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**BBA (II) 4th Semester (N. S.) 2014-17
Examination – July, 2021**

QUANTITATIVE TECHNIQUES

Paper : BBA-II-N-403

Time : Three Hours]

[Maximum Marks : 80

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Section-A, consisting of 8 short answer type questions is *compulsory*. In Section-B you are to attempt *four* questions selecting *one* from each Unit. All questions carry equal marks.

1. Define the following :

(a) Simulation Analysis

- (b) Branch and Bound Method
- (c) Infeasible Assignment
- (d) Vogel's Approximation Method
- (e) Multichannel Queuing System
- (f) Expected Opportunity Loss
- (g) Order Point (OP)
- (h) Simulation Model

UNIT – I

2. Give the importance of quantitative techniques for decision making. Also explain in brief different phases of OR for problem solving.

3. A company produces two types of leather belts, type A and B. Belt A is superior quality and belt B is of lower quality. Profits on each belts are Rs 40 and Rs. 30 per belt respectively. Each belt of type A requires twice as much time as required by a belt of type B. If all the belts were of type B, the company could produce 1000 per day. Belt A requires a fancy buckles and only 400 buckles are available for this per day. For belt of type B, only 700 buckles are available per day. How should the company manufacture the two types of belts in order to have maximum overall profit ?

UNIT - II

4. A production control superintendent finds the following information on his desk. In departments A, B and C, the number of surplus pallets is 18, 27 and 21 respectively. In department G, H, I and J the number of pallets required is 14, 12, 23 and 17 respectively. The time in minutes to move pallets from one department to another is given below.

| To From | G | H | I | J |
|------------|----|----|----|----|
| A | 13 | 25 | 12 | 21 |
| B | 18 | 23 | 14 | 9 |
| C | 23 | 15 | 12 | 16 |

What is the optimal distribution plan to minimize the moving time ?

5. A computer centre has got four expert programmers. The centre needs four application programmes to be developed. The head of the computer centre, after studying carefully the Programmes to be developed, estimates the computer time (in minutes) required by the respective experts to develop the application programmes as follows :

| | | Programmes | | | |
|-------------|---|------------|-----|-----|-----|
| | | A | B | C | D |
| Programmers | 1 | 120 | 100 | 80 | 90 |
| | 2 | 80 | 90 | 110 | 70 |
| | 3 | 110 | 140 | 120 | 100 |
| | 4 | 90 | 90 | 80 | 90 |

Assign the programmers to the programme in such a way that the total computer time is minimum.

UNIT - III

6. Define :

- (a) Critical Path
- (b) Slack time
- (c) Total float
- (d) Free float
- (e) Independent float
- (f) Activity variance
- (g) Project variance

in the context of network models.

7. Product manager has planned a list of activities culminating in the inaugurate launch of the new products.

These are given in the table below :

| Activity | pert 3 time estimates days | | | Immediate Predecessor (s) |
|----------|----------------------------|----|----|---------------------------|
| | P | M | O | |
| a | 20 | 10 | 5 | - |
| b | 12 | 7 | 5 | - |
| c | 12 | 10 | 8 | a |
| d | 40 | 20 | 6 | c |
| e | 90 | 60 | 30 | d |
| f | 14 | 10 | 7 | d |
| g | 50 | 30 | 20 | c |
| h | 12 | 10 | 8 | e, f, g |
| i | 6 | 4 | 3 | b |
| j | 1 | 1 | 1 | h, i |

What is the probability that product manager will be able to complete the language launch within 80 days-time ?

UNIT – IV

8. Explain the fields of application of queuing theory and the main characteristics of queuing system.
9. For the following game, find optimal strategies of A and B and value of game using principal of dominance :

| Player B | B1 | B2 | B3 | B4 |
|----------|----|----|----|----|
| Player A | | | | |
| A1 | 7 | 6 | 8 | 9 |
| A2 | -4 | -3 | 9 | 10 |
| A3 | 3 | 0 | 4 | 2 |
| A4 | 10 | 5 | -2 | 0 |