

MTH601 Final Term Examination Paper – Operations Research

FALL 2006 Session 2

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Marks= M= 65

Time: 120 min

MTH601 - Operations Research - Q. No. 1 (M - 10)

Children Hospital Lahore has monthly demand of 6000 units of a tablet named Flagyl. Each tablet cost Rs. 6 and the cost of one purchase is Rs. 950. Keeping that stock for a year in the hospitals cost Rs. 3 per unit. The shortage cost for a year is Rs. 10 per unit, determine the following

- (i). The Optimum Order Quantity
- (ii). The time between the orders
- (iii). The number of orders per year
- (iv). The Optimum Shortages
- (v). The time of orders being held

MTH601 - Operations Research - Q. No. 2 (M - 10)

Solve the following problem with Big M – Method.

$$\text{Minimize. } Z = 3X_1 + 2X_2 + X_3$$

Subject to.

$$X_1 + X_2 = 7$$

$$3X_1 + X_2 + X_3 \geq 10$$

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$$X_1, X_2, X_3 \geq 0$$

MTH601 - Operations Research - Q. No. 3 (M - 10)

Write the DUAL of the following primal problem.

$$\text{Maximize. } Z = 5 X_1 + 2 X_2$$

Subject to.

$$-X_1 + X_2 \leq -2$$

$$2 X_1 + 3 X_2 \leq 5$$

$$X_1, X_2 \geq 0$$

MTH601 - Operations Research - Q. No. 4 (M - 10)

Solve the transportation model starting with the Vogel's Approximation Method.

	1	2	3	4	Supply
1	10	2	20	11	15
2	12	7	9	20	25
3	4	14	16	18	10
Demand	5	15	15	15	

MTH601 - Operations Research - Q. No. 5 (M - 10)

In a college, every 15 minutes one student arrives for admission information. The staff in the only information counter takes 10 minutes for serving a student on an average. State suitable assumption and find.

I. The average queue length.

II. Increase in the arrival rate in order to justify for second counter (when the waiting time of a student is at least 15 minutes the management will increase one more counter).

MTH601 - Operations Research - Q. No. 6 (M - 10)

A machine costs Rs. 8000. Annual operating cost are Rs. 1000 for the first year, and then increase by Rs. 500 every year. Resale price are Rs. 4000 for the first year and then decrease by Rs. 500 every year. Determine at which age it is profitable to replace the machine.

MTH601 - Operations Research - Q. No. 7 (M - 1)

An unrestricted primal variable will result in an equality dual constraint.

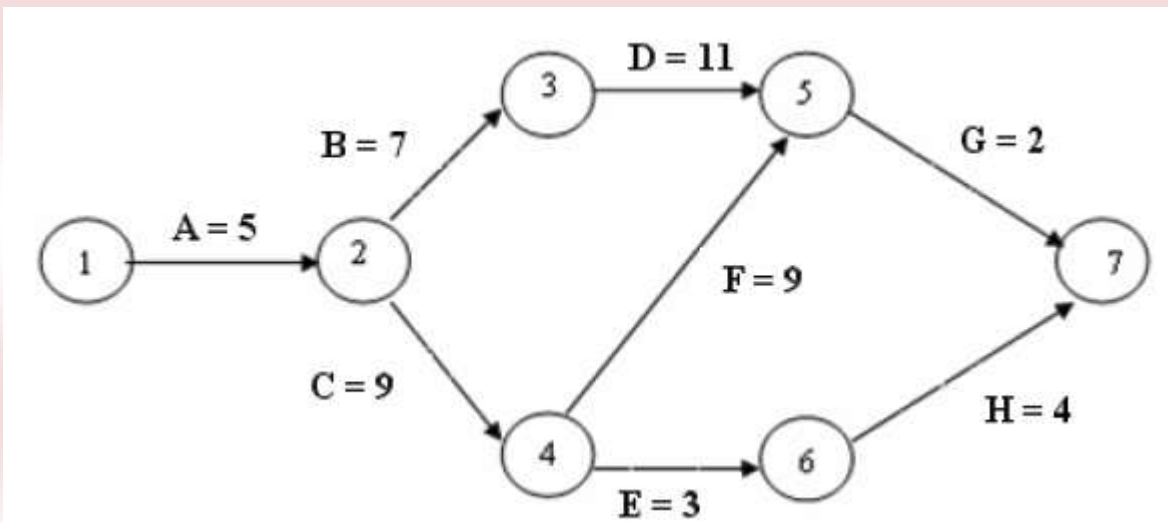
- ▶ True
- ▶ False

MTH601 - Operations Research - Q. No. 8 (M - 1)

In purchasing model with shortage, the formula of order size is

- ▶ $Q^* = \sqrt{\frac{2C_2D}{C_3}}$
- ▶ $Q^* = \sqrt{\frac{2C_2D}{C_3}} \sqrt{\frac{C_3+C_4}{C_4}}$
- ▶ $Q^* = \sqrt{\frac{2C_2D}{C_3}} \sqrt{\frac{R}{R-D}}$
- ▶ $Q^* = \sqrt{\frac{2C_2D}{C_3(1-D/R)}} \sqrt{\frac{C_3+C_4}{C_4}}$

MTH601 - Operations Research - Q. No. 9 (M - 1)



In Above Network Diagram the critical path is

- ▶ (a) A – B – D – G
- ▶ (b) A – C – E – H
- ▶ (c) A – C – F – G
- ▶ (d) Both (a) and (c)

MTH601 - Operations Research - Q. No. 10 (M - 1)

In assignment problem each job requires

- ▶ Exactly one resource
- ▶ At least one resource
- ▶ At most one resource

MTH601 - Operations Research - Q. No. 11 (M - 1)

The dual of the dual problem yields the original primal

- ▶ True
- ▶ False