Sanjay Ghodawat University, Kolhapur 2018-19

Established as State Private University under Govt. of Maharashtra. Act No XL, 2017 EXM/P/09/01

Year and Program:2018-19 **School of Management** **Department of SY BBA II**

Course Code: MBC201 **Course Title: Operations Research Techniques** **Semester – III**

Day and Date: Friday, 30/11/2018 **End Semester Examination (ESE)** **Time: 2.30 to 5.30 pm**

Max Marks: 100

Instructions:
1) All questions are compulsory.
2) Assume suitable data wherever necessary.
3) Figures to the right indicate full marks.

Q.1 **Solve any Two**

		Marks	Bloom's Level	CO
a)	Solve the following L.P.P. by graphical method Min $Z= 20X_1 +10X_2$ Subject to $X_1 +2X_2 \leq 40$ $3X_1 +X_2 \geq 30$ $4X_1 +3X_2 \geq 60$ and $X_1 ,X_2 \leq 0$	07	L4	CO201.2

OR

		Marks	Bloom's Level	CO
a)	Solve the following L.P.P. by graphical method Max $Z = 45X_1 + 80X_2$ Subject to $5X_1 +20X_2 \leq 400$ $10X_1 +15X_2 \leq 450$ and $X_1 ,X_2 \leq 0$	07	L4	CO201.2
b)	Solve the following transportation problem by VAM and obtain an optimal solution by MODI by method.	08	L4	CO201.3

	D	E	F	Supply
A	5	8	4	50
B	6	6	3	40
C	3	9	6	60
Demand	20	95	35	

OR

b) Solve the following transportation problem to minimize cost. obtain IBFS by VAM — 08 — L4 — CO201.3

	1	2	3	Supply
A	7	10	5	90
B	12	9	4	50
C	7	3	11	80
D	9	5	7	60
Demand	120	100	110	

Q.2 **Solve any Two**

a) Apply the Hungarian assignment method to solve the following Assignment Problem. — 07 — L3 — CO201.3

		Men			
Work		1	2	3	4
	I	12	30	21	15
	II	18	33	9	31
	III	44	25	24	21
	IV	23	30	28	14

OR

a) Apply the Hungarian assignment method to Solve the minimal assignment problem whose effectiveness matrix is given below — 07 — L3 — CO201.3

	I	II	III	IV
I	2	3	4	5
II	4	5	6	7
III	7	8	9	8
IV	3	5	8	4

b)	An aircrafts uses rivets at an approximately constant rate of 5000 kg per year. The rivets cost Rs.20 per kg. and the company personnel estimate that it costs Rs.200 to place an order, and the carrying cost of inventory is 10 % per year. How frequently should orders for rivets be placed and what quantities should be ordered for?	08	L4	CO201.4
	OR			
b)	A contractor has to supply 10000 bearings per day to an automobile manufacturer. He finds that when he starts production run, he can produce 25000 bearings per day. The cost of holding bearings in stock for a year is Rs.2 and the set up cost of a production run is Rs.1800. Calculate EBQ and No. of production run in year? (No. of working days in year = 300)	08	L4	CO201.4
Q.3	**Solve any Two**			
a)	Explain the concept, scope of OR as applicable to business and industry.	08	L2	CO201.1
b)	Explain classical transportation problem and write it mathematical formulation.	08	L2	CO201.1
c)	What is unbalanced assignment problem? How is the Hungarian Assignment Method applied in respect of such a problem?	08	L2	CO201.1
d)	What are the various costs associated with inventory. Represent the relationship between various inventory cost.	08	L2	CO201.1
Q.4	**Solve any Two**			
a)	Draw the network and find critical path for the following project.	09	L3	CO201.4

Activity	1-2	1-3	2-4	2-6	3-4	4-5	4-6	5-7	6-7	7-8
Duration(Days)	10	11	13	14	10	7	17	13	9	1

b) Draw the network and find critical path for the following project. 09 L3 CO201.4

Activity	1-2	1-3	2-4	2-5	3-4	4-5
Duration(Days)	6	5	5	8	5	2

c) Draw the network and find critical path for the following project. 09 L3 CO201.4

Activity	A	B	C	D	E	F	G
Immediate Predecessor	-	-	A	A	B,C	D	E
Optimistic Time	2	3	4	4	2	3	3
Most likely Time	4	5	5	5	4	4	5
Pessimistic Time	6	7	6	12	12	11	7

Q.5 **Solve any Two**

a) In the following table pay-off of three Acts A_1, A_2, A_3 and the state of the nature S_1, S_2, S_3 probabilities of state of nature are 0.2 , 0.5 , and 0.3 respectively. Calculate EMV and determine optimum strategy. 09 L3 CO201.4

Act / State	A_1	A_2	A_3	Probabilities
S_1	50	-20	-100	0.2
S_2	100	110	200	0.5
S_3	300	500	250	0.3

b) Explain the following terms

1)Course of Action 2) State of nature 3) Payoff table 09 L2 CO201.1

c) A farmer wants to decide which of the three crops he should plant om his 100 acre farm. The profit from each is dependent on the rainfall during the growing season. The farmer has categorized the amount of rainfall as High, medium and low. His estimated profit for each is shown in the table below

09 L3 CO201.4

Rainfall	Estimated Conditional Profit(Rs)		
	Crop A	Crop B	Crop C
High	8000	3500	5000
Medium	45000	4500	5000
low	2000	5000	4000

If the farmer wishes to plant only one crop, decide which should be his 'best crop' using Maximin Criterion

Q.6 **Solve any Three**

a) Construct a network diagram for the following

06 L3 CO201.4

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

b) Define 1) Activity
2)Event

06 L2 CO201.1

c) Construct a network diagram for the following

06 L3 CO201.4

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

d) Explain the types of Decision making situations.

06 L2 CO201.1

*****