NEW

2017

M B A

2nd Semester Examination

OPERATIONS RESEARCH

PAPER—MBA-205

Full Marks : 100

Time : 3 Hours

The figures in the right-hand margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Illustrate the answers wherever necessary.

1. Answer any *eight* of the following :　　　　8×5

   (a) State the applications of network analysis.

   (b) Define the following terms :
      (i) Dangling, and
      (ii) Looping in drawing networks.

   (c) State the objectives of inventory control.

   (d) Write a short note on Customers' Behaviour relating to queueing theory.

(e) What are the components of Ordering Cost and Carrying Cost in relation to inventory problem ? How do they behave ? 3+2

(f) Explain, in brief, different types of floats in network analysis.

(g) What are the applied areas of OR in management ?

(h) Clearly distinguish between slack variable and artificial slack variable with examples.

(i) State the importances of assignement problem in business.

(j) Write the dual form of LPP from the following LPP :

Max $Z = 7x_1 + 5x_2$

Subject to $x_1 + 2x_2 \leq 6$

$4x_1 + 3x_2 \leq 12$

Where $x_1, x_2 \geq 0$.

(k) Old hens can be bought at Rs.2 each and young ones at Rs.5 each. The old hens lay 4 eggs per week and the young ones lay 6 eggs per week; each egg being worth 50 paise. If there are only Rs.70 available to spend on purchasing the hens and if it is not possible to house more than 20 hens at a time, how many of each kind of hens should be bought in order to have a maximum profit per week. Formule the above problem as a LPP.

(Continued)

(l) Find the initial basic solution of the following transportaion problem using least cost method.

	D_1	D_2	D_3	D_4	Supply
O_1 →	4	6	9	5	16
O_2 →	2	6	4	1	12
O_3 →	5	7	2	9	15
Demand →	12	14	9	8	

2. Answer any *four* of the following : 4×10

(a) A project has the following activities :

<u>Activity</u>	<u>Duration (Days)</u>
1–2	2
1–3	4
1–4	3
2–5	1
3–5	6
4–6	5
5–6	7

You are required to :

(i) Draw the project network.

(ii) Find the critical path and total project duration.

(iii) Find earliest start time, latest start time, earliest finish time and latest finsih time. 2+4+4

(b) (i) An airlines organisation has one resrevation clerk on duty in its local branch at any given time. The clerk handles informations regarding passenger reservations and flight timings. Assume that the number of customers arriving during any given period is poisson distributed with an arrival rate of eight per hour and that the reservation clerk can service a customer in six minutes on an average with an exponentially distributed service time.

   (1) What is the probability that the system is busy ?

   (2) What is the average time a customer spends in the system ?

   (3) What is the average length of the queue and what is the average number of customers in the system ?   2+2+2

   (ii) State the assumptions and applications of queueing theory.   2+2

(c) Describe the inventory model of economic lot size system with uniform demand.   10

(d) Solve the following LPP using simplex method :

Maximise $Z = 5x + 6y$

Subject to $x + y \leq 5$

$2x + 3y \leq 12$

where $x \geq 0$, $y \geq 0$.

(e) Find the optimal solution of the following transportation problem using MODI method.

To → From ↓	D	E	F	Supply
A	6	4	1	50
B	3	8	7	40
C	4	4	2	60
Demand	20	95	35	

(f) Solve the following assignment problem to determine
  (i) Optimal job assignment, and
  (ii) the cost of assignments.

		Job				
		1	2	3	4	5
	A	10	3	3	2	8
	B	9	7	8	2	7
Mechanic	C	7	5	6	2	4
	D	3	5	8	2	4
	E	9	10	9	6	10

[Internal Assessment : 20]

(Turn Over)