00124

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	: **TAX4438/TAI3541/TTI3241** **Production Planning and Organization**
Academic Year	: 2019/2020
Date	: 30th July 2020
Time	: 0930-1230 hrs
Duration	: **3 hours**

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 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 **three (03) decimal points**.

8. This is a Closed Book Test (CBT).

9. Answers should be in clear handwriting.

10. Do not use red colour pens.

Compulsory Question

(Q1) (a) Differentiate between the "Offer samples" and "Reference samples". (02 marks)

(b) Briefly discuss two (02) aspects considered during marker making to ensure the requirements of quality in cutting. (04 marks)

(c) Using suitable sketches, explain the three (03) forms of fabric spreading. (06 marks)

(d) State three (03) standard facts on hand movements considered under the principles of motion economy. (03 marks)

(e) Give two (02) advantages of using standard data to calculate the Standard Minute Value. (02 marks)

(f) Write down four (04) personal factors, which affects the productivity in the garment industry. (02 marks)

(g) Describe two (02) reasons for maintaining higher "Work In Progress" in a garment factory. (02 marks)

(h) Write down the three (03) important principles, which can be used to determine the optimum cut order plan. (03 marks)

(i) Briefly explain one (01) suitable method to handle absenteeism in line balancing. (01 marks)

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

(Q2) (a) Discuss two (02) differences between the "Cut to stock" and "Cut to order" garment manufacturing systems. (02 marks)

(b) Write down the four (04) major processes of the product development in garment industry. (04 marks)

(c) Describe the terms "Sectional marker" and "Interlocking marker". Explain the marker type, which gives the highest fabric utilization out of these two maker types. (03 marks)

(d) Giving suitable examples, describe how the following two (02) factors affect the marker efficiency.

(i) Shape of the pattern pieces

(ii) Fabric utilization standards (06 marks)

(Q3) (a) Using suitable sketches, explain the four (04) classes of "Spread on open" method. Out of these four classes, discuss the most suitable class for nap fabrics. (05 marks)

(b) Assume your factory has accepted to cut fabric batches with following defects.

  i) Batch 1: Fabric width variations within the roll

  ii) Batch 2: Roll to roll color shade variations

When spreading each of these two (02) fabric batches, explain the possible problems and the actions to be taken to avoid quality defects in the finished garment. (06 marks)

(c) Briefly explain the importance of considering the design characteristics of the finished garment during following processes.

  i) Marker planning

  ii) Fabric spreading process (04 marks)

(Q4) (a) Write down two (02) rules to be followed to control the bias in activity sampling. (02 marks)

(b) Briefly explain the importance of using accurate observed rating to calculate the Standard Minute Value (SMV) for an operation. (04 marks)

(c) Time study has been carried out on an operation and its results are given below. (BSI standard 100 rating is used).

Number	Element	Observed rating	Observed time (min)
1	Open the bundle	90	0.12
2	Sort the panels	65	0.56
3	Align the elastic to waistband	80	0.73
4	Sew the elastic on waistband	70	2.01
5	Pick and align the bow to center	85	0.56
6	Sew the bow on waistband	105	0.61
7	Cut excess thread using hand scissor	90	0.88
8	Close the bundle and dispose	75	0.25

Bundle size = 8
Machine allowance = 7.5%
Relaxation allowance = 10%

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

(Q5) (a) Briefly discuss one (01) advantage and one (01) disadvantage of using operator specialization in the garment industry. (04 marks)

    (b) Discuss the effect of following factors on the productivity in the garment industry.

        i) Product design study

        ii) Investment (08 marks)

    (c) Briefly explain the kaizen concept and its objectives. (03 marks)

(Q6) (a) Assume your garment factory has received three (03) contract orders, which should be completed within 10 days. Out of these, you have to decide the orders to be accepted based on the factory capacity. The details of the received orders are given in the table below. Assume that any of these orders cannot be subcontracted and there are no unexpected production downtimes.

Contract	Number of garments	SMV per garment
A	5250	8
B	2400	5
C	3000	5

Following details are available for the garment factory.

Number of operators = 15

Working hours per day = 7 hours

Efficiency level of the factory = 80%

Committed capacity of the factory = 300 hours for 10 days

Answer the following questions by clearly indicating the steps of calculating the capacity of the factory.

        i) With the given capacity constraints, identify the contract orders to be accepted by the factory. Explain the reasons for your selection. (10 marks)

        ii) If the buyer has agreed to give additional 8 days for the order completion, discuss whether it is possible to accept all three (03) orders. (02 marks)

    (b) Briefly explain the term "Expediting" in relation to the production planning and controlling in a garment factory. (03 marks)

(Q7) The details of an order received by the cutting department are given below.

Size	A	B	C	D	E
Quantity	125	200	250	150	100
Single garment marker length (m)	1.2	1.4	1.8	2.0	2.2

Information relevant to constraints, costs, and possible savings is given below. All the times are given in standard minutes.

Fabric cost per meter = Rs. 200/=

Maximum cutting height = 100 plies

Maximum number of garments per marker = 4 garments

End allowance = 4 cm per ply

Fabric saving percentage for 4 garments marker = 6%

Fabric saving percentage for 3 garments marker = 4%

Cutting time per one garment marked = 15 minutes

Spreading time/ply = 0.8 minutes

Marker preparation time per one garment marked = 20 minutes

Labour cost per hour = 25 rupees

(a) Prepare an economic cut order plan with minimum number of lays and markers.

(05 marks)

(b) Calculate the total cost of the materials required to complete the order. (06 marks)

(c) Calculate the total labour cost required to complete the order. (04 marks)

(Q8) ABC garment factory has scheduled to complete 640 garments during 480 minutes shift in a production line. The operation breakdown of the garment is given in the table below. Assume the efficiency of the production line is 100%.

Number	Machine	Operation	SMV
1	Lockstitch	Sew to hold gusset	0.54
2	3 thread overlock	Sew gusset to back panel	0.71
3	4 thread overlock	Sew first side seam	0.88
4	4 thread overlock	Sew second side seam with label	0.97
5	Lockstitch	Attach waist elastic	1.02
6	Lockstitch	Attach bow to front	0.43
7	Bartack	Secure leg and waist seams	0.35
8	Iron	Ironing	0.49

i) Calculate the number of workplaces and number of operators required to balance the line. (12 marks)

ii) Calculate the balancing loss and comment whether the line is well balanced or not. (03 marks)