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**END SEMESTER EXAMINATION – 2021**

**Semester : 5th (New)**

**Subject Code : Me-502**

**INDUSTRIAL ENGINEERING**

**Full Marks – 70**

**Time – Three hours**

**The figures in the margin indicate full marks  
for the questions.**

**Instructions :**

1. *All* questions of PART – A are compulsory.
2. Answer any *three* questions from PART – B.

**PART – A**

**Marks – 25**

1. Fill in the blanks : 1×5=5
  - (a) The first method invented for project planning was \_\_\_\_\_.
  - (b) In Work study, the symbol D implies \_\_\_\_\_.

**[Turn over**

- (c) SQC techniques are based on the theory of \_\_\_\_\_.
- (d) If a worker gets daily wage of Rs. H, then according to Rowan plan, his maximum daily earnings can be \_\_\_\_\_.
- (e) The numbers of measures to define normal distribution is \_\_\_\_\_.

2. Write true or false :

1×5=5

- (a) The critical activity has zero float.
- (b) In normal distribution diagram, the two tails extend indefinitely and never touch the horizontal line.
- (c) In micro-motion study, Therbligs is represented by standard symbol and color.
- (d) A big advantage of PERT over Gantt chart is that, in PERT the interrelationships among activities is clearly shown.
- (e) In Halsey wage incentive plan, a worker is ensured a minimum wage.

3. Choose the correct one :

1×15=5

(a) Work study is concerned with

- (i) improving present method and finding standard time
- (ii) improving production capacity
- (iii) improving production and control
- (iv) All of the above

(b) Standard time is defined by

- (i) Normal time + allowances
- (ii) Normal time + idle time + allowances
- (iii) Normal time + idle time
- (iv) None of the above

(c) Gantt charts are used for

- (i) forecasting sales
- (ii) production schedule
- (iii) scheduling and routing
- (iv) linear programming

- (d) Which is not a wage incentive plan ?
- (i) Rowan plan                      (ii) Emerson plan
  - (iii) Halsey plan                      (iv) Taylor plan
- (e) PERT analysis is based on
- (i) Optimistic time
  - (ii) Pessimistic time
  - (iii) Most likely time
  - (iv) All of the above
- (f) Which one is a Job Evaluation method ?
- (i) Rankine method
  - (ii) Diary method
  - (iii) Check list method
  - (iv) None of the above
- (g) Objective of job evaluation is
- (i) to ensure correct wages
  - (ii) to reduce work imbalance
  - (iii) to resolve wage disputes
  - (iv) All of the above



- (h) The vertical axis of a Bar Chart represents
- (i) dimension                      (ii) tolerance
  - (iii) frequency                      (iv) deviations
- (i) In a 'Quality Circle', the number of employees ranges from
- (i) 0 - 5                      (ii) 8 - 10
  - (iii) 5 - 10                      (iv) 4 - 12
- (j) Which one is not a control chart ?
- (i) R-chart                      (ii) p-chart
  - (iii) Xbar-chart                      (iv)  $\beta$ -chart
- (k) Time study is carried out to determine the time required to complete the job by
- (i) a slow worker
  - (ii) a fast worker
  - (iii) an average worker
  - (iv) an apprentice

**(l) The start or completion of task is called**

- (i) An event                      (ii) An activity**
- (iii) A duration                (iv) A dummy act**

**(m) Motion study involves analysis of**

- (i) actions of operator**
- (ii) layout of work place**
- (iii) tooling and equipment**
- (iv) All of the above**

**(n) PERT has following time estimate**

- (i) one time estimate**
- (ii) two time estimate**
- (iii) three time estimate**
- (iv) four time estimate**

**(o) Actual performance of a task is**

- (i) An event                      (ii) An activity**
- (iii) A duration                (iv) None of these**

**PART – B**

**Marks – 45**

4. (a) **What is a Process Flow Chart in production ?  
What are its uses and advantages ?**

**3+3+3=9**

- (b) **What are the main symbols used in Process Flow Chart ? Explain at least six of them.**

**6**

5. (a) **What is Time Study ? What are its advantages ?**

**4+4=8**

- (b) **What is the procedure of Time study ? Write the names of equipments for Time study.**

**4+3=7**

6. (a) **Define Job Evaluation. What are its uses ?**

**5**

- (b) **What are the differences between Job Evaluation and Job Analysis ?**

**5**

- (c) **Name the different Wage Incentive Plans.**

**5**

7. Write short notes on any *three* :

5×3=15

- (a) R-chart
- (b) Bonus and incentives
- (c) Therbligs
- (d) Gantt plan.