Total No. of printed pages = 7

END SEMESTER EXAMINATION - 2019

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 *five* questions from PART – B.

PART – A

Marks – 25

1. Fill in the blanks : 1×10=10

   (a) Work study is also recognized as _____.

   (b) The process of drawing a flow chart for an algorithm is called _____.

   (c) Standard time is equal to Normal time + _____.

[Turn over

(d) In time study, the rating factor is applied to determine _____ of a job.

(e) Wages represents _____ rates of pay.

(f) _____ are also called payments by results.

(g) In organized industrial establishments pay review takes place in _____ years.

(h) Process control is carried out during _____.

(i) The chart used to monitor attributes is _____.

(j) The control chart used for the fraction of defective items in a sample is _____.

2. Write true or false : 1×10=10

(a) Low cost, higher volume items require no inspection.

(b) Central tendency of a process is monitored in Range chart.

(c) Performance of a product is the product which is capable of doing the intended job.

(d) Acceptance sampling is not a component of a quality.

(e) Quality of a product is at its lowest when performance quality component is neglected during its manufacturing.

(f) Job evaluation is a systematic process of evaluating different jobs of an organization.

(g) Merit rating determines the extent to which an employee meets job requirements.

(h) Allowance is paid only at the time of employee's exit after serving more than five years.

(i) Process standard deviation is necessarily equal to the sample standard deviation of the same process.

(j) The critical path is an activity or series of activities that if delayed will delay the whole project.

3. Choose the correct answer : 1×5=5

(a) LCL for the R-Chart is given by

(i) D_3R (ii) D_2R

(iii) $R-D_3R$ (iv) d_2R

(b) In process chart the symbol used for storage is

(i) circle (ii) square

(iii) arrow (iv) triangle

(c) The correct order of procedure in method study is

(i) select - record - examine - develop - define - install - maintain

(ii) select - define - examine - develop - record - install - maintain

(iii) select - record - develop - examine - define - install - maintain

(iv) select - record - examine - define - develop - install - maintain

(d) In outline process chart the horizontal line represents

(i) general flow process

(ii) materials being introduced

(iii) Both (i) and (ii)

(iv) None of the above

(e) Which of the following statement is not correct :

(i) PERT is the activity oriented and CPM is event oriented.

(ii) In PERT three times estimates are made where as in CPM only one time estimate is made

(iii) In PERT slack is calculated where as in CPM floats are calculated.

(iv) Both PERT and CPM are used for project situation.

PART – B

Marks – 45

4. (a) What are the objectives of Industrial Engineering ?

(b) Write about the work management technique.

(c) An industrial job involves five operations and the related data is given below. Assuming rest and personal allowances as 10% and contingencies at 2% of the basic time find the standard time for completing the job. 2+2+5=9

Operation No.	Observed Time (minutes)	British Standard Rating(0–100)	Remarks (if any)
1	0.20	85	———
2	0.32	95	———
3	0.26	90	———
4	0.35	100	———
5	2.05	80	Observed time is for Transporting 10 jobs.

5. (a) What is process chart ? Explain five basic symbols of process chart with example.

(b) What are job evaluation and Merit Rating ? Explain at least two traditional methods of Merit Rating. 1+3+2+3=9

6. (a) Distinguish between PERT and CPM.

(b) Explain the following terms (any *five*) :

(i) Event

(ii) Activity

(iii) Dummy activity

(iv) Rams

(v) Moss

(vi) Gert. 2×2+5=9

7. (a) Define S.Q.C. Mention practical devices used as tools of S.Q.C in factories.

(b) State the advantages of usuing statistical methods of quality control.

(c) What are the various factors which effect quality ? 1+2+3+3=9

8. (a) How X-bar and R-charts help in ensuring quality control.

(b) What do you understand by Sampling plan ? Describe single sampling and double sampling plans and discuss their relative advantages and disadvantages with one example.

3+1+2+2+1=9

9. (a) What is plant lay-out ? State the advantages of a good plant lay-out.

(b) Enumerate the principle of good plant lay-out.

1×2+7=9

10. (a) Define production. Enlist the methods of production.

(b) Enlist the tools of productivity.

(c) State the factors on which productivity depends.

1+2+3+3=9