

NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

FACULTY OF INDUSTRIAL TECHNOLOGY

DEPARTMENT OF INDUSTRIAL & MANUFACTURING ENGINEERING

PRODUCTION PLANNING & CONTROL – TIE 5102

1st SEMESTER EXAMINATIONS FEBRUARY 2010

Instructions to candidates

1. Time allowed 3 hours
2. Answer all Questions in Section A and one question in Section B
3. Each question carries 25marks.

SECTION A

QUESTION 1

- (a) Discuss the important developments in the study of production systems from the Age of Empiricism to the current Age of Earthman-ship oriented Production System. [20]
- (b) What is the relationship between a Production Process and a Production System? [5]

QUESTION 2

- (a) What work study methods can be used in the service industry? Describe using an example. [4]
- (b) In conducting work study on the shop floor, describe the major challenges that a Work Study Practitioner encounters and suggest mitigation measures for these challenges. [16]
- (c) What is Work sampling and how does it contribute to Work study? [5]

QUESTION 3

The company you work for has been considering keeping only enough workers employed on straight-time per quarter to produce 40,000 gallons. Either subcontracting or overtime would be used to supply the difference between the straight time production capacity of 40,000 gallons per quarter and the highly variable quarterly demand. Your company will furnish the materials and has a quote from a subcontractor for a price of \$19.50 per gallon for each gallon supplied, and the subcontractor has guaranteed that it could supply up to 20,000 gallons a quarter. Your company's labour union is willing to work as much overtime as necessary to avoid the use of the subcontractor. The cost of overtime pay is \$9.50 per hour of overtime worked.

- (a) Compute the overtime cost and the subcontracting cost per quarter for the two aggregate plans. [12]
- (b) Which factors will be important in deciding between the two plans? [10]
- (c) How are Aggregate Plans for Goods different from those of Services? [3]

SECTION B

QUESTION 4 (25)

- (a) Contrast independent and dependent demand by way of an example. [4]
- (b) Contrast planned order receipts and scheduled receipts in MRP. [4]
- (c) Product P is made of two subassemblies, A and B, and Part C: 2As, 3Bs and 4Cs are needed for each P. Each A requires 3 Ms and 4 Ns; each B requires 4Cs and 5Ds.
 - i. If 25 Ps are needed and there are 10 units of A, B, and C on hand, how many additional Cs will be needed? [5]
 - ii. Suppose now that the bill of materials (BOM) incorrectly shows that each B requires 8Cs (instead of 4). How many leftover Cs will there be? [4]
 - iii. Suppose that the BOM incorrectly shows that each B requires 2 Cs. How many Cs will be needed in addition to the number based on the erroneous BOM?. [2]
 - iv. What problems might this cause if it is not discovered before final assembly and what costs will be incurred if the error results in too many Cs ordered, as in part (ii)? [6]

QUESTION 5

- (a) Using an example of a company of your choice, define Capacity and give a value for the capacity of that facility. [3]
- (b) Describe factors that lead to and show how you would arrive at the Effective Capacity and Rated Capacity. [8]
- (c) Discuss the important steps found in Strategic Capacity Planning for a medium sized manufacturing organisation. [14]

END OF EXAMINATION