DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

B. Tech. (All Branches) (Semester – V) Elective II

End Semester Examination November 2017

Sub.: Quantitative Techniques in Project Management (QTPM) **Time: 03 Hours**

Max. Marks: 70

Instructions to the Student:

1. Question No. 1 is compulsory.
2. All questions are compulsory. However, there is internal choice among them.
3. Clearly mention the main question number along with the sub questions.

Que. 1: Select the right choice from the given answers 10

1. Which of the following assertation is true of an optimal solution to an LPP?

(a) Every LP has an optimal solution
(b) Optimal solution has always occurs at extreme points
(c) If an optimal solution exists, there will be at least one at a corner
(d) All of the given

2. In a balanced transportation model where supply equals demand -----

(a) all constraints are equalities
(b) none of the constraints are equalities
(c) all constraints are in equalities
(d) none of the constraints are inequalities

3. The replacement policy that is imposed on an item irrespective of its failure is ------

(a) Group replacement
(b) Individual replacement,
(c) Repair spare replacement,
(d) Successive replacement.

4. An assignment problem is a special form of transportation problem where all supply and demand values equal to -----

(a) Zero
(b) two
(c) one
(d) three

5. In an ----------inventory system a constant amount is ordered when inventory declines to a predetermined level.

(a) Economic
(b) Optional
(c) Periodic
(d) Continuous

6. In a departmental store customers arrive at a rate of 20 customers per hour. The average no. of customers that can be handled by cashier is 24 per hour. Probability that cashier is idle?

(a) 1
(b) 1/6
(c) 5
(d) 5/6

7. In VAM method, the opportunity cost associated with a row ------

(a) the difference between the smallest cost and the next smallest cost in the row
(b) the difference between the smallest unused cost and the next smallest unused cost in the row
(c) the difference between the smallest cost and next smallest unused cost in the row
(d) None of the above

8. Which of the following is not a rule of network construction?

(a) Each defined activity is represented by one and only one arrow

(b) A network should have only initial and one terminal node

(c) Identical initial and final nodes can identify two activities

(d) Only as few dummy activities should be included as is warranted

9. The ---------- allows which determination of the early start, early finish, late start and late finish.

(a) Three point estimates

(b) Flow chart technique

(c) Precedence diagramming method

(d) Critical pat method

10. Which of the following does not generate changes to the project documents?

(a) Define Activities

(b) Sequence Activities

(c) Estimate Activity resources

(d) Estimate Activity durations

Que. 2 Solve the following:

(a) A paper mill produces mainly two grades of papers X and Y owing to raw material restrictions; it cannot produce more than 400 Tonnes of grade X and 300 Tonnes of grade Y in a week. There are 160 production hours in a week. It requires 0.2 and 0.4 hours to produce a tonne of products X and Y respectively with corresponding profits of Rs. 200 and Rs. 500 per tonne. Formulate the above as LPP and find the optimum product mix using graphical method. 8

(b) Give comparison between Graphical Method and Simplex Method of solving LPP. 4

Que. 3. Solve the following:

(a) Solve the traveling salesman problem by using the data given below:

C12 = 20, C13 = 4, C14 = 10, C23 = 5, C34 = 6, C25 = 10, C35 = 6, C45 = 20 and Cij = Cji . And there is no route between cities ' i ' and ' j ' if a value for Cij is not given in the statement of the problem. (i and j are = 1,2,..5). 6

(b) Solve the following Transportation Problem using VAM and determine the total cost initial basic feasible solution. 6

	Destinations					
Source	A	B	C	D	E	Supply
W	20	19	14	21	16	40
X	15	20	13	19	16	60
Y	18	15	18	20	---	70
Z	0	0	0	0	0	50
Demand	30	40	50	40	60	

Que. 4 Solve the following:

(a) In large maintenance department fitters draw parts from the parts stores, which is at present staffed by one storekeeper. The maintenance foreman is concerned about the time spent by fitters in getting parts and wants to know if the employment of a stores helper would be worthwhile. On investigation it is found that: 6

(1) A simple queue situation exists,

(2) Fitters cost Rs. 2.50 per hour,
(3) The storekeeper costs Rs. 2/- per hour and can deal on an average with 10 fitters per hour.
(4) A labour can be employed at Rs. 1.75 per hour and would increase the capacity of the stores to 12 per hour.
(5) On an average 8 fitters visit the stores each hour.

(b) An auto rickshaw owner finds from his previous records that the cost per year of running an auto rickshaw whose purchase cost is Rs. 7000/- is as given below:

Year	1	2	3	4	5	6	7	8
Running cost in Rs.	1100	1300	1500	1900	2400	2900	3500	4100
Resale value in Rs.	3100	1600	850	475	300	300	300	300

At what age the replacement is due? 6

Que. 5 Solve any two of the following:
(a) Describe with a flow chart a scientific inventory control system. How the ABC classification of the inventory is done? Explain. 6

(b) Find the optimal order quantity for a product for which the price breaks are as under:

Quantity	Unit cost in Rs. per unit
$0 \leq q1 < 500$	10.00
$500 \leq q2 < 750$	9.25
$750 \leq q3 < \infty$	8.75

The monthly demand for the product is 200 units. The cost of storage is 2% of the unit cost and the cost of ordering is Rs. 350/- per order. 6

(c) Explain the following terms with suitable examples and sketch wherever necessary.
(1) Set up cost (2) Holding cost (3) Shortage cost, (4) Re order point (5) Fixed order quantity (6) Fixed order interval 6

Que. 6 Solve the following:
(a) A small project is composed of 7 activities whose time estimates are listed below. Activities are being identified by their beginning (i) and ending (j) node numbers. 9

Activities		Time in weeks		
i	j	to	tm	tp
1	2	1	1	7
1	3	1	4	7
1	4	2	2	8
2	5	1	1	1
3	5	2	5	14
4	6	2	5	8
5	6	3	6	15

1. Draw the network
2. Calculate the expected variances for each
3. Find the expected project completed time

(b) Explain with suitable freehand sketches a Fulkerson rule of Network Numbering. 3

OR

Que. 6 A project consists of 4 activities. Their logical relationship and time taken is given along with crash time and cost details. If the indirect cost is Rs. 2000/- per week, find the optimal duration and optimal cost. 12

Activity	Immediately preceding activity	Normal		Crash	
		Time in days	Cost In Rs.	Time in days	Cost In Rs.
A	---	4	4000	2	12000
B	A	5	3000	2	7500
C	A	7	3600	5	6000
D	B	4	5000	2	10000

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