Solve the following Problems:
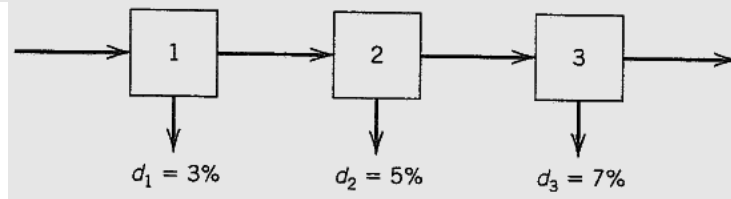
Problem #1 (10 Points)

Consider a simple three-step manufacturing process as illustrated in the given figure. Assuming that demand is 1,000 units, what is the required input to meet demand? You'll note that the required input is the same if the scrap rates are reversed for processes 1 and 3. Assume that the scrap cost is $5 at process 1, $10 at process 2, and $15 at process 3. The defective rates are 3%, 5%, and 7%, respectively. Compute the total scrap cost for the given system and the system where the scrap rates are reversed. Which system would be preferred?


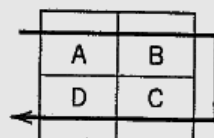$d_1 = 3\%$ $d_2 = 5\%$ $d_3 = 7\%$

Problem #2 (10 Points)

A company produces four products in its production facility. The facility has four departments labeled A–D. The routing information, production quantities, and volumes for each product are given in the table below.

Product	Production Quantities (per day)	Routing	Volume (compared to Product 1)
1	15	B-A-D-C-A	1
2	20	A-D-C-B	1
3	14	A-C-D-B	2
4	10	B-A-C-D	0.5

The distance from A to B is 50 units, B to C is 50 units, and C to D is 50 units. For (b), the distances from A to C and B to D (and the reverse directions) are given by the hypotenuse of a triangle formed by the departments (e.g., ABC). Which layout would you prefer, (a) or (b)? Why?
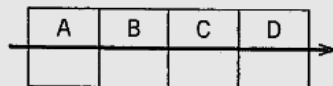
(a) Straight-line flow layout

وتر المثلثHypotenuse

(b) U-flow layout

وفقكم الله