

**MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)**

(Affiliated to JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD)  
Gundlapochampally (H), Maisammaguda (V), Medchal (M), Medchal-Malkajgiri (Dist), Hyderabad

**IV B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, APRIL-2018****SUBJECT: UNCONVENTIONAL MACHINING PROCESS**

(BRANCH: ME)

Time: 3 Hours

Max Marks: 75

**PART-A****I. Answer all the questions****5 x 1 = 5 M**

1. The mechanism of metal removal in Ultrasonic Machining is \_\_\_\_\_.
2. What are the different types of ECM operations?
3. The transfer media applied in EDM during machining process is \_\_\_\_\_.
4. What are the applications of EBM?
5. What is meant by PAM?

**II Answer all the questions****10 x 2 = 20 M**

1. What are recent developments in ultrasonic machining processes?
2. What are the recent developments in USM?
3. Define Mean Number of Abrasive grains per unit volume of the carrier gas in AJM.
4. What are the advantages of AJM?
5. What is the use of dielectric in EDM process?
6. Write the working principle of EDM.
7. What are the applications of LBM?
8. What are the process parameters in EBM?
9. What is the principle of PAM?
10. List the different types of torches used in PAM.

**PART-B****Answer all the questions****5 x 10 = 50 M**

1. a) What is the need of UCMP? (5)  
b) Distinguish between Conventional and Un Conventional Machining process? (5)  
(OR)
2. Describe the principle and working of USM with a neat sketch. List the advantages, limitations and applications.
3. Explain the theory and material removal rate of Electro Chemical Machining Process.  
(OR)
4. Describe the principle and working of a ECM with a neat sketch. List the advantages, Limitations and applications of ECM?
5. What are the desirable properties of a dielectric fluid? Gives some examples for dielectric fluids. Explain the functions of dielectric fluid.  
(OR)
6. State the working principle and applications of Electric Discharge Machining process. What do you understand by power circuits for EDM?

7. Describe the principle and working of Laser Beam Machining (LBM) with a neat sketch. List the advantages, limitations and applications.

(OR)

8. Describe the theory of electron beam machining its advantages and its applications in various industries?

9. Explain Shaped tube electrolytic Machining process with a neat sketch and its advantages and disadvantages.

(OR)

10. Write short notes:

a) Abrasive flow finishing.

(5)

b) Chemical machining.

(5)

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**IV B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, APRIL-2018**SUBJECT: Robotics

(BRANCH: ME)

Time: 3 Hours

Max Marks:75

**PART-A****I. Answer all the questions**

5 x1=5M

1. What is mean by automation?
2. Define manipulator kinematics.
3. What do you mean by Jacobian matrix?
4. Define pneumatic actuator.
5. What features are required for robot in spray painting?

**II Answer all the questions**

10 x 2=20M

1. Explain 3 DOF associated with wrist.
2. What are the advantages of industrial robot?
3. Write homogeneous transformation matrix.
4. Define forward and inverse kinematic with the help of block diagram.
5. Define trajectory.
6. What are the software packages available for robot programming?
7. State the advantages and limitation of a hydraulic drive.
8. Define resolver.
9. Write the different applications in manufacturing.
10. What is depalletizing?

**PART-B****Answer all the questions**

5 x 10=50M

1. a) Describe the types of joints used in robots.  
b) Briefly explain present and future applications of industrial robotics.

**OR**

2. Explain the different types of grippers used in Robots.

3. For the point  $a_{uvw} = (6, 2, 4)^T$  perform following operations.

- a) Rotation  $30^\circ$  about the X- axis, followed by translation of 6 units along Y-axis.
- b) Translate 6 units along Y-axis, followed by rotation of  $45^\circ$  about X axis.
- c) Rotation  $60^\circ$  about Z-axis followed by translation of 10 units along the X-axis

**OR**

4. Determine the rotation matrix for a rotation of  $45^\circ$  about y-axis, followed by a rotation of  $120^\circ$  about z- axis, and a final rotation of  $90^\circ$  about x-axis.
5. What is offline and online robot programming?. List the different teaching methods of programming a robot.

**OR**

6. Explain Jacobean singularities in details.

7. With neat sketches explain the encoders used in robots.

**OR**

8. List and explain the different types of position sensors with neat sketches.

9. a) what are the applications of robotics in industry.  
b) Explain spray painting by robot.

**OR**

10. Explain various material handling applications of robot.



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(BRANCH: ME)

Time: 3 Hours

Max Marks: 75

**PART-A****I. Answer all the questions****5 x 1=5M**

1. Define accuracy and precision?
2. List the instruments used to measure low pressure.
3. What is meant by tachometer?
4. List out various types of psychrometers.
5. Draw a block diagram of a system using the labels input, output and control.

**II Answer all the questions****10 x 2=20M**

1. What is the function of a sensing element, signal conditioner and indicating element of a measuring instrument?
2. Explain the various types of errors in measurement systems.
3. Explain the temperature measurement by thermocouples.
4. List out the disadvantages of indirect method level measurement.
5. Why is a rotameter called variable area flow meter.
6. What are the limitations of hot wire anemometer?
7. If a strain gauge has a low gauge factor, what does it indicate?
8. What is a psychrometer.
9. What are the basic elements of a control system?
10. Explain what is meant by the term control.

**PART-B****Answer all the questions****5 x 10=50M**

1. Explain the dynamic performance characteristics of measuring instruments.  
(OR)
2. Describe the principle of operation of Piezo electric transducer. Identify the input and output of the system.
3. Explain the use of thermocouples for the measurement of average temperature of a room.  
(OR)
4. With the help of a suitable diagram, explain the construction, working and principle features of bourdon pressure gauge.
5. Explain with a neat sketch the constructional features & working principle of Laser Doppler Anemometer (LDA).  
(OR)
6. (a) Explain the working of centrifugal force tachometer with advantages and disadvantages.  
(b) Define vibration. Explain the measurement of vibration by the reed vibrometer and the stroboscope.
7. What is a psychrometer? Explain with a neat sketch the constructional features & working principle of Sling Psychrometer with advantages and disadvantages?  
(OR)
8. What is a psychrometer? Explain working principle of absorption psychrometer.
9. (a) Briefly explain the different types of control systems  
(b) Explain the working of speed control system?  
(OR)
10. With suitable diagrams, explain how a torsion dynamometer works.



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Time: 3 Hours

Max Marks:75

**PART-A****I. Answer all the questions****5 x1=5M**

1. Define CAD.
2. Define synthetic curves.
3. What is difference between Move & copy?
4. Define GT.
5. What is CAQC.

**II Answer all the questions****10 x 2=20M**

1. What are the benefits of computer aided design?
2. Give the details of Z-buffer method for hidden surface removal.
3. What are requirements of geometrical modeling?
4. What are Planar, curved & Ruled surfaces?
5. Explain what do you understand by the term numeric control.
6. Distinguish between NC and CNC.
7. What is retrieval and generative type CAPP system?
8. What are the benefits of CAPP?
9. Explain Role of computer in QC.
10. What is machine vision?

**PART-B****Answer all the questions****5 x 10=50 M**

1. Briefly explain the computerized product cycle in the manufacturing environment with block diagram.

**(OR)**

2. What is Raster Scan Graphics? Explain DDA Algorithm?
3. Explain surface representation Methods with neat diagrams.

**(OR)**

4. How do you compose solid modeling through CSG and B-rep. Explain?

5. Explain features of machining centre and turning centre.

**(OR)**

6. Explain various editing commands with example.
7. Differentiate between variant and generative process planning approach.

**(OR)**

8. What is group technology and Explain MICLASS system of coding?
9. What do you understand by computer aided quality control? Explain in detail?

**(OR)**

10. How computers aid in quality control and inspection of mechanical components? Explain any one of the inspection method.





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**IV B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, APRIL-2018****SUBJECT: POWER PLANT ENGINEERING**

(BRANCH: ME)

Time: 3 Hours

Max Marks:75

**PART-A****I. Answer all the questions****5 x 1 = 5 M**

1. List out the factors with which the unit size of the power plant is being decided.
2. What do you mean by supercharging in Diesel engine.
3. What is spillway?
4. Explain the need of radiation shield
5. What are the emissions from power plants?

**II Answer all the questions****10 x 2 = 20 M**

1. Name the four major components of steam power plant.
2. What is drift? How is the drift eliminated in the cooling towers?
3. Discuss the effect of inter cooling in a gas turbine plant.
4. What are the different types of super charging systems.
5. List out different types of solar collectors.
6. What are the different types of Non-conventional power sources?
7. List the desirable properties of good moderator.
8. Limitations of gas cooled reactors.
9. Write the General power tariff equation.
10. What is the significance of incremental rate of a power plant?

**PART-B****Answer all the questions****5 x 10 = 50 M**

1. Explain the various draught systems with a neat sketch.

**(OR)**

2. Draw the Steam Power Plant layout and explain in detail.

3. Explain the working of Diesel Power Plant with a neat sketch.

**(OR)**

4. Indicate and explain briefly the various systems of an internal combustion engine power plant with suitable sketches.

5. What are the advantages and disadvantages of solar cell?

(OR)

6. What are the functions of surge tank? Describe different types of surge tanks

7. What are the different types of radioactive waste disposal from nuclear power plant?

(OR)

8. What are the difference between a pressurized water reactor nuclear power plant and boiling water reactor nuclear power plant?

9. Explain briefly the various methods of reducing the thermal pollution.

(OR)

10. What the different types of pollution standards in India. Explain in detail.

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**IV B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, APRIL-2018****SUBJECT: Operations Research**(BRANCH: **Common to ME & Mining**)Time: **3 Hours**

Max Marks:75

**PART-A****I. Answer all the questions****5 x1=5M**

1. Define Operation Research?
2. What are the conditions used to solve n jobs three machines problem by using Johnson algorithm?
3. Give any two applications of Queuing theory.
4. Define Economic Order Quantity.
5. What is backward recursive approach in dynamic programming?

**II. Answer all the questions****10 x 2=20M**

1. Write a short note on degeneracy in transportation problems.
2. Explain duality in linear programming.
3. List out different types of sequencing models.
4. Explain the principal assumptions made while dealing with sequencing problems.
5. What is Steady state system in queuing models?
6. Write basic elements of queueing model.
7. What are Advantages of under stocking?
8. A particular item has demand of 9000units per year. The cost of procurement is Rs. 100 and the Holding cost per unit is Rs. 2.40 per year. The replacement is instantaneous and no shortages are allowed. Determine the economic lot size.
9. What are the applications of dynamic programming?
10. Write short note on simulation languages.

**PART-B****Answer all the questions****5 x 10=50M**

1. Use the two-phase simplex method to

$$\text{Maximize } Z = 5x_1 - 4x_2 + 3x_3$$

Subject to

$$2x_1 + x_2 - 6x_3 = 20$$

$$6x_1 + 5x_2 + 10x_3 = 76$$

$$8x_1 - 3x_2 + 6x_3 = 50$$

$$x_1, x_2, x_3 \geq 0$$

(OR)

2. Find the optimal solution to the following Transportation problem.

Centers

	P	Q	R	S	Availability
A	10	8	7	12	500
B	12	13	6	10	500
C	8	10	12	14	900
Demand	700	550	450	300	

3. A factory has a large number of bulbs all of which must be in working condition. The mortality of bulbs is given in the following table:

Week	1	2	3	4	5	6
Proportion of bulbs failing during the week	0.1	0.15	0.25	0.35	0.12	0.03

If a bulb fails in service, it costs 3.50 to replace but if all bulbs are replaced at a time it costs Rs.1.20 each. Find the optimal group replacement policy.

(Assume 1000 bulbs are available in the beginning).

(OR)

4. Find the sequence that minimizes the total elapsed time (in hours) required to complete on the following two machines.

Task	A	B	C	D	E	F	G
Machine I	2	5	4	9	6	2	7
Machine II	6	8	7	4	3	9	3

5. The capacity of yard is to admit of 9 trains. 30 trains/hour are received on average in the yard. Service rate is 40Trains/hour. Determine

- The probability that the yard is empty
- Average queue length

(OR)

6. At a one-man barber shop, customers arrive according to the Poisson distribution with a mean arrival rate of 4 per hour and his hair cutting time was exponentially distributed with an average hair-cut taking 12 minutes. There is no restriction in queue length. Calculate the following :

- Expected time in minutes that a customer has to spend in the queue.
- Fluctuations of the queue length.
- Probability that there is at least 5 customers in the system.

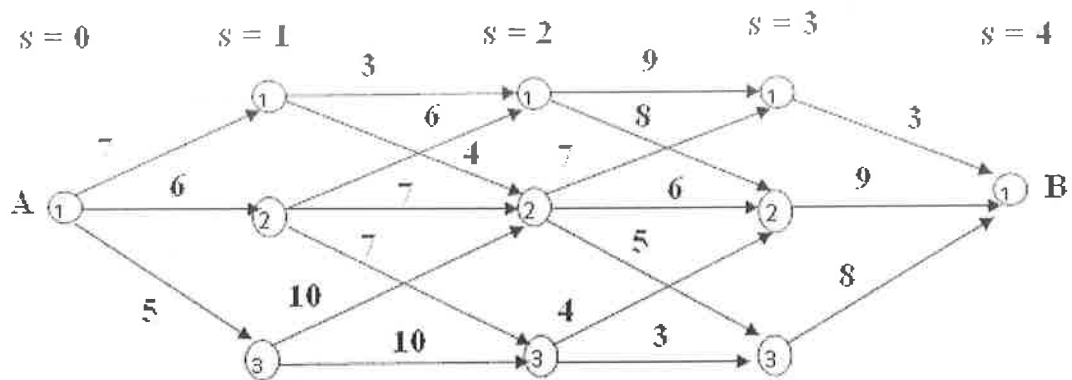
Percentage of time the barber is idle in 8-hr. day.

7. Find the most economic batch quantity of a product on a machine of the production rate of the item on the machine is 300 pieces/day and the demand is uniform at the rate of 150 pieces/day. The set-up cost is Rs.300 per batch and the cost of holding one item in inventory is Rs.0.81 per day. How will the batch quantity vary if the machine production rate was infinite?

(OR)

8. A commodity is to be supplied at a constant rate of 200 units per day. Supplies of any amount can be had at any required time, but each ordering costs Rs.50: costs of holding the commodity in inventory is Rs.2.00 per unit per day while the delay in the supply of the items includes a penalty of Rs.10 per unit per day. Find the optimal policy  $(Q,t)$ , where 't' is the reorder cycle period and Q is the inventory level after reorder. Also find the optimal inventory level and shortage units. What would be the best policy if the penalty cost becomes infinity?

9. Find the shortest path from vertex A to vertex B along arcs joining various vertices lying between A and B as shown in the figure. Length of the path is given below.



(OR)

10. Use DPP method to

$$\text{Minimize } Z = 3x_1 + 5x_2.$$

Subject to

$$x_1 \leq 4,$$

$$x_2 \leq 6,$$

$$3x_1 + 2x_2 \leq 18$$

$$x_1, x_2 \geq 0.$$

