PRINCE OF SONGKLA UNIVERSITY

FACULTY OF ENGINEE٩RING

Final Examination : Semester 1

Date : September 30, 2004

Subject : 226-491 Sp. Tops. In MfE I (Advanced Material Handling)

Academic Year : 2004

Time : 09.00 - 12.00

Room : R300

Directions :

❑ Can take any books to the room.

❑ Show your solutions and method in your answer sheet.

❑ There are 5 problems. You must do all of them.

❑ Can use any calculators.

❑ Total scores are 100.

Name................................. Code..............................

Question	Full Scores	Taken Scores
1	30	
2	30	
3	20	
4	10	
5	10	
Total	**100**	

ทุจริตในการสอบ โทษขั้นต่ำ คือ พักการเรียน 1 ภาคการศึกษา และปรับตกใน
รายวิชาที่ทุจริต

ผศ. วนิดา รัตนมณี,

ผู้ออกข้อสอบ

Good Luck

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รหัสนักศึกษา....................................

1. **(30 points)** From the first case study distributed in the class, answer these question

   1.1 Briefly describe the cookie production process in term of flow chart and facility location.

   1.2 Design the material handling system for the process.

   1.3 Why did increasing the length of the oven result in a faster output rate?

   1.4 Do you think that the company is making the right decision by not automating the packing of cookies?

   1.5 Explain your reasoning. What obligation does a company have to its employees in a situation such as this? What obligation does it have to the community? Is the size of the town a factor? Would it make a difference if the company was located in a large city? Is the size of the company a factor? What if it was a much larger company?

   1.6 What factors cause the company to carry minimal amounts of certain inventories? What benefits result from this policy?

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2. (**30 points**) From the second case study distributed in the class, answer these question

2.1 Why is it important for the Postal Service to have a high volume of mail to process?

2.2 What caused productivity to increase?

2.3 What impact did competitive pressures have on the Postal Service?

2.4 What measures did the Postal Service adopt to increase competitiveness?

2.5 What results were achieved by the Postal Service's changes?

2.6 What effect will increased use of e-mail have on postal productivity?

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3. **(20 points)** Consider an AS/RS with dedicated storage/retrieval machine per aisle, eight aisles in the whole system. Information regarding the system is as given below:

    3.1 unit load data: height of a unit load = 10 in., high clearance of the unit load in the slot = 2 in., width of a unit load = 10 in., wide total clearance of the unit load in the slot = 2 in., length of a unit load = 10 in., high total clearance of the unit load in the slot = 2 in.

    3.2 two feet wide aisles separate racks from the side walls and one end of wall of the structure

    3.3 length of a storage aisle = 150 unit loads

    3.4 height of a storage aisle = 50 unit loads

    3.5 height between top level of rack and building ceiling = 10 in.

    3.6 aisle length of 10 ft. is required in front of the system to support the P/D stations and other material handling devices used for delivering and removing loads from the AS/RS. The P/D station is located at the end of the S/R aisle.

    3.7 Pick up or drop off time per unit load = 0.25 min

    3.8 Average system horizontal and vertical travel speed are 300 ft./min and 100 ft./min respectively.

    3.9 60% of the storages and retrievals are done under single command cycle. 40% of the storages and retrievals are performed under dual command cycles.

    3.10 It is intended that 300 storages and 300 retrievals are to be performed 8 hours per aisle. Each aisle has a dedicated S/R machine.

Determine:

Q-1 What is the minimum space requirement (Volume) of the AS/RS system?

Q-2 Can the S/R machine handle the handling workload over the eight hours?

Q-3 If the answer of Q-2 is yes, what is the utilization of the S/R machine? If not, how many storages and retrievals can be performed 8 hours per aisle?

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4. (**10 points**) What are the integrated material handling system and the intelligence material handling system? Explain and give some examples of these systems in the answer book.

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5. (**10 points**) How many phases of pneumatic transportation system? Explain all of them.

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