

NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY
DEPARTMENT OF TEXTILE TECHNOLOGY
SPECIAL SUPPLEMENTARY EXAMINATIONS MAY 2006
PRODUCTION ANALYSIS EXAMINATION - TXT 4234

TIME: 3 HOURS

INSTRUCTIONS

1. Answer any **TWO** questions from **Section A** and any **THREE** questions from **Section B**.
2. Each question carries 20 marks.
3. Begin each question on a fresh page, write legibly and draw neat diagrams in pencil.
4. Total marks: 100.

SECTION A

QUESTION 1

- a) Explain the term production planning and control. [4]
- b) Discuss the five P's of production management. [5]
- c) (i) What is value analysis? [2]
(ii) Outline the steps in value analysis. [5]
(iii) State the benefits of value analysis. [4]

QUESTION 2

- (a) Explain the terms quality of design and quality of conformance. [4]
- (b) Discuss quality responsibilities of
(i) Production manager [4]
(ii) Chief Executive [4]
(iii) Operators [4]
(iv) Stores manager

QUESTION 3

- (a) Distinguish aggregate planning from master production scheduling. [4]

- (b) Discuss strategies used in the textile industry to:
- (i) alter demand to suit capacity
 - (ii) alter capacity to suit demand. [5]
- (c) Distinguish between breakdown maintenance and total productive maintenance in manufacturing. [6]

Section B

Answer all questions in the section

Question 4

a) In a small machine shop there are 4 jobs to be processed, each going to machine A first followed by machine B and finally machine C. The processing times are given below.

	Job 1	Job 2	Job 3	Job 4
Processing time on m/c A in minutes	15	11	12	13
Processing time on m/c B in minutes	8	7	6	10
Processing time on m/c C in minutes	12	15	11	10

Can you apply Johnson's rule to determine the shortest processing time? If so, why is it possible? If it is not possible, state your reasons. [8]

- b) Describe briefly what is meant by 'product layout' and state what you consider to be the main advantage and disadvantage of such a layout [6].
- c) What do you understand by the term 'productivity' and how can this be improved in an organisation? [6]

Question 5

- a) Give an overview of production planning in manufacturing in terms of the levels, planning horizon time span, units of measure and the outputs of various levels. [4]
- b) A small company producing travel goods makes four models of products A,B,C,D and the weekly demands for four weeks is shown below in *Table 3*.

Week	A	B	C	D
1	110	440	325	180
2	170	450	300	185
3	100	480	410	180
4	150	470	385	175
Processing time	3.25	2.05	4.28	3.85

Table 3 Demand for travel products

- (i) Develop the workforce loading data and illustrate it graphically. [5]
(ii) If the company has a permanent workforce of 75 working 40 hours per week illustrate the company loading data. [3]
- d) Carver and Co run a manufacturing company which operate a small print shop in Bulawayo where there is one offset press to perform work for customers. Today its day 55 and jobs waiting to be processed are shown below in Table Q5

Job	A	B	C	D	E	F
Processing time	9	11	8	12	7	5
Date received	37	39	42	47	48	55
Due date	71	81	75	98	86	108
Changeover time (minutes)	30	48	10	60	90	15

Table Q5. Orders for Carver and Son

Schedule the jobs using

- (i) First come First served
(ii) Least change over cost

In each case calculate Total flow time, average tardiness

[8]

Question 6

Cradle Ltd is a company manufacturing furniture. Table 4 shows its demand schedule for 2005.

Table 4: Demand schedule for cradle

Month	j	f	m	a	m	j	j	a	s	o	n	d
Demand in 1000 units	2,7	3,5	4,7	1,8	1,5	3,245	4,25	3,875	2,975	1,875	2,5	1,1

In December production was 1800 units and there was just enough labour to produce the demand without overtime or subcontracting. Ending inventory in December is 250 units. Operating data is as follows

Stockout costs \$35

Holding cost per unit per week \$2,50

Hiring cost per employee \$350
Termination cost per employee \$275
Labour cost per hour \$8
Overtime cost per hour \$12
Subcontracting cost per unit \$35
Labour hours per unit 3.20
Working hours per week 40
Maximum hours overtime per week 10
Weeks per month 4

Develop two aggregate plans based on

- (i) Chase demand based on hiring and termination of employees where overtime and subcontracting are not an option.
- (ii) Level strategy based on production of the average monthly demand in the period and use of overtime and subcontracting.

Deduce the better method by considering total costs.

[20]

END OF QUESTION PAPER