國立臺灣科技大學 109 學年度碩士班招生試題

系所組別：工業管理系碩士班乙組

科　　目：生產管理

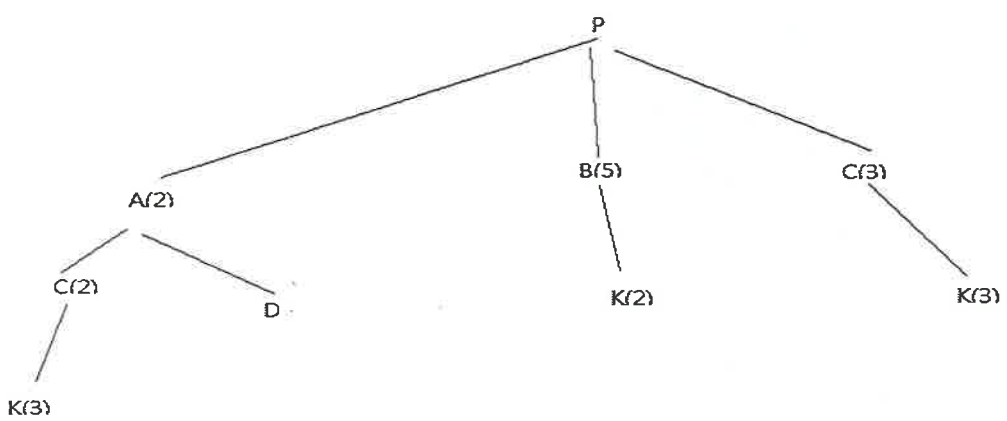
(總分為 100 分)

1. (10%) The weekly output of a production process is shown below, together with data for labor and material input. The standard inventory value of the output is $125 per unit. Overhead is charged weekly at the rate of $1500 plus 0.5 times direct labor cost. Assume a 40-hour week and an hourly wage of $16. Material cost is $10 per running foot. Compute the average multifactor productivity for this process:

Week	Output	#Workers	Material (ft.)
1	412	6	2840
2	364	5	2550
3	392	5	2720
4	408	6	2790

2. (20%) A Small business owner is contemplating the addition of another production line. Capacity increases and equipment will result in an increase in annual fixed cost of $50000. Variable costs will be $25 per unit.
   A. (10%) What unit selling price must the owner obtain to break-even on a volume of 2500 units a year?
   B. (10%) Because of market condition, the owner feels a revenue of $47 is preferred to the value determined in part A. What volume if output will be required to achieve a profit of $16,000 using this revenue.

3. (20%) Using the production tree shown, determine the following:
   A. (10%) The quantity of component K that will be needed to assemble 80 units of P. Assuming no on-hand inventory exists.
   B. (10%) The quantity of component K needed to assemble 80 units of P, given on-hand inventory of 30 A's, 50 B's and 20 C's.



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4. (10%) How to achieve lean manufacturing? Illustrate your implementation steps. What is the relation between lean manufacturing and lead time reduction? Explain in detail.

5. (20%) A shop works a 400-minute day. The manager of the shop wants an output of 200 units per day for the assembly line that has the elemental tasks shown in the following table. Response the following questions:
   A. (10%) Construct the precedence diagram.
   B. (10%) Assign tasks according to the *greatest positional weight* rule. The positional weight for a task is the sum of the task times for itself and all its following tasks. Compute the efficiency.

Task	Duration (minutes)	Precedes Task
a	0.5	b,c,d
b	1.4	e
c	1.2	e
d	0.7	f
e	0.5	g,j
f	1.0	i
g	0.4	h
h	0.3	k
i	0.5	j
j	0.8	k
k	0.9	m
m	0.3	end

6. (20%) The Economic Production Quantity (EPQ) model assumes that units are received incrementally during production.
   A. (10%) Given the holding cost per unit per year H, the unit set-up cost 2H, the usage rate u, the production rate 2u, and the annual demand D, derive the total cost function and the optimal EPQ to minimize cost.
   B. (10%) How to deal with the situation when production rate is less than usage rate? Suppose that some units come from outsourcing, how to adjust the EPQ model?