1. Give the descriptions for the following 10 items (3% for each, 30% in total):
   (1) vertical integration
   (2) project management
   (3) Enterprise Resource Planning (ERP)
   (4) Quality Function deployment (QFD)
   (5) Quality engineering
   (6) bull-whip effect (in supply-chain management)
   (7) chase strategy vs. level strategy (in aggregate planning)
   (8) lean systems
   (9) Material Requirements Planning (MRP)
   (10) reorder point system vs. periodic review system

2. List and describe the characteristics of Make-to-Stock strategy, Assemble-to-Order strategy, and Make-to-Order strategy in manufacturing industries. (10%)

3. Use *Transportation Method* (of Operations Research) to construct a "tableau" for a three-period production plan based on the following definitions, (10%)

   h = holding cost per unit per period

   r = cost per unit to produce on regular time

   c = cost per unit to produce on overtime

   s = cost per unit to subcontract

   u = undertime cost per unit

   b = backorder cost per unit per period

   I_0 = beginning inventory level

   I_3 = desired inventory level at the end of period 3

   R_t = regular-time capacity in period t

   O_t = overtime capacity in period t

   S_t = subcontracting capacity in period t

   D_t = forecasted demand for period t

   U = total unused capacities

(背面仍有題目,請繼續作答)

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4. (a) Discuss the relationship between inventory cost and service level.**(5%)**

    (b) What are the measures used when addressing service levels. **(5%)**

5. A fundamental relationships among work in process (WIP), cycle time (CT), and throughput (TH) in a manufacturing system can be described by Little's Law: $WIP = TH \times CT$. Is it possible for an assemble line to have the same throughput with both high WIP with high cycle time and low WIP with low cycle time? **(5%)** Which would you rather have? **(5%)** Why? **(5%)**

6. (a) What is a lean production system? **(5%)**

    (b) How a lean production system is built? **(5%)**

7. (a) Write the equation for the standard EOQ single-stage inventory model.**(5%)**

    (b) A plant purchases 150,000 units of an electrical component per year. The fixed ordering cost is $60. The unit cost is $0.25 if ordered in quantities less than 1000, $0.24 if order size is between 1,000 and 10,000, and $0.23 for orders of more than 10,000. The holding cost rate is 0.4 per year. Give a general procedure to obtain an optimal order quantity (you do not need to calculate the exact solution). **(10%)**