

INDIAN MARITIME UNIVERSITY
(A Central University, Government of India)

December 2016 End Semester Examinations

**Fourth Semester – Master of Business Administration
International Transportation and Logistics (2009 batch)**

Operations Research (PG22T1403)

Date : 15.12.2016

Time: 3 Hrs

Maximum Marks: 75

Pass Marks : 38

SECTION-A

(10x 1= 10 Marks)

(Answer All Questions)

- 1) A dummy activity in a network consumes
 - (a) Minimum resources
 - (b) Adequate resources
 - (c) No resources
 - (d) All the above
- 2) A Basic Feasible Solution means
 - (a) Costs are minimized
 - (b) Benefits are maximized
 - (c) An optimal solution is not possible
 - (d) An acceptable solution
- 3) Dual to the dual is
 - (a) Negative
 - (b) Zero.
 - (c) Primal
 - (d) A degenerate value
- 4) Vogel's method is used to obtain
 - a) Saddle point
 - b) A feasible solution
 - c) An optimal solution
 - d) A pricing decision

5) Critical path in a network

- (a) is the shortest path in the network
- (b) is the longest path in the network
- (c) contains no dummy activities
- (d) contains few dummy activities

6) Shadow price indicate

- a) the optimal solution
- b) the feasible solution
- c) the worth of the resources
- d) none of the above

7) In game theory when pure strategy does not yields equilibrium point

- (a) No further action is taken
- (b) The mixed strategy with probability is obtained
- (c) The mixed strategy with certainty is identified
- (d) Additional information is needed

8) Mean arrival rate of cars (following Poisson distribution) at a toll gate is 90 per hour and average time of passing the gate is 38 seconds. The traffic intensity

- (a) $18/25$
- (b) $19/20$
- (c) $21/35$
- (d) $20/25$

9) Baulking in waiting line occurs

- (a) When customer decides not to enter the waiting line
- (b) When customer leaves the waiting line
- (c) When arrival follows Poisson distribution
- (d) When service follows exponential distribution

10) PERT network is used

- (a) when time elements are known with certainty
- (b) when time elements are estimated
- (c) when project has no definite starting point
- (d) when project has a definite starting point

SECTION-B**(5x 5= 25 Marks)****(Answer ANY FIVE Questions. All Questions carry equal marks)**

11. What is the role of operations research in solving management problems? Explain with examples.
12. Explain the role of network analysis in project management. How cost-benefit analysis is performed?
13. Customers arrive to a shop at the rate of 30 per hour. Service by staff takes an average of 1 minute per customer.
 - i. Calculate the mean customer time
 - a. Spent waiting in line
 - b. Spent waiting for service
 - ii. Find the mean number of persons
 - a. in line
 - b. Waiting for service
14. Maximise Using LPP approach
 $Z = 3x$
 Subject to $60x + 120y \leq 12000$, $8x + 5y \leq 600$, $3x + 4y \leq 500$ & $x, y \geq 0$
15. Explain the waiting line theory in decision making and discuss its applications customer service
16. Formulate the dual problem for the following LPP
 Minimise $Z = 10x + 20y$
 Subject to $3x + 2y \geq 18$,
 $x + 3y \geq 8$,
 $2x - y \leq 6$ and $X, Y \geq 0$
17. Explain how linear programming method is used in transportation problems . What are the assumptions made in linear programming approach?

SECTION - C**(4 x 10 = 40 Marks)****(Question No.18 is compulsory. Answer any THREE from the remaining questions)**

18. A project comprises of the following activities and relevant information to such activities are given below :
- | Task | A | B | C | D | E | F | G | H | I | J |
|----------------|-----|------|-----|---|---|---|-----|-----|-----|---|
| PREVIOUS .TASK | --- | ---- | A&B | B | A | C | E&F | D&F | G&H | I |
| TIME IN WEEKS | 3 | 8 | 4 | 2 | 1 | 7 | 5 | 6 | 8 | 9 |

- Draw the network
- Identify the critical path
- What is the expected duration of the project
- What action you might take to complete the project by 42 weeks?

19. A firm has 4 factories (source) manufacturing goods which are to be transported to 4 destinations. The cost details, requirements, availability at the source is given. Derive an optimal strategy of transportation of goods from factories to destinations at optimal cost.

		Destinations (Freight cost /unit)				
		1	2	3	4	Supply
Source	1	25	55	40	60	60
Source	2	35	30	50	40	140
Source	3	36	45	26	66	150
Source	4	35	30	41	50	50
Demand		90	100	120	140	

20. What is meant by float of an activity? Discuss the difference between PERT and CPM networks. What is meant by resource levelling?

21. Solve the following L P P

$$\text{Maximise } M = 6X + 10Y + 2Z$$

SUBJECT TO

$$2X + 4Y + 3Z \leq 40, \quad X + Y \leq 10, \quad 2Y + Z \leq 12 \quad X, Y, Z \geq 0$$

22. For The Following Activities, immediate preceding activity (I. P.A) and time estimates are given. Calculate the Expected Project Duration and associated Probability. Also Calculate The Variance of the Project. Do you think that the probability of completing the project in 18 days is more than 50%?

Activity	I P A	Time estimates
A	----	1, 1, 7
B	----	1, 4, 7
C	-----	2, 2, 8
D	A	1, 1, 1
E	B	2, 5, 14
F	C	2, 5, 8
G	D & E	3, 6, 15

- 23) In a marketing game between 2 firms the outcome for various strategies is given below:
Solve the game and indicate optimum strategy for X and Y and the value of the game .

		Y's strategy			
		Y1	Y2	Y3	Y4
X'S STRATEGY	X1	8	5	-7	9
	X2	-6	6	4	- 2
