

5. In practice, what must be the temperature of electrolyte used in ECM?
 - a) 10 - 20°C
 - b) 60 - 80°C
 - c) 20 - 40°C
 - d) 80 - 100°C
6. Laser beam machining uses which type of power sources for machining?
 - a) Very low power
 - b) Medium power
 - c) Low power
 - d) High power
7. What are the values of voltages used in the EBM process?
 - a) 10 V
 - b) 150 V
 - c) 50 V
 - d) 200 V
8. Which of the following mechanisms is used for material removal in EDM?
 - a) Electro discharge erosion
 - b) Electro chemical dissolution
 - c) Magnetic abrasion
 - d) Mechanical erosion
9. Electro chemical grinding is _____ Electro chemical machining.
 - a) Superior to
 - b) Similar to
 - c) Inferior to
 - d) None of the mentioned
10. Which of the following electrolytes are used for machining purpose in ECG?
 - a) Sodium nitrate
 - b) Nitric acid
 - c) Hydro chloric acid
 - d) Potassium permanganate
11. Which is softer material in USM?
 - a) Tool
 - b) Tool & Work piece
 - c) Work piece
 - d) None of the mentioned
12. Vacuum is the machining medium for _____.
 - a) LBM
 - b) EBM
 - c) WJM
 - d) None of the mentioned

PART - B

Answer any FOUR out of SIX

[4x7=28]

1. Write difference between conventional Machining and Non-Conventional Machining Processes with suitable examples.
2. What are the functions of dielectric fluid and electrode in Electro-Discharge machining? Explain in detail with help of diagram.
3. Explain the process of material removal in Electro Chemical Machining (ECM) with schematic diagram.
4. Write difference between Electron Beam Machining (EBM) and Laser Beam Machining (LBM) Processes.
5. Enlist process parameters involved in Ultrasonic Machining (USM) and also explain their effect on MRR and Surface Finish.

6. In electrochemical machining of pure iron a material removal rate of 600 mm³/min is required. Estimate current requirement. Consider valency of Iron is 2, Density of iron is 7.8 kg/m³, Faraday's constant, F is 96500 coulomb.

PART-C

Answer any TWO out of FOUR

[2x15=30]

1. How Abrasive Jet Machining (AJM) is different from Water Jet Machining (WJM)? Explain working principle, applications, advantages and limitations of Water Jet Machining (WJM).
2. What are the main components of Electro-Discharge Machining? Also explain Working principle mentioning the ranges of process parameters. Also enlist applications, advantages and limitations of the process.
3. Draw a schematic diagram of an electrochemical drilling unit and explain working of each components. What do you understand by dynamics in ECM process?
4. Explain about components and working of Laser Beam Machining. Also enlist applications, advantages and limitations of the process.



8th Semester End Term Examination: 2021-22.

Subject : Total Quality Management Roll No:

Course : B.TECH ME

Full Marks : 70 Time : 3 Hours.

Instructions to the Candidates:

- Read the question paper very carefully.
- Start writing from 2nd page onwards; **Don't Write On The 1st Page Backside.**
- Question Paper is divided into Three Parts -A, B & C.
- Part-A is containing 12 multiple choice questions.
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PART - A

[12x1=12]

Multiple Choice Questions

1. The Quality as "Fitness of Use" is given by
 - a. Walter Shewhart
 - b. Joseph MJuran
 - c. Philip Crosby
 - d. W. Edward Deming
2. Cost generated before the before a product is shipped as a result of non-conformance to requirements is
 - a. Appraisal Cost
 - b. External Failure Cost
 - c. Internal Failure Cost
 - d. Prevention Cost
3. The expression of dissatisfaction with a product either orally or written is
 - a. Customer retention
 - b. Customer complaints
 - c. Customer satisfaction
 - d. Customer service
4. ----- are the charts that identify potential causes for particular quality problems.
 - a. Control Chart
 - b. Cause and Effect Diagram
 - c. Flow chart
 - d. Pareto chart

5. Motivation includes
 - a. Job satisfaction
 - b. Job enlargement
6. Kaizen is
 - a. Small change
 - b. Sudden impact
7. Plan-do-study-act cycle is a procedure to
 - a. Overall improvement
 - b. Permanent improvement
 - c. Continuous improvement
 - d. Immediate improvement
8. "Poko-Yoke" is the Japanese term for
 - a. Card
 - b. Continuous improvement
 - c. Fool proof
 - d. Fishbone diagram
9. Which of the following is not a target of Total Quality Management
 - a. Customer satisfaction
 - b. Continuous cost reduction
 - c. Reducing manpower
 - d. Continuous operational improvement
10. The roof of House of Quality shows the interrelationship between
 - a. Functional requirements
 - b. Service process
 - c. Design attributes
 - d. Manufacturing process
11. While setting Quality objective, which need has to be considered.
 - a. Customer need
 - b. Supplier need
 - c. Organizational need
 - d. Worker need
12. The aim of Just-In-Time manufacturing principle is to eliminate
 - a. Time wastage
 - b. Labour wastage
 - c. Cost of excessive inventory
 - d. All of the above

PART - B

Answer any FOUR out of SIX

[4x7=28]

1. What is meant by 'Cost of quality'? Explain in details the categories of quality costs
2. Explain the Dimensions of service quality
3. Explain the contributions of Juran to TQM
4. State and explain the barriers to TQM implementation in an organization.
5. What are the Japanese 5S principles? Mention some benefits of implementing 5S principles.

6. Write short notes on
 - a. Customer perception of quality and
 - b. Customer complaints

PART - C

Answer any TWO out of FOUR

[2x15=30]

1. Discuss the objectives, process, outcome and benefits of FMEA?
2. (a) Discuss ISO 14000 requirements and its benefits?
(b) Discuss the implementation of ISO:9000:2000 quality systems?
3. (a) What is the concern of most consumer? Is it price of the product or service? Explain in detail.
(b) What are the different ways of receiving customer feedback? How are the feedback used
4. Explain about the following :
(i). QFD process
(ii). Benchmarking process



8th Semester End Term Examination: 2021-22.

Subject : Operation Research **Roll No:**
Course : B.TECH [ME]
Full Marks : 70 **Time : 3 Hours.**

3. A project has the following activities and other characteristics:

Destinations (Time in hours)		Destinations (Time in hours)				
		D ₁	D ₂	D ₃	D ₄	Avail
O ₁		7	8	4	5	5
O ₂		8	10	2	3	7
O ₃		7	6	17	8	8
O ₄		19	10	11	3	10
Req		10	5	10	5	

Activity (i-j)	Estimated Duration in weeks		
	Optimistic	Most Likely	Pessimistic
1-2	1	1	7
1-3	1	4	7
1-4	2	2	8
2-5	1	1	1
3-5	2	5	14
4-6	2	5	8
5-6	3	6	15

- What is the expected project length?
 - What is the probability that the project will be completed no more than 4 weeks later than expected time?
4. Maximize $Z = 5x_1 - 4x_2 + 3x_3$ Subject to
- $$2x_1 + x_2 - 6x_3 = 20$$
- $$6x_1 + 5x_2 + 10x_3 \leq 76$$
- $$8x_1 - 3x_2 + 6x_3 \leq 50$$
- $$x_1, x_2, x_3 \geq 0$$
- Solve by Simplex method.

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PART - A

Multiple Choice Questions

[12x1=12]

- In a Linear Programming Problem function to be maximized or minimized are called _____.
 a) Constraints c) Objective function
 b) Basic solution d) Feasible solution
- The solution to a transportation problem with m-sources and n-destinations is feasible if the numbers of allocations are _____.
 a) m+n b) mn c) m-n d) m+n-1
- _____ are entities whose value is determined from the solution of LPP
 a) objective function c) decision variable
 b) constraints d) opportunity cost
- The shortest time in the PERT is called _____ time
 a) Expected c) Pessimistic
 b) Optimistic d) Most likely
- The total time required to complete all the jobs in a job sequence problem is known as _____

9. Processing order
 a) processing time
 b) Elapsed time
 c) Idle time
 d) Elapsed time
10. Operations Research approach is _____.
 a) Scientific
 b) Intuitive
 c) Collect essential data
 d) Collect essential data
11. The objective of network analysis is to _____.
 a) Minimize total project duration
 b) Minimize total project cost
 c) Maximize production delays, interruption and conflicts
 d) Maximize total project duration
12. Which of the following is not an inventory?
 a) Raw material
 b) Consumable tools
 c) Re-order stock level
 d) none
13. The optimum level of inventory is popularly referred to as the _____.
 a) Minimum stock level
 b) Economic Order Quantity
 c) Re-order stock level
 d) none
14. Inventory carrying costs consists of _____ and _____.
 a) Shipping cost, storage cost
 b) Handling cost, storage space cost
 c) Vendor cost, physical management cost
 d) Storage cost, physical management cost
15. _____ is a mathematical technique used to solve the problem of allocating limited resource among the competing activities
 a) Linear Programming problem
 b) Replacement Problem
 c) Assignment Problem
 d) Non linear Programming Problem
16. _____ or _____ are used to "balance" an assignment or transportation problem.
 a) Destinations; sources
 b) Dummy rows; dummy columns
 c) Units supplied; units demanded
 d) Large cost coefficients; small cost coefficients

PART - B

[4x7=28]

Answer any FOUR out of SIX

- Explain the steps in PERT method and also write the formula in calculating project variance and estimated time.
- What are costs that are involved in carrying inventory? Explain them in detail.
- What is sequencing problem? Explain the following terms in context of sequence problems: i) Total elapsed time and Idle time ii) no passing rule iii) processing

- Derive the mathematical equation for EOQ. What are the assumptions involved? Listed in the table are the activities and sequencing requirements necessary for completing the research project. Find the critical path.

Activity	A	B	C	D	E	F	G	H	I	J	K	L	M
Duration	4	2	1	12	14	2	3	2	4	3	4	2	2
Immediate Predecessor	E	A	B	K	-	E	F	F	F	I, L	C, G, H	D	I, L

- A company produces three products A, B and C by using two raw materials X and Y. 4000 units of X and 6000 units of Y are available for production. The requirement of raw materials by each product is given below:

Raw material	Requirement per unit of product		
	A	B	C
X	2	3	5
Y	4	2	7

The labor time for each unit of product A is twice that of product B and three times that of product C. The entire labor force of the company can produce the equivalent of 2500 units of product A. A market survey indicates the minimum demand of the three products are 500, 500 and 375 respectively for A, B and C. However, their ratio of number of units produced must be equal to 3: 2: 5. Assume that the profit per units of product A, B and C are Rupees 60/-, 40/- and 100 respectively. Formulate the L.P.P. for maximizing the profit.

PART - C

Answer any TWO out of FOUR

[2x15=30]

- Find the sequence that minimizes the total time required in performing the following jobs on three machines in the order ABC. Processing times (in hours) are given in the following table:

Job	1	2	3	4	5
Machine A	8	10	6	7	11
Machine B	5	6	2	3	4
Machine C	4	9	8	6	5

- The matrix given below shows the time required to shift a load from origins to destinations. Formulate a least time schedule. Time given in hours. Solve by north-west corner method



8th Semester End Term Examination: 2021-22.

Subject : Automobile Engineering **Roll No:**

Course : B.Tech ME

Full Marks : 70 **Time : 3 Hours.**

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PART - A

[12x1=12

Multiple Choice Questions

1. If the air-fuel mixture in a spark ignition engine is too rich, then air-fuel ratio is about
a. 17:1 b. 15:1 c. 13:1 d. 10:1
2. The battery is an electrochemical device, which means battery
a. Makes chemicals by mechanical means c. Uses chemical action to provide electricity
b. Has curved plates instead of flat plates d. Does not use an electrolyte
3. The correct flow of power through the drive train is
a. Engine drive shafts, clutch, main shaft, counter shaft, final driven gear, wheels
b. Engine clutch, main shaft, counter shaft, final driven gear, drive shafts, wheels
c. Engine clutch, counter shaft, main shaft, final driven gear, drive shafts, wheels
d. Engine main shaft, counter shaft, clutch, final driven gear, drive shafts, wheels

4. The braking control type traction control system (TCS) generally operates in the speed range of
 - a. Less than 20 kmph
 - b. Less than 60 kmph
 - c. Less than 40 kmph
 - d. More than 60 kmph
5. The capacity of a battery is usually expressed in terms of
 - a. Volts
 - b. Amperes
 - c. Weight
 - d. Ampere hours
6. Which of the following indicates multi-grade oil?
 - a. (A) SAE 30
 - b. API SF
 - c. SAE20 W50
 - d. API 50
7. The ignition coil is used to
 - a. Step up current
 - b. Step up voltage
 - c. Step down current
 - d. Step down voltage
8. The basic purpose of a four-wheel drive (4WD) system is that it
 - a. Delivers improved cornering on dry road surfaces
 - b. Eliminates the need of snow tyres, tyre chains, etc.
 - c. Ensures effective transmission of engine torque to all four wheels, even on slippery road surfaces
 - d. Ensures that effective braking can be performed, even on slippery surfaces
9. When a gear box has four forward speeds and one reverse speed, it is said to be a
 - a. 3-speed gear box
 - b. 5-speed gear box
 - c. 4-speed gear box
 - d. 6-speed gear box
10. In a hydraulic power steering system, the power steering pump is driven by a
 - a. Belt driven by camshaft
 - b. Belt driven by drive-shaft
 - c. Chain driven by crankshaft
 - d. Belt driven by crankshaft
11. Wheel base of a vehicle is the
 - a. Distance between the canters of the front and rear wheels
 - b. Distance between the canters of the front tyres
 - c. Distance between the canters of the rear tyres
 - d. Extreme length of the vehicle
12. The temperature at which tyre inflation pressure should be checked is
 - a. 20°C
 - b. 25°C
 - c. 35°C
 - d. Ambient temperature

PART B

ANSWER ANY FOUR OUT OF SIX

(4x7=28)

1. Briefly explain the different layouts of vehicle construction
2. Write a short note on electronic control unit.
3. Explain the single plate clutch with neat sketch.
4. Explain the purpose and working of differential unit.
5. Write short note on ABS and Traction control.
6. Explain the wheel alignment system.
- 7.

PART C

ANSWER ANY TWO OUT OF FOUR:

(2x15=30)

1. Differentiate between BoF vs. UNI body construction of a Vehicle. Explain integral and semi-integral type vehicle body construction.
2. Describe CRDI system in detail.
3. Sketch and explain various steering geometries. What is the necessity of a steering gear box?
4. Explain the concept of hybrid and CNG vehicles with neat sketch.