

The Open University of Sri Lanka  
Faculty of Engineering Technology  
Department of Textile and Apparel Technology



Study Programme	: Bachelor of Technology Honours in Engineering/ Bachelor of Industrial Studies Honours
Name of the Examination	: Final Examination
Course Code and Title	: <b>TAI3541/TTI3241 Production Planning and Organization</b>
Academic Year	: 2017/18
Date	: 14 <sup>th</sup> January 2019
Time	: 1330-1630hrs
Duration	: <b>3 hours</b>

### General Instructions

1. Read all instructions carefully before answering the questions.
  2. This question paper consists of **Eight (08)** questions in **Five (05)** pages.
  3. **Number of questions to be answered = 06**
  4. Answer **Question one (Q1), which is compulsory and Five (05) more** questions.
  5. Question one (Q1) carries 25 marks and questions two (Q2) to eight (Q8) carry fifteen (15) marks each.
  6. Answer for each question should be commenced from a new page.
  7. In all the calculations the answers should be rounded up to **two (02) decimal points**.
  8. This is a Closed Book Test (CBT).
  9. Answers should be in clear hand writing.
  10. Do not use red colour pens.
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**Compulsory Question**

- (Q1) (a) Give four (04) processes carried out during the “Attainment of commercial products” in the product development phase. (02 marks)
- (b) Write down the three (03) main components of the term “Fashion”. (03 marks)
- (c) Briefly explain four (04) features of an accurate pattern matching during marker making. (08 marks)
- (d) Differentiate between “Micro data” and “Macro data” used in work measurement. (04 marks)
- (e) Give two (02) reasons for rebalancing the production lines after starting the production. (02 marks)
- (f) Briefly discuss how the “Maximum ply height” affects the economic cut order planning. (06 marks)

**Answer any five (05) from the following seven (07) questions**

- (Q2) (a) Giving three (03) major reasons explain why it is difficult to achieve 100% marker efficiency. (06 marks)
- (b) Write down why it is important to maintain correct ply tension during the spreading of knitted fabrics. (03 marks)
- (c) Describe the following two (02) requirements of spreading.
- (i) Shade sorting of cloth pieces
- (ii) Avoidance of fusion of plies during cutting (06 marks)
- (Q3) (a) Describe the “Buying through an agent” concept when selecting an overseas garment manufacturer during the order placement process. (05 marks)
- (b) “Competitiveness of a garment factory can be improved with the use of productivity improvement techniques.” Discuss whether this statement is true or false by giving four (04) examples. (10 marks)
- (Q4) (a) Explain the following terms related to work measurement.
- (i) Standard operator
- (ii) Operator rating
- (iii) Contingency allowance (06 marks)

- (b) Time study has been carried out in a production line and its results are given below. (BSI standard 100 rating is used).

Number	Element	Observed rating	Observed time (min)
1	Open the bundle	110	0.12
2	Sort the panels	70	0.34
3	Attach lace to hem	85	1.09
4	Sew one side seam	65	1.45
5	Pick and align the labels	80	0.56
6	Sew second side seam with labels	105	0.92
7	Attach waist elastic	90	1.88
8	Get the trims and align	85	0.66
9	Attach trims to waist	90	0.83
10	Bar tack the seams	80	0.47
11	Close the bundle and dispose	75	0.25

Bundle size = 12

Machine allowance = 7.5%

Relaxation allowance = 10%

Based on the given data, calculate the Standard Minute Value (SMV) of the given garment. (09 marks)

- (Q5) (a) A garment factory has received contract orders to be completed within the given due weeks as given in the table below.

Contract	Number of garments	SMV per garment	Week due
A	14000	12	2
B	9600	15	5
C	21000	8	5
D	12000	6	3
E	24000	8	5
F	15000	8	2
G	12000	18	5
H	10000	12	4

The factory has two (02) similar production lines with similar capacity. The factory works for five (05) days per week. The daily capacity of a production line is 24000 SMV. Each production line has 25 operators. Draw the Gantt chart for planning the work load received by the factory. (09 marks)

- (b) When scheduling the production orders in a garment factory, maintaining an excess capacity can be both advantageous and disadvantageous. Explain this statement by giving three (03) examples. (06 marks)

- (Q6) (a) Giving at least five (05) examples describe the factors, which affect the output capacity of a garment factory. (09 marks)

- (b) Briefly explain three (03) main requirements of a financial incentive scheme to improve the productivity of sewing machine operators. (06 marks)

- (Q7) Assuming that the cutting section of a particular factory has received an order which requires four (04) sizes of two (02) colors. The quantities needed to be cut from each size and color, and the respective single marker lengths are given in the table below.

Color	Number of garments needed to be cut in different sizes			
	Size 12	Size 14	Size 16	Size 18
Yellow	280	460	520	220
Red	120	300	260	160
Single garment marker length (m)	1.2	1.4	1.8	2.2

The constraints of lay dimensions are as follows.

Maximum cutting ply height = 200 plies

Maximum number of garments per ply = 4 garments

End allowance per ply = 6 cm

Fabric saving percentage for multi size marker = 3%

Cost of fabric per meter of Yellow color = Rs. 420/=

Cost of fabric per meter of Red color = Rs. 450/=

- (a) Prepare an economic cut order plan with minimum number of lays and markers. (08 marks)
- (b) Calculate the material requirement of each color fabric. (05 marks)
- (c) Calculate the total cost of materials required to complete the order. (02 marks)

- (Q8) (a) ABC garment factory has planned to finish 2000 garments per day. The factory works 480 minutes in a day. The operational breakdown of a garment and the output of each operation per 8 hours are given below.

Number	Machine	Operation	Output per 8 hours
1	OL3TH	Neaten gusset liner	3700
2	SNLS	Sew to hold gusset	3850
3	OL3TH	Join gusset to back panel	2000
4	OL3TH	Attach leg elastic	2650
5	COVER SEAM	Topstitch leg elastic	2800
6	OL4TH	Join first side seam	3780
7	OL4TH	Attach waist elastic	850
8	COVER SEAM	Topstitch waist elastic	960
9	OL4TH	Join second side seam	1850
10	SNLS	Attach bow to front	3690
11	BART	Secure leg and waist seams	3740
12	IRON	Ironing	2130

- (i) Calculate the number of workplaces and number of operators required to balance the line. (08 marks)
- (ii) Calculate the balancing loss and comment whether the line is well balanced or not. (01 marks)
- (b) Give three (03) methods, which can be used to reduce the balancing loss during production line balancing. (06 marks)

