



Name :
Roll No. :
Invigilator's Signature :

CS/B.Tech/APM(NEW)/SEM-6/APM-602/2013

2013

**PRODUCTION PLANNING & CONTROL IN
APPAREL INDUSTRY**

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.*

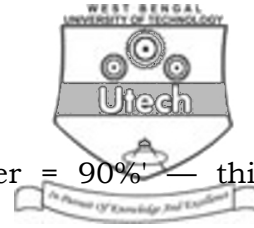
GROUP - A

(Objective Type Questions)

1. Answer all the questions : 10 × 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 = 90%' — this statement indicates
- a) Observed time > Basic time
 - b) Basic time > Observed time
 - c) Observed time = Basic time
 - d) None of these.
- iii) Which of the following control charts is useful to prepare the plan for plant Layout ?
- a) Two handed process chart
 - b) Multiple activity chart
 - c) Operation process chart
 - d) Travel chart.
- iv) Which of the following statements is *False* ?
- a) Job on the critical path cannot have any 'Slack'
 - b) In case of the last job in the sequence the Earliest Finish = Latest Finish.
 - c) Slack of a job cannot be higher than the duration of that job
 - d) The estimated duration of a job is usually the 'Most likely time of completion' of that job.



- v) 'Job card' is associated with
- production calculation
 - method study
 - production planning
 - production scheduling.
- vi) Which of the following parameters is not required for calculating man power requirement for a process in sewing department ?
- SAM
 - Performance rating %
 - Absenteeism %
 - Personal allowances %.
- vii) Which of the following parameters are not essential in case of spread planning ?
- Marker ratio
 - Colour ratio
 - Total order quantity
 - Fabric consumption details.
- viii) In an Apparel factory with computerized sewing machine and effective ERP system, which of the following productivity calculation systems is the most suitable one ?
- Operator productivity
 - Labour productivity
 - Machine productivity
 - None of these.



B) Write brief answers.

ix) Write the full forms of PMTS and PERT.

x) Mention the parameters required to calculate the productivity of a Sewing department.

GROUP - B

(Short Answer Type Questions)

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

2. a) Draw a block diagram to show the different levels of Apparel Productivity Calculation.
- b) Explain the significance of 'Average' in case of the 'Westinghouse Technique' of calculating the performance rating % for sewing operators. $3 + 2$
3. a) Explain why slack time of a job on critical path must be zero in case of PERT & CPM ?
- b) Explain the principle of allocation of sewing operators for different style numbers in order. $2 + 3$
4. a) 'Earliest start of the first job must be equal to the latest start of that job'. Justify this statement in context of PERT & CPM.
- b) Explain how 'Multiple Activity' chart can help in reducing the interference allowance. $2 + 3$



5. The sewing machine operators in an Apparel factory are expected to work for 450 minutes in a shift of 8 hours. The Remaining time is meant for rest and personal needs etc.
- Determine the standard time for Sleeve Attaching operation, whose normal time (basic time) is 2 minutes.
 - Calculate number of sleeves to be attached per shift.
 - If the operator engaged on the above job attaches 180 pieces of sleeves in a shift, what is his efficiency in that shift ? 2 + 2 + 1
6. The following represent the procedure of Garment Washing as observed on 9th April, 13 in M/s Prateek Fashions.
- Bunch of Garments (40 pcs) are taken from the intermediate storage Rack and carried up to the washing machine (5 mtrs away from the Rack) : Time taken 2 minutes
 - Filling of water to the washing machine : 2 minutes
 - Adding Detergents : 0.5 minutes + 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 hydroextractor (2.5 mtrs away from the washing machine) : 0.2 minute.

Draw a flow process chart for the above mentioned activities.

GROUP - C

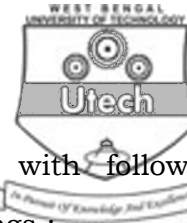
(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

- 7. a) Mention different causes of loss in productivity in Sewing Department. What are the techniques generally used to minimize the loss in production time in an Apparel factory.



- b) Prepare a Spread planning based upon the following information : Order Number – XZ-120, Style Number – ZEN-200, Total order quantity = 5000 pcs, Size ratio = S:M:L :: 2:2:1, Colour ratio = Ivory : Camel :: 2:3, Max number of Ply = 45. 5 + 10
8. a) The activities undertaken by an operator of a high speed computerized multi-head embroidery machine are as observed under for a particular day.
- Threading : 15 minutes
- Switch on machine and framing : 10 minutes
- Loading of design to the CPU : 6 minutes
- Automatic embroidery (1 full repeat) : 45 minutes
- M/c stoppage due to thread breakage and knotting : 12 minutes
- M/c stoppage due to power failure : 5 minutes
- Prepare a multiple activity chart and calculate capacity utilization % of man and machine in the given work cycle.

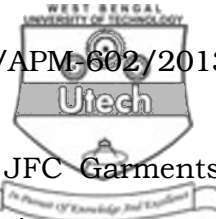


- b) A process consists of five elements with following observed time and the performance ratings :

Element	Observed Time in Minutes	Remarks
A	1.2	Manual job
B	0.5	Manual job
C	4.0	Machine job
D	1.5	Manual job
E	2.0	Machine job

Assuming rest and personal allowance as 15%, contingency allowance as 3% and process allowance as 2% of the basic time, calculate standard allowed time per piece. Assume performance rate % for operator = 80%. 9 + 6

9. a) Briefly mention the objectives of a good plant layout in apparel industry.
- b) Draw a neat flow diagram to illustrate the steps involved in the systematic procedure for plant layout.
- c) Explain mathematically the basic principle of order follow up and updating the job completion in a Gantt chart. 4 + 5 + 6

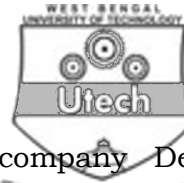


10. a) In a shirt manufacturing factory M/s JFC Garments, the data on the output and various inputs are as mentioned below :

Total number of machines per shift	: 90
Total number of operators per shift	: 92
Total number of helpers per shift	: 12
Total number of checkers per shift	: 15
Total number of supervisors per shift	: 2
Duration of work per shift	: 450 minutes
Product Sewn	: Men's full sleeve formal shirt
SAM of the shirt (Sewing)	: 15 minutes
Average output per shift	: 1500 shirts

Calculate the following :

- Operator productivity (Sewing)
 - Machine productivity (Sewing)
 - Productive efficiency of operators (Sewing)
 - Total labor productivity (sewing)
- b) Explain the basic differences between the principles of calculating performance rating % by speed rating method & synthetic rating method. 10 + 5



11. a) In a Ladies T-shirt Manufacturing company Delta Apparels, the details of order number SL 023/13 is as given below :

Data of order confirmation : 15th May 2013
Style No. : Sig/L/003
Colour No. : Pantone-IP00023
Total Number of Pcs ordered : 5000

The details of production planning estimation are as under :

Time Estimation :

Fabric sourcing : 6 days
Fabric inspection : 800 m per day
Cutting : 700 pcs per day
Sewing : SAM = 12 minutes,
450 working minutes
per day, 80 operators.

Washing & finishing : 13 days

Ironing : 7 days

Final inspection : 5 days

Packing : 7 days

Assume fabric consumption per pc = 1.5 mtr and
an overall fabric
wastage % = 8%

Prepare a suitable Gantt chart to make a planning sheet for the order mentioned above. Mention the expected date of order completion according to your Gantt chart.



b) In M/s A. S. Fashions, the following information are collected :

Total working hour per shift = 450 minutes,
 Avg. Absenteeism : 8 %, Methods effectiveness : 90%,
 Avg. Factory performance = 95%, Rework = 12%,
 Rejection = 3 %, Machine delay = 1%, Waiting time = 1%, Misce. delay = 2 %

- i) Draw a curve to illustrate detailed break up of the causes of loss in productivity
- ii) Determine the productivity percentage. 10 + 5

12.

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

- a) Draw PERT & CPM diagram.
- b) Show the critical path.



- c) Calculate the required number of days to complete the process.
 - d) Calculate the earliest and latest finish of each activity.
 - e) Slack time for each activity.
-