B. B. A. (Sem. VI) (CBCS) (W.E.F.-2019) Examination
April – 2022
Advanced Operations Research Techniques
(Stat. Grp.)
(New Course)

Time : $2\frac{1}{2}$ Hours]   [Total Marks : **70**

Instruction : Attempt all questions.

1   (a)   Differentiate between PERT and CPM.   **10**

    (b)   Explain briefly types of float used in network analysis.   **10**

OR

1   The time estimates for various activities in a construction   **20**
    project are given below :

Activity	Time estimates		
	Optimistic time	Most likely time	Pessimistic time
1 – 2	10	12	16
2 – 3	2	8	36
2 – 4	1	4	5
2 – 6	2	3	4
3 – 5	8	12	20
4 – 5	15	18	30
4 – 6	3	5	8
5 – 7	2	4	8
6 – 7	6	9	12
7 – 8	4	6	14

(a)   Draw network diagram.

(b)   Calculate expected time for each activity and variance of
      each activity.

(c)   Determine the critical path.

2 (a) What is sequencing ? State the assumptions in   **10**
        sequencing.

   (b) Discuss about the algorithm for processing '*n*' jobs   **10**
        through 2 machines.

OR

2 Find out optimum sequence for the given data and also find   **20**
   total time and ideal time for each machine :

Product	p_1	p_2	p_3	p_4	p_5	p_6	p_7	p_8
Machine M_1	30	45	15	20	80	120	65	10
Machine M_2	20	30	50	35	34	40	50	20

3 Explain briefly Hungarian method for solving an assignment   **15**
   problem.

OR

3 A company wants to undertake an order for a customer. The   **15**
   order involves four tasks *A, B, C* and *D*. Four workers W_1, W_2, W_3
   and W_4 are available for doing the tasks. Each worker will be
   assigned only one task. The company manager wishes to minimize
   the labour hours to complete the order. The time required for
   each worker to complete each task are shown below in table :
   Task labour time (in hours)

Worker	Job			
	A	B	C	D
W_1	5	3	1	5
W_2	6	6	2	7
W_3	5	5	3	8
W_4	8	2	4	3

How the manager will assign the tasks to the workers so that
the total time for completion of all the four tasks is minimised ?

4   Explain in detail Replacement problem. Also discuss various   **15** types of replacement situation.

<center>**OR**</center>

4   A purchase price of machine is Rs. 80,000. It's maintenance   **15** cost and resale value are as follows. After what time machine should be replaced ?

Year	1	2	3	4	5	6	7
Maintenance Cost	1000	1200	1600	2400	3000	3900	5000
Resale Value (in '000 Rs.)	75	72	70	65	58	50	45

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