Asynchronous activity – Aggregate operations planning

The planner for a company that makes garden tractors is about to prepare an aggregate production plan that will cover the next six months. She has collected the following information:

Month	1	2	3	4	5	6	Total
Forecast demand	2000	2000	3000	4000	5000	2000	18000

Permanent workforce = 140

Production per month = 20 per worker

Initial inventory = 1000 units

Costs

Regular time permanent workforce = $100 per tractor

Overtime = $150

Temporary = $100 per tractor

Hire cost = $500 per temporary worker or $25 (= $500/20 units) per unit charged to the first month of employment; assume that temporary workers have the same productivity as permanent workers

Holding = $10 per tractor per month (charged on the average inventory level)

Back order = $150 per tractor per month

Question 1: The planner wants to evaluate a production plan that calls for level output/workforce (with the current level of permanent workforce, 140) using inventory to absorb the uneven forecast demand but allowing some back order.

Question 2: The planner has decided to investigate the use of overtime to make up for the shortage. Accordingly, the planner desires an ending inventory of 1000 units at the end of sixth month. It is the policy of the company that the maximum amount of overtime output per month be 400 units. Develop an aggregate production plan in this case and compare it to plan 1.

Question 3: The third option is to use temporary workers during months of high demand. Suppose that temporary workers will be working during a second shift and enough of them are available. Develop an aggregate production plan in this case. Again, the planner desires an ending inventory of 1000 units at the end of sixth month.