



Roll No.

**PRESIDENCY UNIVERSITY
BENGALURU**

SCHOOL OF ENGINEERING

TEST - 1

Even Semester: 2018-19

Course Code: MEC 311

Course Name: Industrial Engineering Techniques

Programme & Sem: B.Tech (DE) & VI Sem

Date: 06 March 2019

Time: 1 Hour

Max Marks: 40

Weightage: 20%

Instructions:

(i) **All questions are compulsory. No internal choices are given**

Part A

Answer **both** the Questions. **Each** question carries **six** marks. (2Qx6M=12)

1. Draw the Cost vs. Volume of Production graph for Break Even Point and define the term Break Even Point. (3M Graph+3M Definition)
2. Draw the curves of Total Holding/Carrying Cost, Total Ordering Cost, Total Inventory Cost and Total Annual Cost on Cost vs. Order Size graph and define the term Economic Order Quantity. (3M Graph+3M Definition)

Part B

Answer **both** the Questions. **Each** question carries **eight** marks. (2Qx8M=16)

3. State the assumptions used in Sequencing Models. (minimum 4x2M=8)
4. For a production system

Demand = 18000 units/year

Purchase cost = Rs. 8 per unit

Ordering cost = Rs. 240 per order

Holding cost = 12% of purchase cost per unit per year

No. of working days in a year = 300

Then determine –

- (a) Economic Order Quantity (EOQ) (2M)
- (b) Optimum number of orders in a year (2M)
- (c) Optimum time period of one inventory cycle (2M)
- (d) Total Inventory Cost at EOQ. (2M)

Part C

Answer **both** the Questions. **Each** question carries **six** marks. (2Qx6M=12)

5. For a production system

Fixed cost = Rs.9000, Variable cost = Rs. 15000,

Selling price = Rs. 30000, No. of quantities to be produced = 5000 units

Determine –

- (a) (BEP) units (2M)
- (b) Margin of Safety (2M)
- (c) Volume of Production for a profit of Rs. 30000. (2M)

6. Set of jobs are to be processed on a single machine.

Jobs	Processing Time (min.)	Due Time (min.)
A	13	54
B	10	81
C	16	72
D	6	68
E	11	39
F	8	48
G	19	84
H	15	92

- (a) Obtain a sequence using Shortest Processing Time rule. (2M)
- (b) Determine the Make Span Time. (2M)
- (c) Determine Job Flow Time for each job. (2M)



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**PRESIDENCY UNIVERSITY
BENGALURU**

SCHOOL OF ENGINEERING

TEST - 2

Even Semester: 2018-19

Date: 16 April 2019

Course Code: MEC 311

Time: 1 Hour

Course Name: Industrial Engineering Techniques

Max Marks: 40

Program & Sem: B.Tech. & VI Sem (DE)

Weightage: 20%

Instructions:

(i) Read the questions and answer accordingly.

Part A

Answer **all** the Questions. **Each** question carries **four** marks. (3Qx4M=12)

1. Write the steps involved in Jonson's Rule for solving "N Jobs on Two Machines" kind of sequencing problems.
2. A company is producing a batch of 5 components for which the machining times of the components on different machines is as given below

Components	Machine X (min.)	Machine Y (min.)	Machine Z (min.)
A	8	3	5
B	4	4	6
C	7	3	7
D	5	4	8
E	6	4	4

These components are to be processed in the technological order of Machine X, Machine Y and Machine Z. Find the optimum sequence, Make Span Time & Idle Time for each machine.

3. Give the classification of Forecasting Techniques.

Part B

Answer **both** the Questions. **Each** question carries **six** marks. (2Qx6M=12)

4. Define the term "Forecasting". State its benefits.
5. Find the optimum sequence for the following set of jobs. Also find Make Span Time and Idle Time for each machine.

Jobs	Machine-1 (min.)	Machine-2 (min.)
A	3	7
B	6	9
C	5	8
D	10	5
E	7	4
F	9	10
G	8	4
H	6	9
I	5	12

Part C

Answer **both** the Questions. **Each** question carries **eight** marks.

(2Qx8M=16)

6. For the given set of work elements, draw the precedence diagram, balance the assembly line and determine Efficiency and Balance Delay for the line (as per Largest Candidate Rule). Take cycle time as one minute.

Work Elements	Task Times (min.)	Precedence Relation
1	0.2	-
2	0.4	-
3	0.7	1
4	0.1	1,2
5	0.3	2
6	0.11	3
7	0.32	3
8	0.6	3,4
9	0.27	6,7,8
10	0.38	5,8
11	0.5	9,10
12	0.12	11

7. Draw the Precedence Diagram for the following set of work elements by Rank Position Weighted Method. Balance the line & determine Efficiency and Balance Delay for the line. Take T_c as 18 min.

Work Element	Task Times (min.)	Precedence Relation
1	8	-
2	3	1
3	3	1
4	3	1
5	6	2
6	7	4
7	5	3,5,6
8	3	7
9	2	7
10	5	7
11	8	8
12	5	10
13	10	9,11,12

Part CAnswer **all** the Questions. Each question carries **fifteen** marks.

(2Qx15M=30M)

5. The number of persons arriving at a service center is 8 customers/hour and service provider takes 5 min./customer on an average. Then determine –
- Number of customers in the system and average waiting time in the system.
 - Number of customers in the queue and average waiting time in the queue.
 - Probability that at least 2 customers are waiting in the queue.
6. The sales of an automobile company is as given below. Forecast the demand for the next 2 years (11th and 12th year) using Linear Regression Analysis

Year	Sales
1	30
2	33
3	37
4	39
5	42
6	46
7	48
8	50
9	55
10	58



PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING
END TERM FINAL EXAMINATION

Even Semester: 2018-19

Date: 23 May 2019

Course Code: MEC 311

Time: 3 Hours

Course Name: Industrial Engineering Techniques

Max Marks: 80

Program & Sem: B.Tech & VI Sem

Weightage: 40%

Instructions:

- Q.1 of Part-A contains 20 questions of MCQ's/Fill in the Blank/Match the following type with **NO NEGATIVE** marking.

Part AAnswer **all** questions. Each question carries **one** mark.

(20Qx1M=20)

- In inventory control, the economic order quantity is the
 - Optimum lot size
 - Highest level of inventory
 - Lot corresponding to break-even point
 - Capability of a plant to produce
 - Queuing theory is associated with
 - Sales
 - Inspection time
 - Waiting time
 - Production time
 - An event is indicated, on the network diagram of PERT & CPM, by
 - A straight line
 - A number enclosed in a circle or a square
 - A straight line with circles at the ends
 - A dotted line
 - In queuing theory, the nature of the waiting situation can be studied and analysed mathematically if complete details of
 - Arrival and waiting times are known and can be grouped to form a waiting line model
 - All variables and constants are known and form a linear equation
 - The laws governing arrivals, service times, and the order in which the arriving units arrives to the system are known
 - None of the above

- v. If the Fixed Cost of the assets for a given period doubles, then how much will the Break-Even quantity becomes?
- Half the original value
 - Same as the original value
 - Twice the original value
 - Four times the original value
- vi. In the cost structure of a product, the selling price is determined by the factors such as
- Sales turn
 - Lowest competitive price over
 - Various elements of the cost
 - All of the above
- vii. Gantt chart provides information about the
- Material handling
 - Proper utilisation of manpower
 - Production schedule
 - Efficient working of machine
- viii. Sequencing prescribes the
- Flow of material in the plant
 - Proper utilization of man power
 - Proper utilization of machines
 - Inspection of final product
- ix. Which of the following are the benefits of assembly line balancing
1. It minimizes in-process inventory.
 2. It reduces the work content.
 3. It smoothens the production flow.
 4. It maintains the required rate of output.
- 1, 2 & 3
 - 2, 3 & 4
 - 1, 3 & 4
 - 1, 2 & 4
- x. Which of the following methods can be used for forecasting when a demand pattern is consistently increasing or decreasing
- Regression analysis
 - Moving average
 - Variance analysis
 - Weighted moving average
- xi. Queuing theory deals with problems of
- Material handling
 - Reducing the waiting time or idle time
 - Better utilization of man services
 - Effective use of machines
- xii. Which of the following is independent of sales forecast
- Productivity
 - Inventory control
 - Production planning
 - Production control

- xiii. The reasons which are basically responsible for the formation of a queue should be that
- The average service rate less than the average arrival rate
 - Output rate is linearly proportional to input
 - Output rate is constant and the input varies in a random manner
 - All of the above
- xiv. Which of the following statement is wrong?
- An activity consumes time and resources whereas an event does not consume time or resources
 - The performance of a specific task is called an activity
 - An event is an instantaneous point in time at which an activity begins or ends
 - The turning of a job on lathe is an event whereas job turned is an activity
- xv. Profit-Volume chart technique is an effective tool for analysis when the company dealing with
- Single product only
 - A loss situation
 - Only turn-key assignments
 - More than one product
- xvi. At the break-even point, _____ equals to the Total Sales or Revenue.
- xvii. In the notation (a/b/c):(d/e/f), the first position represents _____.
- xviii. In an assembly line, the formula for balance delay is _____.
- xix. The probability distribution of an activity in PERT follows _____ distribution.
- xx. PERT has _____ time estimate.

Part B

Answer **all** the Questions. **Each** question carries **ten** marks.

(3Qx10M=30M)

2. What are the differences between Program Evaluation & Review Technique and Critical Path Method?
3. The demand for a luxury car has been shown below. The expert forecasted sale of 100 cars for the month of March with a smoothing constant of 0.15. Find the forecast for the month of August.

Month	Demand
March	150
April	200
May	100
June	50
July	150

4. Define the following terms –
 - Optimistic time.
 - Pessimistic time
 - Most likely time
 - Critical path.