Sanjay Ghodawat University, Kolhapur
Established as State Private University under Govt. of Maharashtra. Act No XL, 2017

2018-19
EXM/P/09/01

Year and Program: **SYBBA 2018-19**

School of Management

Department of Management

Course Code: MBC201

Course Title: Operations Research Techniques

Semester – III

Day and Date: Thursday 30/5/2019

End Semester Examination (ESE)

Time: 3 Hrs. 10-30 am to 1·30 pm

Max Marks: 100

Instructions:
1) All questions are compulsory.
2) Assume suitable data wherever necessary.
3) Use of non.Programmable calculator is allowed.

Q.1	**Solve the following**	Marks	Bloom's Level	CO
a)	Solve the following L.P.P. by graphical method	07	L4	CO2

$$\text{Max } Z = 5X_1 + 7X_2$$

$$\text{Subject to } X_1 + X_2 \leq 4$$

$$3X_1 + 8X_2 \leq 24$$

$$10X_1 + 7X_2 \leq 35$$

$$\text{and } X_1, X_2 \geq 0$$

OR

a)	Solve the following L.P.P. by graphical method	07	L4	CO2

$$\text{Min } Z = 3X_1 + 2X_2$$

$$\text{Subject to } 5X_1 + X_2 \geq 10$$

$$X_1 + X_2 \geq 6$$

$$X_1 + 4X_2 \geq 12$$

$$\text{and } X_1, X_2 \geq 0$$

ESE
Page 1/5

b) Solve the following transportation problem by VAM and obtain an optimal solution by MODI method. 08 L4 CO3

	D1	D2	D3	D4	Supply
O1	2	2	2	1	3
O2	10	8	5	4	7
O3	7	6	6	8	5
Demand	4	3	4	4	15

OR

b) Obtain Initial basic Feasible Solution by N-W corner rule and Least cost method. 08 L4 CO3

	1	2	3	Supply
A	2	7	4	5
B	3	3	1	8
C	5	4	7	7
D	1	6	7	14
Demand	7	9	18	34

Q.2 **Solve the following**

a) Apply the Hungarian assignment method to solve the minimal assignment problem whose effectiveness matrix is given below 07 L3 CO3

	A	B	C	D
I	1	4	6	3
II	9	7	10	9
III	4	5	11	7
IV	8	7	8	5

ESE
Page 2/5

b)	The annual demand for an item is 3200 units. The unit cost is Rs.3 and inventory carrying charges is 25% per annum. If the cost of one procurement is Rs.150 then Determine i)EOQ ii)No. of order per year iii)the optimal cost	08	L4	CO4
	OR			
b)	A stockist has to supply 12000 units of a product per year to his customer. The demand is fixed and known and the shortage cost is assumed is to be infinite. The inventory holding cost is Rs.0.20 per unit per month and the ordering cost per order is Rs. 350, determine i)the optimum lot size ii)minimum total yearly cost	08	L4	CO4
Q.3	**Solve any Two**			
a)	Explain the scope of OR as applicable to business and industry.	08	L2	CO1
b)	Explain classical transportation problem and write it mathematical formulation.	08	L2	CO1
c)	Explain Hungarian method in the context of an assignment problem.	08	L2	CO1
d)	Explain the various costs associated with inventory.	08	L2	CO1
Q.4	**Solve any Two**			
a)	Draw the network and find critical path for the following project.	09	L3	CO4

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

b)	Draw the network and find critical path for the following project.	09	L3	CO4

Activity	1-2	1-3	2-4	3-4	3-5	4-5	4-6	5-6
Duration(Days)	6	5	10	3	4	6	2	9

ESE

c) Draw the network and find critical path for the following project. 09 L3 CO4

Activity	A	B	C	D	E	F	G
Immediate Predecessor	-	A	A	B	C	D	D,E
Optimistic Time	3	3	2	4	4	3	2
Most likely Time	3	6	4	6	6	4	5
Pessimistic Time	3	9	6	8	8	5	8

Q.5 **Solve any Two**

a) From the pay off table shown below , decide which is optimal act 09 L3 CO4

	Strategies		
Events	A_1	A_2	A_3
S_1	50	-20	-100
S_2	100	110	200
S_3	300	500	250

$P(S_1) = 0.4, P(S_2) = 0.5, P(S_3) = 0.1$

b) The following table shows possible pay off for the manufacturing company expansion decision. Determine the strategy by using Maximax and Maximin criteria. 09 L3 CO4

Alternative	State of nature (Product demand)			
	High	Moderate	Low	Nil
Expand	50000	25000	-25000	-45000
Construct	70000	30000	-40000	-80000
Subcontract	30000	15000	-1000	-10000

c) Explain the decision making under the conditions of certainty and uncertainty 09 L2 CO1

ESE

page 4/5

Q.6 **Solve any Three**

a) Construct a network diagram for the following — 06 — L3 — CO4

Activity	A	B	C	D	E	F
Immediate Predecessor	-	A	-	B,C	C	D,E

b) Explain 1) Optimistic time
2) Pessimistic time — 06 — L2 — CO1

c) Construct a network diagram for the following — 06 — L3 — CO4

Activity									
1-2	1-3	1-4	2-5	3-6	3-7	4-6	5-8	6-9	7-8	7-9

d) Explain Clearly the following terms — 06 — L2 — CO1

i) State of nature
ii) Payoff table
iii) Opportunity loss

*****

ESE
Page 5/5