.06
11	0.30
12	0.40
13	0.20
14	0.04

It costs Rs. 15 make an item which sells for Rs. 20 normally but at the end of the day the surplus has to be disposed at Rs. 10 per item. What is the optimum output? Also find EVPI.

Section C $(2 \times 15 = 30)$ Marks

PART - A - Case Study - Compulsory Question

19. A project has the following characteristics. Find out critical path and minium time required to complete the project.

Activity	Duration-weeks	predecessors
A	6	-
B	8	A
C	4	A
D	9	B
E	2	C
F	7	D

PART - B

Answer any **ONE** questions

20. Solve the problem using simplex method.

Max $Z = 4X_1 + 7X_2$

Subject to $4X1 + 3X2 \leq 12$,

$3X1 + 4X2 \leq 12$

$X1, X2 \geq 0$

21. Solve the problem using MODI method

	A	B	C	D	Demand
S1	7	4	3	4	15
S2	3	2	7	5	25
S3	4	4	3	7	20
S4	9	7	5	3	40
supply	12	8	35	25	