

Reg. No. _____ Name _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
THIRD TRIMESTER MBA DEGREE EXAMINATION APRIL 2018

36 OPERATIONS RESEARCH

Max. Marks: 60

Duration: 3 Hours

Any missing data shall be assumed. All assumptions must be clearly stated.
Use of statistical tables and graph sheets are permitted, if necessary.

PART A

Answer all questions. Each question carries 2 marks

1. Explain the *Degeneracy* in LPP.
2. Explain '*Unbalanced Transportation Problems*', using an example.
3. Describe '*Duality*' in LPP.
4. "*A Decision Tree is highly useful to a decision maker in multi-stage situations*". Discuss.
5. List down the different *time estimates* and the *expected time* in PERT.

PART B

Answer any 3 questions. Each question carries 10 marks

6. Solve the given LPP using Simplex method:

$$\begin{aligned} \text{Maximize, } & Z = 4x_1 + 10x_2 \\ \text{Subject to: } & 2x_1 + x_2 \leq 50 \\ & 2x_1 + 5x_2 \leq 100 \\ & 2x_1 + 3x_2 \leq 90 \text{ and} \\ & x_1, x_2 \geq 0 \end{aligned}$$

7. Find the Initial Solution to the following TP using VAM:

		<i>Destination</i>				
		D1	D2	D3	D4	
<i>Factory</i>	F1	3	3	4	1	100
	F2	4	2	4	2	125
	F3	1	5	3	2	75
	<i>Demand</i>	120	80	75	25	

8. a) Discuss the *MODI method*, in detail. (4)
 b) Write short notes on: i) *Degeneracy in Simplex Method*, and ii) *Sensitivity Analysis*. (6)
9. A retailer purchases strawberries every morning at Rs.60 per case and sells for Rs.90 per case. Any case remaining unsold at the end of the day can be disposed off next day at a salvage value of Rs. 30 per case. Post sales have ranged from 12 to 15 cases per day. The following is the record of sales for the past 120 days.

No .of days	12	24	36	48
Cases sold	12	13	14	15

Determine how many cases of strawberries the retailer should purchase per day to maximize his profit.

10. a) Discuss *Laplace Criterion* and *Hurwicz Criterion*. (4)
 b) Write short notes on : i) CPM and ii) PERT. (6)

PART C

Compulsory question, the question carries 20 marks

11. a) At a car workshop, on an average, a customer arrives every 5 minutes and on an average, the service time is 4 minutes per customer. Suppose that the inter arrival time follows Poisson distribution and the service time are exponentially distributed. Calculate :
- Traffic Intensity
 - Idle Time
 - No. customers in the system
 - Queue Length
 - Expected time spent in the system , and
 - Expected waiting time in the Queue. (10)

- b) Solve the game whose pay-off matrix is :

	<i>Player B</i>	
<i>Player A</i>	3	5
	4	1

(10)
