



Name :
Roll No. :
Invigilator's Signature :

CS/B. TECH (APM)/SEM-8/APM-802J/2011

2011

APPAREL WORK MEASUREMENT

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.

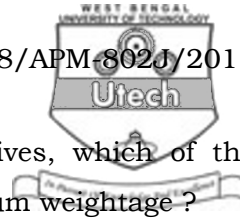
GROUP - A

(Objective Type Questions)

1. Answer the following : 10 × 1 = 10
- i) PMTS stands for
 - a) Percentage of Machine Time Selected
 - b) Predetermined Motion & Time Study
 - c) Predetermined Material Transfer System
 - d) Post Manufacturing Time Study.
 - ii) 'Work Sampling' is a part of
 - a) Method Study b) Time Study
 - c) Work Measurement d) Both b & c.
 - iii) Parameters of 'Basic time'
 - a) Observed time, Standard Time
 - b) Observed time, Break Time
 - c) Stoppage Time, Run Time
 - d) Observed Time, Performance Rating.



- iv) What of the following charts are useful to obtain an observation regarding Movement of Materials and the Carrier ?
- a) String Diagram b) Multiple Activity Chart
c) Travel Chart d) Flow Process Chart.
- v) Two Handed Process Chart can be useful for recording
- a) Automatic Rotary Screen Printing Operation
b) Manual Sewing Operation
c) Tumble Washing Operation
d) Lay Lot planning.
- vi) Distinct part of a specific job is termed as
- a) Section
b) Division
c) Element
d) none of the above.
- vii) Which of the following symbols can be used to represent 'Checking the levels while counting the garments for packing' ?
- a) b) D
c) → d) ∇.
- viii) 'Skill inventory' can be used to make
- a) Line balancing b) Training need report
c) Appraisal report d) all of the above.
- ix) Give one example each for 'Contingency allowance' & 'Process Allowance'.



- x) For evaluating the process alternatives, which of the following criteria usually gets maximum weightage ?
- a) Time cycle
 - b) Return on investment
 - c) Operator's feedback
 - d) Productivity.

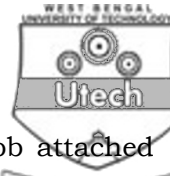
GROUP - B

(Short Answer Type Questions)

Answer any *three* of the following.

3 × 5 = 15

2. Explain in brief the factors to be considered before selecting a job to be analyzed for method study. 5
3. What do you mean by the 'Element' of a job? Mention different types of elements with suitable examples. 5
4. a) Draw a neat block diagram to show the constitution of standard time by showing different elements of standard time.
b) Define 'storage' and 'contingency allowance'
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 need etc.
a) Determine the standard time for packet attaching operation, whose normal time (basic time) is 1.5 minutes.
b) Calculate the number of packets to be attached per shift



c) If the operator engaged on the above job attached 150 pieces of pockets in a shift, what is his efficiency in that shift ? 2 + 2 + 1

6. An apparel manufacturer produces 3 products P, Q & R by using the same manufacturing facilities arranged in six departments A, B, C, D, E and F. The material handling is done by fork lifting trucks. Pallets designed for material handling can carry 150 pieces of the products manufactured. The monthly volume of production of the products are 600, 900 and 300 for A, B and C respectively. The sequence of operation of the products being manufactured are as mentioned below :

Product	Sequence of Movement
P	A, E, B, D, C, F
Q	A, B, C, D, F, F
R	C, B, A, E, D, F

Construct a travel chart to illustrate the movements of truck.

7. Define work study and time study and state their utility 5

GROUP - C

(Long Answer Type Questions)

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

8. a) Define 'Work Measurement'. Mention how work measurement can help in improving the productivity in apparel industry.
- b) Draw a suitable question Matrix for conducting 'critical examination' in Method Study.



- c) An assembly operation in Sewing Department consists of five elements with the following observed time and the performance ratings.

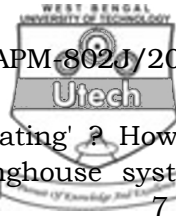
Element	Observed Time in Minutes	Performance Rating %
A	0.5	70
B	0.5	75
C	0.2	80
D	1.0	75
E	1.2	80

Assuming time allotted for rest and personal allowance = 50 minutes and contingency allowance at 20 minutes per shift of 8 hours, calculate the standard allowed minutes for the entire operation. $5 + 4 + 6$

9. 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 : 6 minutes
 Loading of Design to the CPU : 3 minutes
 Automatic Embroidery (1 full repeat) : 30 minutes
 M/c stoppage due to thread breakage and knotting : 10 minutes
 Switch off machine and raise frame : 0.10 minutes
 Taking off the embroidered fabric : 6 minutes
- Prepare a multiple activity chart and calculate capacity utilization % of man and machine in the given work cycle.



- b) A company has 20 machines in its workshop. A work sampling study was conducted to establish percentage loss of time due to different causes. The results of the two-day study are as given below :
- No of observations : 200
Observations of unproductive activity : 20
- i) How many observations are necessary to ensure that the results of the study have an accuracy level of $\pm 5\%$?
 - ii) How many rounds are necessary to complete the required number of observations ?
 - iii) How much is the average time per round assuming 8 working hours per day ? 8 + 7
10. a) The following represents the procedure of Garment Washing as observed on 4th April '11 in M/s Zenith Fashions.
- i) Bunch of Garments (60 pcs) are taken from the intermediate storage rack and carried upto the washing machine (6 mtrs away from the rack) : time taken 1.5 minutes.
 - ii) Filling of water to the washing machine : 1.5 minutes
 - iii) Adding detergents : 0.5 minutes
 - iv) Mixing detergents : 1.5 minutes
 - v) Checking & loading of garments to the washing machine : 6 minutes.
 - vi) Tumble washing cycle : 30 minutes + delay of 5 minutes due to machine problem.
 - vii) Unloading of garments : 3 minutes
 - viii) Carrying the garments to the Hydro extractor (2.5 mtrs away from the washing machine) : 0.2 minutes.
 - ix) Delay of 2 minutes due to power problem
 - x) Hydro extraction : 5 minutes
 - xi) Unloading : 1.5 minutes
 - xii) Carrying upto dryer : 0.5 minutes
- Draw a flow process chart for the above mentioned activities.



- b) What do you mean by 'Performance Rating' ? How is performance rating assessed by wesinghouse system rating? Explain with a suitable example. 7 + 8
11. a) The end results of a work sampling study conducted on a particular embroidery machine are as under :

Observations of machine working : 3500
 Observations of Machine Idle : 1500
 Total Observations : 5000

- i) Calculate the limits of accuracy
 ii) Conclude whether sufficient observations have been made at 95% confidence level.
- b) The operator engaged in an assembly operation performed the following work elements. Given below are the individual elemental times (in minutes) and the average rating.

Element	Cycle-1	Cycle-2	Cycles-3	Cycle-4	Cycle-5	Rating %
A	1.0	1.1	1.3	0.8	0.8	80
B	0.4	0.5	0.8	0.5	0.8	70
C	1.0	1.0	1.0	1.2	1.1	85
D	0.12	0.10	0.11	0.15	0.10	75

- i) Calculate Basic Time of the job
 ii) Calculate SAM for the job assuming total allowance % = 15
 iii) Check whether enough observations have been taken. If no, how many more are needed ? 5 + 10
12. a) Explain the method of selecting the best alternative from the proposed methods.
 b) Write short notes on
 i) Two Handed Process Chart
 ii) Relaxation Allowance. 7 + 8
13. Give a flow chart for a garment manufacturing unit producing any specific garment and discuss the actual time scheduling for each manufacturing unit operation. Show how to calculate the total actual time required for completing the manufacturing of one garment. 5 + 5 + 5