**DMBA205 Operations Research**

**Assignment Set – 1**

1. What is Operations Research? Write in brief the advantages and limitations of Operations Research.

2. Solve the given linear programming problem:

Maximize Z = 3x1 + 2x2 + x3

Subject to: -3x1 + 2x2 + 2x3 = 8

-3x1 + 4x2 + x3 = 7

where x1, x2, x3 ≥ 0

3. Find the Initial Basic Feasible Solution (IBFS) using VAM and Optimal solution using MODI method for the given transportation problem.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | D1 | D2 | D3 | D4 | Supply |
| S1 | 21 | 16 | 25 | 13 | 11 |
| S2 | 17 | 18 | 14 | 23 | 13 |
| S3 | 32 | 27 | 18 | 41 | 19 |
| Demand | 6 | 10 | 12 | 15 |  |

**Assignment Set – 2**

4. A company has four zones open and four salesmen available for assignments. The zones are not equally rich in their sales potentials. It is estimated that a typical salesman operating in each zone would bring in the following annual sales:

|  |  |
| --- | --- |
| Zone A | Rs. 126000 |
| Zone B | Rs. 105000 |
| Zone C | Rs. 84000 |
| Zone D | Rs. 63000 |

The four salesmen are also considered to differ in ability. It is estimated that working under the same conditions their yearly sales would be proportionately as follows:

Salesman P:7; Salesman Q: 5; Salesman R:5; Salesman S:4

If the criterion is maximum expected total sales, it is expected to assign the best salesman to the richest zone and the next best to the second richest zone and so on. Solve the given assignment problem using Hungarian Method.

5a. What is Queuing system? Briefly explain the important Operating characteristics of Queuing system.

b. A self-service store employs one cashier at its counter. An average of 9 customers arrives every 5 minutes while the cashier can serve 10 customers in 5 minutes. Assuming Poisson distribution for arrival rate and exponential distribution for service rate, find

i. Average number of customers in the system.

ii. Average number of customers in queue or average queue length.

iii. Average time a customer spends in the system.

iv. Average time a customer waits before being served.

6. What is Simulation? Write in detail the steps used in simulation processes.

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