

Dr. Babasaheb Ambedkar Open University
Term End Examination July – 2026

Course : Diploma Course
Subject Code : DOR-01
Subject Name : Basics of Operation Research

Date : 06/07/2026
Time : 11:30am to 01:45pm
Duration : 02.15 Hours
Max. Marks : 70

Q-1 Define Operation Research and describe various Operation Research models? 14

OR

The manager of Raja Ltd. must decide on the optimal mix of two blending processes, for which the inputs and outputs per production run are as follows:

Process	Input (units)		Output (units)	
	Crude A	Crude B	Gasoline X	Gasoline Y
Process 1	5	3	5	8
Process 2	4	5	4	4

The maximum amounts available of Crude A and Crude B are 200 units and 150 units, respectively. the Market Requirements shows that Atleast 100 units of Gasoline X and 80 units of Gasoline Y must be produced. The profits per production run of Process 1 and Process 2 are Rs. 300 and Rs. 400, respectively. Express this as a linear programming problem.

Q-2 Describe the history of Operation Research and explain procedure of operation research? 14

OR

Parul Ltd. has two machines A and B. He manufactures two products P and Q on these machines. For manufacturing product P he has to use machine A for 3 hours and machine B for 6 hours, and for manufacturing product Q he has to use machine A for 6 hours and machine B for 5 hours. On each unit of P he earns Rs. 4 and on each unit of Q he earns Rs. 5. How many units of P and Q should be manufactured to get maximum profit? Each machine may not be used for more than 2100 hours.

Q-3 Explain the features and Scope of Operation Research? 14

OR

Explain Advantages and limitations of Linear Programming?

Q-4 Question-4 explain Assumptions and Application areas of Linear Programming? 14

OR

Avishkar Ltd. produces three types of parts for automatic washing machines. It purchases casting of the parts from a local foundry and then finishes the part on drilling. shaping and polishing machines.

The selling prices of parts A, B and C, respectively are Rs 8, Rs 10 and Rs 14. All parts. made may be sold. Castings for parts A, B and C, respectively cost Rs 5, Rs 6 and Rs 10.

The shop possesses only one of each type of machine. Costs per hour to run each of the three machines are Rs 20 for drilling, Rs 30 for shaping and Rs 30 for polishing. The capacities (parts per hour) for each part on each machine are shown in the following table:

Machine	Part A	Part B	Part C
Drilling	25	40	25
Shaping	25	20	20
Polishing	40	30	40

The management of the shop wants to know how many parts of each type it should produce per hour in. order to maximize profit for an hour's run. Formulate this problem as an LP model so as to maximize-total profit to the company.

1. Explain opportunities and shortcomings of Operation Research approach
2. Explain relation of operation research and decision making.
3. Explain the structure of Linear Programming model
4. Explain The Graphical method of Linear Programming
5. Explain extreme point enumeration approach

(B) Choose the correct option for the questions given below and write the answer. 05

1. Operation Research (O.R.) activities originally started during which war?
(A) First World War (B) Second World War
(C) Gulf War (D) Indo-Pak War
2. According to H.M. Wagner, "O.R. is a scientific approach to problem solving for _____ management."
(A) Executive (B) Lower (C) Supervisor (D) Worker
3. How many basic phases are there in the Operation Research (O.R.) procedure?
(A) 2 (B) 3 (C) 4 (D) 5
4. In a Linear Programming (LP) model, the limitations or restrictions on the use of scarce resources are called _____.
(A) Objective functions (B) Decision variables
(C) Constraints (D) Solutions
5. In a Linear Programming (LP) model, all decision variables must be _____.
(A) Negative (B) Zero only
(C) Non-negative (D) Negative or infinite
