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1. What roles the technological capability should act to gain a strategic advantage. Please provide two examples; one with manufacturing firm (produce physical products) and the other a service firm (provider of services).(10%)

2. Please discuss the issues of the major process decisions regarding the process choice, degree of capital intensity, resource flexibility, vertical integration, and customer involvement (20%)

3. Please briefly explain the following terms: (20%)
   (1) benchmarking,
   (2) process capability ratio,
   (3) QFD,
   (4) disruptive technologies,
   (5) PERT

（背面仍有題目，請繼續作答）

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4. (15%) Describe the efficient supply chains and responsive supply chains, and compare them in terms of demand, competitive priorities, new-product introduction, and product variety.

5. (15%) Balance the assembly line using the following information and the longest work-element time rule. The desired output is 360 units per day. Available production time per day is 480 minutes. What is the efficiency for the balanced assembly line?

Work Element	Time (Sec)	Immediate Predecessor(s)
A	30	---
B	20	A
C	50	A
D	45	B
E	30	B
F	55	C,D
G	35	D,E
H	40	F

6. (10%) A manufacturing firm uses a production-planning horizon of three months. They have developed a forecast for the coming three quarters that appears in the table. They can schedule no more than 10% overtime and can produce no more than 10% of a month's production via subcontractors. The company has a zero backorder policy but has space for a maximum of 100 items in their finished-goods inventory. If all costs are shown in the table, what is the minimum-cost aggregate plan?

	January	February	March
Demand	1100	950	1350
Regular Capacity	1000	1000	1000
Regular Production			
Overtime ($40/unit)			
Subcontracting ($100/unit)			
Ending Inventory ($10/unit)			
Cost			

7. (10%) Consider the following problem in which four jobs must each be processed on two machines starting with Machine A and then going to Machine B. The following processing times are available (in hours):

Job	Processing Time Machine A	Processing Time Machine B
A	1	5
B	8	2
C	3	9
D	7	7

What is the minimum makespan for this group of jobs? Depict it graphically using a Gantt chart.