Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.TECH (APM)/SEM-5/APM-503/2011-12

2011
APPAREL PRODUCTION CONTROL

Time Allotted : 3 Hours *Full Marks* : 70

The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable.

GROUP – A
(Objective Type Questions)

1. Answer the following questions : $10 \times 1 = 10$

A. Choose the correct alternatives for the following :

i) "SAM for Pocket attaching operation for style no. 0013/AP is 2 minutes." This statement indicates

a) minimum time required to attach one pocket for style no. 0013/AP = 2 minutes

b) maximum time required to attach one pocket for style no. 0013/AP = 2 minutes

c) average observed time for attaching one pocket for style no. 0013/AP = 2 minutes

d) allotted time estimated for attaching one pocket for style no. 0013/AP = 2 minutes.

ii) "Performance rating of a worker = 80%." This statement indicates

a) average working efficiency of that worker = 80%

b) that worker can perform 80% of the standard performance.

c) maximum working efficiency of that worker = 80%

d) that worker can perform 80% of the most efficient worker in that factory.

iii) Which of the following control charts is useful to optimize machine-wise manpower allocation ?

a) Two handed Process Chart

b) Multiple Activity Chart

c) Operation Process Chart

d) Flow Process Chart.

iv) Flow Process Chart is a useful tool for

a) Production Calculation

b) Production Control

c) Production Planning

d) Lay Lot Planning.

v) Which of the following parameters is not required for calculating manpower requirement for a process in sewing department ?

a) SAM b) Performance rating %

c) Absenteeism % d) Fabric consumption.

vi) Which of the following parameters influences Lay lot planning most significantly ?

a) Marker

b) Fabric colour

c) Total number of fabric rolls available

d) All of these.

vii) In an Apparel factory with computerized sewing machine and effective ERP system, which of the following productivity calculation systems is the most suitable one ?

a) Operator productivity b) Labour productivity

c) Machine productivity d) none of these.

B. Answer the following questions very briefly :

viii) Mention one example each for 'Make Through Process' and 'Progressive Bundling Process' of Apparel Manufacturing.

ix) Write the full forms of AOA and AON.

x) Mention any three activities to improve productivity in sewing department.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

2. Write short notes on the following :

a) Skill inventory in the context of manpower allocation in sewing department

b) Fashion calendar for product development. $2\frac{1}{2} + 2\frac{1}{2}$

3. Details of an order of 2500 pcs Men's Trousers are as given below :

Date of Order Confirmation	:	22nd November, 2011
Date of Delivery	:	20th December, 2011
Style No.	:	AD/M/013
Colour No.	:	Pantone-IP00027.
Total Number of Pcs ordered	:	2500

Standard time required

For Faibric sourcing : 7 days

For Fabric inspection : 6 days

For Cutting : 4 days

For Sewing : 22 days

For Washing and Ironing : 12 days

For Final inspection and Packing : 7 days

Illustrate a suitable production planning through Gantt chart for the above mentioned order.

4. Prepare a suitable check list for cutting operation to avoid errors.

5. The sewing machine operators in an apparel factory are expected to work for 400 minutes in a shift of 8 hours. The remaining time is meant for rest and personal needs etc.

   a) Determine the Standard time for attaching a single piece of pocket, whose normal time (basic time) is 3 minutes.

   b) Calculate number of pockets to be attached per shift.

   c) If the operator engaged on the above job completed pocket attaching for 80 pcs of Style no. ZEN/10/011, where ZEN/10/011 is described as "2 pocket P/C blended men's formal shirt on plain", calculate the productive efficiency of that operator. 2 + 1 + 2

6. Details of orders in hand as on 22nd November, 2011 in M/s Karley Export are given.

a) Order No.1537 : Style No. 3200 :

Colour Pink/002 : Size M – 100 pcs, Size L – 120 pcs, Size XL – 50 pcs

Colour Red/005 : Size M – 80 pcs, Size L – 100 pcs, Size XL – 50 pcs

Style No. 4300 :

Colour Green/002 : Size M – 200 pcs, Size L – 150 pcs, Size XL – 80 pcs

b) Order No. 1231 : Style No. 4100 :

Colour Pink/002 : Size M – 100 pcs, Size L – 120 pcs, Size XL – 50 pcs

Style No. 3200 : Colour Black/012 :

Size M – 100 pcs, Size L – 120 pcs, Size XL – 50 pcs

Colour Pink/002 : Size M – 120 pcs, Size L – 130 pcs, Size XL – 70 pcs

c) Order No. 1432 : Style No. 5222 :

Colour Green/002 : Size M – 300 pcs, Size L – 250 pcs, Size XL – 180 pcs

Style No. 3200 :

Colour Red/005 : Size M – 200 pcs, Size L – 150 pcs, Size XL – 80 pcs

Colour Pink/002 : Size M – 200 pcs, Size L – 150 pcs, Size XL – 80 pcs

Prepare an order concentration chart for Style No. 3200.

7. a) Assume that 2000 men's kurtas must be made in one 40 hour week. Given information are as under :

Standard work content per garment = 10 minutes

Predicted attendance = 95%

Predicted utilization = 90%

Predicted performance rating = 90 % against BSI

Calculate estimated number of operators required for the order mentioned above.

b) What do you mean by 'Throughput time' ? Explain with a suitable example. 3 + 2

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. 3 × 15 = 45

8. a) Describe a suitable set of sequential steps involved in improving the productivity in Apparel Industry.

b) The activities undertaken by an operator of a high speed computerized 20 head embroidery machine are as observed under for a particular day :

Threading : 15 minutes

Framing : 8 minutes

Loading of Design to the CPU : 4 minutes

Automatic Embroidery (1 full repeat) : 35 minutes

M/c stoppage due to thread breakage and knotting : 8 minutes

M/c stoppage due to power failure : 5 minutes

Taking off the embroidered fabric : 4 minutes.

Prepare a multiple activity chart and calculate capacity utilization % of man and machine in the given work cycle. 7 + 8

9. a) An assembly operation in Sewing Department consists of five elements with following observed times and the performance rating.

Element	Observed Time in Seconds	Performance Rating %
Lifting feed dog and feeding fabric	12	80
Adjusting fabric position against notch mark	10	
Sewing	10	
Lifting feed dog and taking off the piece	5	
Dropping the piece inside the bin	3	

Taking standard process + machine delay allowance as 5% of basic time and assuming rest + personal allowance as 40 minutes and contingency allowance as 10 minutes per shift of 8 hours, calculate standard allowed time per piece.

b) The following represents the procedure of Garment washing as observed on 20th March, 2011 in M/s Gokul Fashions :

i) Bunch of garments (40pcs) are taken from the intermediate storage rack and carried up to the washing machine (5 m away from the rack) : Time taken 2 minutes

ii) Filling of water to the washing machine : 2 minutes

iii) Adding Detergents : 0.5 minute + Delay of 1.5 minutes for unavailability of the required detergent in proper place.

iv) Mixing detergents : 1 minute

v) Checking & loading of garments to the washing machine : 5 minutes

vi) Tumble Washing Cycle : 30 minutes

vii) Unloading of garments : 4 minutes + delay of 1.5 minutes due to unavailability of trolley in proper place.

viii) Carrying the garments up to the Hydro extractor (2.5 m away from the washing machine) : 0.2 minutes.

Draw a Flow Process Chart for the above mentioned activities. 6 + 9

10. a) Explain the factors to be considered in making a plan for Apparel Product Development.

    b) Mention in brief the basic characteristics, advantages and disadvantages of different manufacturing processes generally adopted in Apparel Industry. Illustrate with suitable flow chart. 5 + 10

11. a) In a knitted T-Shirt Manufacturing Factory M/s A.P. Garments, the data on the output and various inputs are as mentioned below :

    Total number of machines per shift : 80

    Total number of operators allotted per shift : 82

    Total number of helpers per shift : 08

    Total number of checkers per shift : 10

    Total number of supervisors per shift : 2

    Product Sewn : Men's Half Sleeve Casual T-Shirt

    SAM of the Shirt (Sewing) : 17 minutes

    Average output per shift of 8 hours : 1500 shirts

    Calculate the following :

    i) Operator Productivity (Sewing)

    ii) Machine Productivity (Sewing)

    iii) Average Productive Efficiency per Machine (sewing)

    iv) Total Labour Productivity (Sewing)

b) In M/s Zenith Apparels, the following information are collected :

Total available working time per shift = 450 minutes, Average absenteeism 2%, Average factory performance = 90%, Rework = 10%, Rejection = 3%, Machine delay = 1%, Process delay = 5%, Misc. Delay (power failure, machine break down, maintenance etc.) = 2%.

i) Draw a curve to illustrate detailed break-up of the causes of loss in productivity

ii) Determine the productivity percentage. 8 + 7

12 a)

Activity	Must Precede	Optimistic Time (days)	Pessimistic Time (days)	Most Likely Time (days)
A	none	2	4	3
B	A	1	3	2
C	B	6	8	7
D	C	5	7	6
E	C	4	6	5
F	D	3	5	4
G	E	1	3	2
H	G	3	5	4
I	F+H	1	3	2

Calculate the following :

i) Expected duration of completion for each activity

ii) Earliest and latest finish of each activity

iii) Earliest finish of the entire project

iv) Slack time for each activity

b) Define 'DELAY', 'STORAGE' and 'INSPECTION'. 12 + 3

13. a) What do you mean by 'Line Balancing' ? Briefly explain the steps involved in line balancing with a suitable example.

b) Production order details as on 25th November, 2011 in M/s Amrutha Apparels are as follows :

Production Order No. 1135

Style No. : 6132

Colour Red : X Size – 140 pcs, L Size – 280 pcs, XXL Size – 70 pcs

Colour Purple : X Size – 200 pcs, L Size – 400 pcs, XXL Size – 100 pcs

Make a suitable cut order plan assuming maximum no. of ply per spread = 40. 9 + 6