DEPARTMENT OF MECHANICAL ENGINEERING

COURSE COVERAGE SUMMARY
AND
QUESTION BANK

FOR

IV B.TECH I SEMESTER
(2017 – 18)

MALLA REDDY COLLE GE OF ENGINEERING & TECH NOLOGY

(UGC AUTONOMOUS GOVT. OF INDIA)

(Affiliated to JNTU, Hyderabad, Approved b y AICTE - Accredited by NBA & NAAC – 'A' Grade - ISO 9001:2008 Certified)
Maisammaguda, Dhu lapally (Post Via Hakimpet), Secunderabad – 500100

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COURSE COVERAGE SUMMARY

S.NO	NAME OF THE SUBJECT	UNIT NO.	NAME OF THE TEXT BOOK	CHAPTERS COVERED
1	OR	I	**OPERATIONS RESEARCH by S.D SHARMA,R.Pannerselvam,s.kalavathy,J.K Sharma**	All Chapters covered
		II	**OPERATIONS RESEARCH by S.D SHARMA,R.Pannerselvam,s.kalavathy,J.K Sharma**	All Chapters covered
		III	**OPERATIONS RESEARCH by S.D SHARMA,R.Pannerselvam,s.kalavathy,J.K Sharma**	All Chapters covered
		IV	**OPERATIONS RESEARCH by S.D SHARMA,R.Pannerselvam,s.kalavathy,J.K Sharma**	All Chapters covered
		V	**OPERATIONS RESEARCH by S.D SHARMA,R.Pannerselvam,s.kalavathy,J.K Sharma**	All Chapters covered
2	PPE	I	**Power Plant Engineering :** S.Domkundwar , P.K.Nag ,R.K.Rajput	All Chapters covered
		II	**Power Plant Engineering :** S.Domkundwar , P.K.Nag ,R.K.Rajput	All Chapters covered
		III	**Power Plant Engineering :** S.Domkundwar , P.K.Nag ,R.K.Rajput	All Chapters covered
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		V	**Power Plant Engineering :** S.Domkundwar , P.K.Nag ,R.K.Rajput	All Chapters covered
3	CAD/CAM	I	**CAD/CAM: Priniciples & Applications:** PN Rao	All Chapters covered
		II	**CAD/CAM: Priniciples & Applications:** PN Rao	All Chapters covered
		III	**CAD/CAM: Priniciples & Applications:** PN Rao, Ibrahim Zeid	All Chapters covered
		IV	**CAD/CAM:** Groover	All Chapters covered
		V	**CAD/CAM: Priniciples & Applications:** PN Rao, **CAD/CAM: Groover**	All Chapters covered
4	ICS	I	**Mechanical Measurements and Control:** D.S. Kumar	All Chapters covered
		II	**Mechanical Measurements and Control:** D.S. Kumar	All Chapters covered
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		IV	**Mechanical Measurements and Control:** D.S. Kumar	All Chapters covered
		V	**Mechanical Measurements and Control:** D.S. Kumar	All Chapters covered
5	RBT	I	**Introduction : Mikell P Groover,** R K Mittal, J J Craig	**All chapters covered**
		II	**Motion Analysis and Manipulator** Kinematics: R K Mittal M Groover , R K	**All chapters covered**

			Mittal	
		III	**Differential kinematica manipulator: R K Mittal, J J Craig**	**All chapters covered**
		IV	**Trajectory planning : R K MIttal , J J Craig**	**All chapters covered**
		V	**Applications of robotics: R K Mittal, M Groover**	**All chapters covered**
6	**UCMP**	I	**Advanced machining processes** : VK Jain	**All chapters covered**
		II	**Modern machining process**: Pandey P.C , Shah H.S	**All chapters covered**
		III	**Unconventional machining processes** : C.Elanchezhian, B.Vijaya ramnath and M.Vijayan	**All chapters covered**
		IV	**Unconventional manufacturing processes** :M.K Singh	**All chapters covered**
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MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

Department Of Mechanical Engineering

B.Tech IVth Year 1 Semester

Operations Research

MODEL PAPER 1

PART A (25 Marks)

1. a. Write the scope of Operations research (2M)
   b. Write the Applications of Operations Research (3M)
   c. Write the different Types in Transportation problem (2M)
   d. Define the following i)Alternative optimum solution
   ii)unbounded solution
   iii)Slack variable (3M)
   e. Discuss the practical application of assignment problem (2M)
   f. Discuss the steps of Hungarian method (3M)
   g. What is dynamic programming (2M)
   h. What is Kendall Notation .Give the classification of queuing system based on Kendall Notation (3M)
   i. Define inventory (2M)
   j. Find the value of the game (3M)

6	9
8	4

PART B (50 Marks)

2. a) Let us consider a company making single product. The estimated demand for the product for the next four months are 1000,800,1200,900 respectively. The company has a regular time capacity of 800 per month and an overtime capacity of 200 per month. The cost of regular time production is Rs.20 per unit and the cost of overtime production is Rs.25 per unit. The company can carry inventory to the next month and the holding cost is Rs.3/unit/month the demand has to be met every month. Formulate a linear programming problem for the above situation.

   b) What are applications of OR

OR

3. Solve the following LPP by Big-M penalty method
   Minimize $Z = 5x_1 + 3x_2$
   S.T $2x_1 + 4x_2 \geq 12, 2x_1 + 2x_2 = 10, 5x_1 + 2x_2 \leq 10$
   and $x_1, x_2 \geq 0$

4. A company has factories at F_1, F_2 and F_3 that supply products to ware houses at W_1, W_2 and W_3

.The weekly capacities of the factories are 200,160 and 90 units. The weekly warehouse requirements are 180,120 and 150/units respectively. The unit shipping costs in rupees are as follows find the optimal solution

	W1	W2	W3	supply
F1	16	20	12	200
F2	14	8	18	160
F3	26	24	16	90
Demand	180	120	150	

OR

5. Different machines can do any of the five required jobs with different profits ring from each assignment as shown in adjusting table. Find out maximum profit possible through optimal assignment

.

Jobs	Machines				
	A	B	C	D	E
1	30	37	40	28	40
2	40	24	27	21	36
3	40	32	33	30	35
4	25	38	40	36	36
5	29	62	41	34	39

6. Solve the following sequence problem given optimal solution when passing is not allowed

Machines	Jobs				
	A	B	C	D	E
M1	11	13	9	16	17
M2	4	3	5	2	6
M3	6	7	5	8	4
M4	15	8	13	9	11

OR

7. Machine A costs of Rs:80,000. Annually operating cost are Rs:2,000 for the first years and they increase by Rs:15,000 every years (for example in the fourth year the operating cost are Rs:47,000) .Determine the least age at which to replace the machine. If the optional replacement policy is followed (a)What will be the average yearly cost of operating and owing the machine (Assume that the reset value of the machine is zero when replaced, and that future costs are not discounted

b)Another machine B cost Rs:1,00,000.Annual operating cost for the first year is Rs:4,000 and they increase by Rs:7,000 every year .The following firm has a ma(chine of type A which is one year old. Should the firm replace it with B and if so when?

(c)Suppose the firm is just ready to replace the M/c A with another M/c of the same type, just the the firm gets an information that the M/c B will become available in a year .What should firm do?

8. Obtain the optimal strategies for both pensions and the value of the game for two persons zero sum game whose payoff matrix is as follows.

		player-B	
		B1	B2
Player-A	A1	1	-3
	A2	3	5
	A3	-1	6
	A4	4	1
	A5	2	2
	A6	-5	0

OR

9. The production department of a companyrequired 3,600kg If raw material for manufacturing a particular item per year. It has been estimated that the cost of placing an order is Rs.36 and the cost of carrying inventory is 25% for the investment in the inventories, the price is Rs.10/kg. help the purchase manager to determine and ordering policy for raw material, determine optimal lot size

10. Customers arrive at box office windows being manned by a single individual according to a poisson input process with a mean rate of 20/hr. the time required to same a customer has an exponential distribution with a mean of 90 sec. Find the average waiting time of customers. Also determine the average number of customers in the system and average queue length

OR

11. a)What is simulation? Discuss application of simulation? b)Minimize $z=y_1^2+y_2^2+y_3^2$

subjected to $y_1+y_2+y_3=10$ and $y1, y_2, y_{3\geq 0}$ solve using Bellman's principle

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

Department Of Mechanical Engineering

B.Tech 4th Year 1 Sem

Operations Research

MODEL PAPER 2

PART A **(25 Marks)**

1. a. Define Operations research (2M)
   b. Write the industrial Applications of Operations Research (3M)
   c. Write the different Types in Transportation problem (2M)
   d. Write algorithm for Northwest corner method (3M)
   e. Discuss the practical application of assignment problem (2M)
   f. Discuss the steps of Hungarian method (3M)
   g. What is difference between balanced and unbalanced problems in the Assignment problems (2M)
   h. What is Kendall Notation .Give the classification of queuing system based on Kendall Notation (3M)
   i. Define inventory (2M)
   j. Find the value of the game (3M)

6	**2**	**4**
2	**3**	**3**
5	**2**	**6**

PART B **(50 Marks)**

2.a) Solve the following LP problem using graphical method

Maximize Z == $-x_1+2x_2$

Subjected to $x_1-x_2 \leq -1$

$-0.5x1-x2 \leq 2$ $x_1, x_2 \geq 0$

b) Explain the advantages of OR

OR

3 a.) Explain what is meant by degeneracy in LPP? How can this be solved?

b.) Solve the following LP problem by two phase method. Maximize Z = $5x_1+3x_2$

subjected to $3x_1+2x_2 \geq 3$

$x_1+4x_2 \geq 4$

$x_1+x_2 \leq 5$

$x_1+x_2 \geq 0$

4. a) Solve the following assignment problem to minimize the total time of the

Operator

Jobs					
Operator	1	2	3	4	5
1	6	2	5	2	6
2	2	5	8	7	7
3	7	8	6	9	8
4	6	2	3	4	5
5	9	3	8	9	7
6	4	7	4	6	8

b) Write the Mathematical representation of an assignment model?

OR

5. a). Briefly explain about the assignment problems in OR and applications of assignment in OR?

b) What do you understand by degeneracy in a transportation problem?

6. A book binder has one printing press, one binding machine and manuscripts of 7 different books The time required for performing printing and binding operations for different books are shown below

Book	1	2	3	4	5	6	7
Printing time (hr)	20	90	80	20	120	15	65
Binding time(hrs)	25	60	75	30	90	35	50

Decide the optimum sequence of processing of books binder to minimize the total time required to bring out all the books

OR

7. Six jobs are to be processed on three machines A, B, C with the order of processing jobs as BCA

Job	U	V	W	X	Y	Z
Proc,time on machine A	12	10	9	14	7	9
Proc,time on machine B	7	6	6	5	4	4
Proc,time on machine C	6	5	6	4	2	4

The suggested sequence is Y-W-Z-V-U-X. Find out the elapsed time for the sequence suggested. Is it optimal? If it is not optimal, then find out the optimal sequence and the minimum total elapsed time associated with it.

8. Define group replacement policy.

b) A computer contains 10000 resistors. When any resistor fails, it is replaced the cost of replacing a resistor individually is Rs.1 only. If all the resistors are replaced at the same time, cost per resistor would be reduced to 35 paisa. The % of surviving resistors say S(t) at the end of month t and the P(t) the probability of failure during

The month t is.

t	0	1	2	3	4	5	6
S(t)	100	97	90	70	30	15	0
P(t)	-	0.03	0.07	0.2	0.4	0.15	0.15

What is the optimal replacement policy?

OR

9. a)Explain the terms
i) Maxmin criteria and Minimax criteria ii) Strategies: Pure and mixed strategies.
b) Solve the following game graphically

	Player B		
Player A	B_1	B_2	B_3
A_1	1	3	11
A_2	8	5	2

10. Customers arrive at box office windows being manned by a single individual according to a poisson input process with a mean rate of 20/hr. the time required to save a customer has an exponential distribution with a mean of 90 sec. Find the average waiting time of the customers. Also determine the average number of customers in the system and average queue length

OR

11 a) State and explain the Bellman's principle of optimality.

b) Solve the LPP by dynamic programming approach Maximize z = 4x1 + 14x2

such that 2x 1 + 7x2 ≤ 21
7x1 + 2x2 ≤ 21 x1, x2 ≥ 0

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
Department Of Mechanical Engineering
B.Tech 4th Year 1 Sem
Operations Research

MODEL PAPER 3

PART A (25 MARKS)

1. a. Define Operations research (2M)
   b. Write the assumptions in Linear programming (3M)
   c. Write the formula for EOQ for the purchase model without shortages (2M)
   d. Write algorithm for Least Cost Cell method (3M)
   e. Discuss the practical application of assignment problem (2M)
   f. Discuss the steps of Hungarian method (3M)
   g.What is dominance property (2M)
   h.Distinguish between breakdown maintenance and preventive maintenance (3M)
   i. Define dynamic programming (2M)
   j. Find the value of the game (3M)

6	**2**	**4**
2	**3**	**3**
5	**2**	**6**

PART B (50 Marks)

2. Solve the following LPP problem by Two phase method Max $Z=2x_1+3x_2+5x_3$

S.T $3x_1+10x_2+5x_3\leq 15$

$33x_1-10x_2+9x_3\leq 33$

$x_1+2x_2+3x_3\geq 4$

$x_1, x_2, x_3\geq 0$

OR

3.a) Define the LPP. Give an example

b) Solve the following LPP using graphical method and verify by Simplex method

Maximize $Z=10x_1+8x_2$

S.T $x_1+2x_2\leq 1000$

$x_1\leq 300$

$x_2\leq 500$ and $x_1, x_2, \geq 0$

4. a) Give the mathematical formulation of Transportation problem

b) Use Vogel's approximate method to obtain an initial basic feasible solution of a transportation problem and find the optimal solution

Warehouse / Factory	W	X	Y	Z	Supply
A	11	13	17	14	250
B	16	18	14	10	300
C	21	24	13	10	400
Demand	200	225	275	250	

OR

5. Six jobs go first on machine A, then on machine B and last on a machine C. The order of completion of jobs have no significance. The following table gives machine time for the six jobs and the three machines. Find the sequence of jobs that minimizes elapsed time to complete the jobs.

Jobs	Processing Time		
	Machine A	Machine B	Machine C
1	8	3	8
2	3	4	7
3	7	5	6
4	2	2	9
5	5	1	10
6	1	6	9

6. The data collected in running a Machine the cost of which is Rs: 60,000 are

Resale value	1	2	3	4	5
Resale value (R	42,000	30,000	20,400	14,400	9,650
Cost of Spares (	4,000	4,270	4,880	5,700	6,800
Cost of Labor	14,000	16,000	18,000	21,000	25,00

Find the time when the machine should be replaced?

OR

7. Find the most economic batch quantity of a product on machine if the production rate of the item on the machine is 300 pieces per 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 n rate was infinite?

8. a)Explain the terms i)Rectangular games ii) type of Strategies

b) Solve the following game graphically where pay off matrix for player A has been prepared

1	5	-7	4	2
2	4	9	-3	1

OR

9. A dealer supplies you the following information with regards to a product that he deals in annual demand =10,000 units, ordering cost Rs.10/order. Price Rs.20/unit. Inventory carrying cost is 20% of the value of inventory per year. The dealer is considering the possibility of allowing some back orders to occur. He has estimated that the annual cost of back ordering will be 25% of the value of inventory

    a. What should be the optimum no of units he should buy in 1 lot?
    b. What qty of the product should be allowed to be back ordered
    c. What would be the max qty of inventory at any time of year
    d. Would you recommend to allow backordering? If so what would be the annual cost saving by adopting the policy of back ordering.

10. a) Explain how the queues are classified and give their notations
    b) In a bank, cheques are cashed at a single "teller" counter. Customers arrive at the counter in a Poisson manner at an average rate of 30 customers/hr. The teller takes on an average 1.5 minutes to cash a cheque. The service time has been shown to be exponentially distributed.
    i) Calculate the percentage of time the teller is busy
    ii) Calculate the average time a customer is expected to wait.

OR

11. Use dynamic programming to solve the following
    LPP Max $z= 3x_1+5x_2$

    Subjected to $x_1 \leq 4$.

    $X_2 \leq 6$,

    $3x_1+2x_2 \leq 18$,

    $x1, x2 \geq 0$

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
Department Of Mechanical Engineering
B.Tech 4th Year 1 Sem
Operations Research

MODEL PAPER 4

PART A **(25 Marks)**

1. a. Define Operations research (2M)
   b. What is simulation and what is the need of simulation (3M)
   c. What is surplus variable (2M)
   d. Write algorithm for Northwest corner method (3M)
   e. Discuss the practical application of Transportation problem (2M)
   f. Discuss the steps of Hungarian method (3M)
   g. What is difference between balanced and unbalanced problems in the Assignment problems (2M)
   h. Define the following i)balking
      ii)Reneging
      iii)dynamic programming (3M)
   i. Define strategy (2M)
   j. Find the value of the game (3M)

1	-1	3	-1	5
-2	2	-2	4	-2

PART B **(50 Marks)**

2. a)Write the applications and scope of OR

   b) Use Big-M method solve the following

   Max $Z=6x_1+4x_2$

   Subjected to $2x_1+3x_2\leq 30$, $3x_1+2x_2\leq 24$, $x_1+x_2\geq 3$, $x_1, x2 \geq 0$

OR

3. Solve the following LPP by Two phase method Max $z =2x_1+3x_2+5x_3$

   subjected to $3x_1+10x_2+5x_3\leq 15$

   $33x_1-10x_2+9x_3\leq 33$

   $x_1+2x_2+3x_3\geq 4$

   $x_1,x_2, x_3 \geq 0$

4.a) What do you understand by degeneracy in a transportation problem?

b) Obtain initial solution in the following transportation problem by using VAM and LCM

Source	D1	D2	D3	D4	D5	Availability
S1	5	3	8	6	6	1100
S2	4	5	7	6	7	900
S3	8	4	4	6	6	700
Requirement	800	400	500	400	600	

OR

5. Different machines can do any of the five required jobs with different profits resulting from each assignment as shown in the adjusting table. Find out maximum profit possible through optimal assignment.

Jobs	Machines				
	A	B	C	D	E
1	30	37	40	28	40
2	40	24	27	21	36
3	40	32	33	30	35
4	25	38	40	36	36
5	29	62	41	34	39

6. A salesman has to visit five cities A,B,C,D,E. The intercity distances are tabulated below

	A	B	C	D	E
A	-	12	24	25	15
B	6	-	16	18	7
C	10	11	-	18	12
D	14	17	22	-	16
E	12	13	23	25	-

Find the shortest route covering all the cities.

OR

7.a) Explain the terminology of sequencing techniques in operations research?

b) Solve the following sequence problem, given an optimal solution when passing is not allowed

Machines	Jobs				
	A	B	C	D	E
M1	11	13	9	16	17
M2	4	3	5	2	6
M3	6	7	5	8	4
M4	15	8	13	9	11

8.a) Purchase manager places order each time for a lot of 500 no of particular item from the available data the following results are obtained, inventory carrying 40%, ordering cost order Rs.600, cost per unit Rs.50 annual demand 1000 find out the loser to the organization due to his policy

b) What are inventory models? Enumerate various types of inventory models and describe them briefly

OR

9. a)What are characteristics of a game?

b) Reduce the following Game by dominance and the fid the game value

PlayerA					
		I	II	III	IV
	I	3	2	4	0
	II	3	4	2	4
	III	4	2	4	0
	IV	0	4	0	8

10. A bakery keeps stock of a popular brand of cake. Previous experience show the daily demand pattern for the item with associated probabilities as given

Daily damand (number)	0	10	20	30	40	50
Probability	0.01	0.20	0.15	0.50	0.12	0.02

use the following sequence of random numbers to simulate the demand for next 10 days Random numbers: 25,39,65,76,12,05,73,89,19,49 Also estimate the daily average demand for the cakes on the basis of the

OR

11. Solve using dynamic programming

Max $z= 50x_1+100x_2$

S.T $2x_1+3x_2 \leq 48$

$x_1+3x_2 \leq 42$

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
Department Of Mechanical Engineering
B.Tech 4th Year 1 Sem
Operations Research

MODEL PAPER 5

PART A **(25 Marks)**

1. a. Define scope of Operations research (2M)
   b. Write the advantages of simulation (3M)
   c. What is artificial variable (2M)
   d. Write algorithm for LCM method (3M)
   e. Discuss the practical application of Transportation problem (2M)
   f. Write any three applications of Bellman's principle of optimality (3M)
   g. What is difference between balanced and unbalanced problems in the Assignment problems (2M)
   h. Write the applications of Travelling salesman problem (3M)
   i. Define pure strategy (2M)
   j. Discuss the steps of Hungarian method (3M)

PART B **(50 Marks)**

2. a) A firm produces three types of biscuits A,B,C it packs them in arrangement of two sizes 1 and 11. The size 1 contains 20 biscuits of type A, 50 of type B and 10 of type C. the size 11 contains 10 biscuits of type A, 80 of type B and 60 of type C. A buyer intends to buy at least 120 biscuits of type A, 740 of type B and 240 of type C. Determine the least number of packets he should buy. Write the dual LP problem and interrupt your answer

   b) Solve the following LPP using graphical method and verify by Simplex method

   Maximize $Z=10x_1+8x_2$

   S.T $x_1+2x_2\leq 1000$

   $x_1\leq 300$

   $x_2\leq 500$ and $x_1, x_2 \geq 0$

OR

3. a) Explain what is meant by degeneracy in LPP? How can this be solved? b)Solve the following LP problem by graphically

   Maximize $Z=2x_1+x_2$

   S.T $x_1+2x_2\leq 10$, $x_1+x_2\leq 6, x_1-x_2\leq 2, x_1-2x_2\leq 1$ $x_1, x_2 \geq 0$

4. a) State the assignment problem mathematically.

   b) For the assignment table, find the assignment of salesmen to districts that will result

in maximum sales

Districts / Sales people	A	B	C	D	E
1	32	38	40	28	40
2	40	24	28	21	36
3	41	27	33	30	37
4	22	38	41	36	36
5	29	33	40	35	39

OR

5. a) What do you understand by degeneracy in a transportation problem?

b)A company has three plants at locations A.B.C which supply to Warehouse located at D,E,F,G and H. Monthly plant capacities are 800,500, and 900 respectively. Monthly warehouse requirements are 400,500,400 and 800units.Unit Transportation cost in rupees is

	D	E	F	G	H
A	5	8	6	6	3
B	4	7	7	6	5
C	8	4	6	6	4

Determine the optimum distribution for the company in order to minimize total transportation cost by NWCR

6. a) State Group of replacement policy

b) The following failure rates have been observed for a certain type of light bulbs

End of week	Probability of failure date
1	0.05
2	0.13
3	0.25
4	0.43
5	0.68
6	0.88
7	0.96
8	1.00

The cost of replacing an individual failed bulb is Rs.1.25.the decision is made to replace all bulbs simultaneously at fixed intervals and also to replace individual bulbs as they fall in service. If the cost of group replacement is 30 paise per bulb, what is the best interval between group replacements? At what group replacement price per bulb would a policy of strictly individual replacement become preferable to the adopted policy?

OR

7. a) A firm is considering the replacement of a machine, whose cost price is Rs.12,200 and its shop value is Rs.200. From experience the running (maintenance and operating) costs are found to be as follows.

Year	1	2	3	4	5	6	7	8
Ruuning cost	200	500	800	1200	1800	2500	3200	4000

When should the machine be replaced?

b) Explain two person zero sum game and n person game?

8. The demand for a purchased item 1000 units per month and shortages are allowed. If the unit cost is Rs. 1.50 per unit, the cost of making one purchase is Rs.600,the holding cost for one unit is Rs.2 per year and one shortage isRs.10 per year. Determine

i)The optimum purchase quantity

ii)The number of orders per year

iii)The optimal total yearly cost

OR

9. a)Obtain the optimal strategies for both pensions and the value of the game for two persons zero sum game whose payoff matrix is as follows.

		player-B	
		B1	B2
Player-A	A1	1	-3
	A2	3	5
	A3	-1	6
	A4	4	1
	A5	2	2
	A6	-5	0

b) Explain pay of matrix and types of strategy in game theory?

10. a) Define simulation why simulation uses. Give one application area when this technique is used in practice

b) Use dynamic programming to solve the following

LPP Max $z= 3x_1+5x_2$

Subjected to $x_1 \leq 4$.

$X_2 \leq 6$,

$3x_1+2x_2 \leq 18$,

x1,x2≥ 0

OR

11. a)What are the applications of the dynamic programming?.Explain Bellman's principle of optimality.

b)Using dynamic programming approach solve the below problem

Maximize $z = 8x_1 + 7x_2$

S.T $2x_1 + x_2 \leq 8, 5x_2 + 2x_2 \leq 15, x_1, x_2 \geq 0$

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

Department Of Mechanical Engineering

B.Tech 4th Year 1 Sem

Model Paper - I

Power Plant Engineering

Time : 3 Hours Max.Marks : 75

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a,b,c as sub questions .

Part -A (25 Marks)

1 a) What is the difference between renewable and non renewable sources of energy ?. [2]

b) Draw the energy conservation chart for a steam power plant. [3]

c) What is co-generation ?. [2]

d) Contrast a fire tube and water tube boiler. [3]

e) What points should be considered for designing a coal handling plant ?. [2]

f) Classify the I.C.engines. [3]

g) Classify the hydraulic turbines. [2]

h) Name the common coolants used in a reactor. [3]

i) Define load factor and utility facor. [2]

j) What are the major sources of air pollutants ?. [3]

Part -B (50 Marks)

2 a) When the wet type of mechanical dust collector is prefered and why? [5]

b) Explain with the neat diagram the working of different types of wet type mechanical collectors . [5]

OR

3 a) What is the importance of thermal power development in the country?. Describe its
Development during the last six plans period . [5]

b) Explain different types of cooling towers used in steam power plant. Discuss their specific
advantages.

4 a) What are the different methods of firing coal ?. [5]

b) List out the advantages of diesel power plants. [5]

OR

5) A regenrative gas turbine power plant consists of two stage compressor with perfect cooling and single turbine. All the components of the plants are mounted on a single shaft. The overall pressure ratio is 8. The maximum temperacture of the cycle is limited to 590^{0}C. The regenerator receives 60% of the available energy from the exchaust gases. The compressor and turbine isentropic effiencies are 83% and 86% respectively. Find the

efficiency and ratio of useful work to the turbine work. [10]

6 a)What are the factors considered in selecting a prime mover for a hydro electric power
Plant ?. [5]

b) Write a short note on Spill ways. [5]

OR

7 a) Classify horizontal wind turbine systems and explain any such system. [5]

b) Give the information about various world tidal power plants. [5]

8 a) What do you understand by thermal shielding ? [3]

b) What are the functions of a reflector ? [4]

c) Explain the working of a homogeneous reactor ?. [3]

OR

9 a) How nuclear reactors are are classified? [3]

b) Discuss the advantages and disadvantages of Pressurized Water Reactor [4]

c) Give a brief account of nuclear waste disposal. [3]

10 a) Explain load curve and load duration curve. [4]

b) A power plant has the following annual factors, Load factor = 70%,Capacity factor = 50%,Use factor = 60%.Max demand is 20 MW. Find

i. Annual energy production.
ii. Reserve capacity over and above peak load.
iii. Hours during which the plant is not in service per year.

OR

11 a) What are the basic elements exhausted with the flue gases ?. [5]

b) Discuss various methods to reduce sulphur dioxide emissions . [5]

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

Department Of Mechanical Engineering

B.Tech 4th Year 1 Sem

Model Paper - II

Power Plant Engineering

Time : 3 Hours Max.Marks : 75

Note : This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units . Answer any one full question from each unit. Each question carries 10 marks and may have a,b,c as sub questions .

Part -A (25 Marks)

1a) What are the two main types of steam power plants ?. [2]

b) Define a boiler. [3]

c) What is the necessity of reheating of steam? [2]

d) What are the various types of fuels used in thermal plants? [3]

e) What is the function of a superheated? [2]

f) Give the field of application of diesel power plants. [3]

g) Name the components of a gas turbine plant. [2]

h) What are the materials used for solar cells?. [3]

i) Define incremental rate and incremental efficiency. [2]

j) What is thermal pollution? [3]

PART-B 50MARKS

2) a) What do you understand by FBC? Explain its working principle with a neat sketch.

b) What are the major advantages of FBC system over conventional one?

3 a) What will be the future planning of power generation in India? b) What are the different methods of firing coal ?.

4 a) Explain with necessary diagram, different fuel injection systems used in diesel engine plant. [5]

b) Contrast between diesel engine and steam engine. [5]

OR

5) Draw the gas power plant layout and explain. [10]

6 a) What are the functions of surge tank and fore bay? [5]
b) Explain the various types of dams that are used in electric power generation [5]

OR

7 a) Explain the working princip[le of solar chimney . [5]
b) What are the factors consided in erecting a wind power plant?. [5]

8) Discuss the various factors to be considered , while selecting the site for nuclear power stations . Discuss the advantages and disadvantages . [10]

OR

9 a) What is a moderator in nuclear reaction? Explain the desirable properties of good Moderator. [5]
b) How are the nuclear reactors classified ?. [5]

10 a) Explain environmental pollution due to road transport. [5]
b) Write short notes on stratospheric ozone depletion and acid fog. [5]

OR

11a) Explain (a). Load factor (b). Demand factor. [5]

b) A central power station has annual factors as follows :
Load factor = 60%
Capacity factor = 40%
Use factor = 50%

Power station has a maximum demand of 15000 kw .
Determine

i. Annual energy production.

ii. Reserve capacity over and above peak load [5]

iii. Hours per year not in service.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

Department Of Mechanical Engineering

B.Tech 4th Year 1 Sem

Model Paper - III

Power Plant Engineering

Time : 3 Hours Max.Marks : 75

Note : This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units . Answer any one full question from each unit.

Each question carries 10 marks and may have a,b,c as sub questions .

Part -A (25 Marks)

1a) What is regenerative cycle? [2]

b) Contrast dry and wet cooling towers. [3]

c) What is a stoker? [2]

d) What Operations comprise ash handling? [3]

e) What are the requirements of a good economizer ? [2]

f) Draw the layout of a typical diesel power plant layout . [3]

g) Define air rate and work ratio. [2]

h) What is a fuel cell? [3]

i) Define half life. [2]

j) What is meant by "capacity scheduling" ?. [3]

Part -B (50 Marks)

2 a) Explain with a neat sketch the working principle of pulverized coal storage in bunker & pulverized fuel handling system. [5]

b) Explain with a neat sketch the working principle of various types of ash handling systems. [5]

OR

3 a) Explain with a neat sketch the working principle of MHD generator and its advantages and disadvantages. [5]

b) Explain the working principle of closed cycle gas turbine with a neat sketch and name the various fuels used in the gas turbines. [5]

4 a) Explain with a line diagram the working principle of hydro electric power plant. [5]

b) Explain the working principle of a solar pond [5]

OR

5 . Write the status of biomass energy and solar energy in Indian context. [10]

6 a) Explain with a neat sketch the working principle of pressurized water reactor and boiling water reactor. [5]

b) Explain the various nuclear wastes of power plants & energy storage systems. [5]

OR

7 a) What is a moderator in nuclear reaction? Explain the desirable properties of good moderator. [5]

b) Explain the properties of moderator used in nuclear reactor. [5]

8 a) How are silicon cells fabricated? [5]

b) What are the advantages and disadvantages of SPV generation ?. [5]

OR

9 a) Explain load curve and load duration curve. [5]

b) Write about the method of loading steam power plant. [5]

10 a) What do you understand by the term tariff ?. [5]

b) Discuss the economic loading of combined steam and hydro plants. [5]

OR

1 a) Briefly explain fossil fuel pollution.

b) What do understand by acid rains? What are the reasons of this? How are they controlled?

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

Department Of Mechanical Engineering

B.Tech 4th Year 1 Sem

Model Paper - IV

Power Plant Engineering

Time : 3 Hours Max.Marks : 75

Note : This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units . Answer any one full question from each unit.

Each question carries 10 marks and may have a,b,c as sub questions .

Part -A (25 Marks)

1a) Classify the power plants on the basis of traditional use. [2]

b) Mention the uses of fly ash. [3]

c) What is a super critical boiler?. List out its merits and demerits. [2]

d) Draw the neat sketch of electrostatic precipitator. [3]

e) Discuss the applications of diesel electric power plants . [2]

f) Bring out the differences between closed and open gas turbine cycles. [3]

g) Mention the purpose of surge tank in a hydro electric power plant. [2]

h) Mention the concept of solar thermal receiver system. [3]

i) What is nuclear fusion ?. [2]

j) How the concentration of gaseous pollutants expressed?. [3]

Part -B (50 Marks)

2 a) What are the ash handling systems? Draw a line diagram of hydraulic ash handling system for modern high capacity power plants. Explain. [5]

b) Explain the working principle of a evaporative suface condenser, with the help of a neat sketch. [5]

OR

3 a)Explain the working of spreader stoker. [5]

b) Calculate the height of the required to produce a draught equivalent to 20 mm of water if the flue gas temperature is 260^0 c and ambient temperature is 27^0 c and the stochiometric air requirement is 18kg/ kg of fuel. Assume 50% excess air for combustion.

4 a) Why is super charging necessary in diesel power plants?. What methods are used for Supercharging diesel engines ?.

b) A gas turbine has a pressure ratio of 6 and maximum cycle temperature of 800^0 c . [6 The isentropic f efficiencies of compressor and turbine are 0.82 and 0.85 respectively. Calculate the power output and efficiency ,when air enters the compressor at 15^0c and 1 bar.

OR

5 a)Explain the working of a thermoelectric engine with suitable sketches. [4]

b) What is the importance of the parameter gas conductivity in MHD Generation? [3]

c) Discuss the problems associated with the operation of a fuel cell. [3]

6 a) What are different non conventional energy sources ?. Explain the working of a Geothermal power plant?. [3]

b) What are the key parameters of water on which the magnitude of hydro power depends ? [3]

c) What is a spillway? Why are spillways required ? [4]

OR

7a) What is "Direct Energy Conversion system?. Explain in brief various types of Direct energy conversion systems. [4]

b) Differentiate flat plate collectors and focusing collectors. [3]

c) Describe flat plate collector with a neat diagram . [3]

8a) What are the different types of reactors commonly used in nuclear power stations?. [2]

b) What do you understand by breeding? What factors control the breeding? Draw a neat diagram of breeder reactor and list out its advantages and disadvantages. Why only sodium is used as coolant in breeder reactors. [8]

OR

9 a) How is waste disposed from nuclear power station ? [5]

b) Sketch and explain the working of boiling water reactor. [5]

10 a) What are the tariffs in common use?. Explain the flat demand rate method. [5]

b) Explain the straight line method and sinking fund method of calculating the depreciation. [5]

OR

11a) What do you understand by power plant economics? [3]

b A power station has two 60 MW units each running for 1500 a year. The energy energy produced per year is $700 * 10^6$ Kw-hr. Calculate the plant load factor and plant use factor. [5]

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
Department Of Mechanical Engineering
B.Tech 4th Year 1 Sem

Model Paper – V

Power Plant Engineering

Time : 3 Hours Max.Marks :75

Note : This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units . Answer any one full question from each unit.
Each question carries 10 marks and may have a,b,c as sub questions .

Part -A (25 Marks)

1 a) Define boiler draught. [2]

b) What is the function of a cooling tower in a power plant ?. [3]

c) What are the principles of stokers ?. [2]

d) Mention two characteristics of diesel power plant. [3]

e) What are the applications of gas turbine power plants. [2]

f) What is the principle of tidal energy ?. [3]

g) What is the function of pressuriser in PWR?. [2]

h)What are the safety measures for nuclear power plants? [3]

i) What are straight meter and block meter method tariffs ? [2]

j) What are the operating characteristics of power plants ? [3]

Part -B (50 Marks)

2 a) Differentiate the overfeed and underfeed coal firing systems. [5]

b) Enumerate the advantages and disadvantages of pulverized fuel firing. [5]

OR

3 a) Explain the working principle of electrostatic precipitator and Give its advantages. [5]

b) With a neat sketch explain VELOX –boiler. State the fact on which it is constructed. [5]

4) Explain the cooling systems of diesel power plants. [10]

OR

5 a) Explain the gas turbine plant with intercooler, regenerator and raheater Give the combined T-S diagram. [5]

b) Explain the different sources od geothermal power . [3]

c) What are the advantages and disadvantages of solar cell [2]

6 a) Distinguish between hydro power plant and thermal power plant. [5]

b) What is pumped storage system? [5]

OR

7 a) Classify wind turbine power systems. [4]

b) Explain the working principle of high head hydro power plant ,giving its layout clearly. [6]

8) Explain how fission reaction takes place and how the chain reaction is Controlled? [10]

OR

9a) What are the desirable properties of a good moderator ? [5]

b) What are the main difficulties in handling radio active waste?. [5]

10 a) Give the requirements of tariff . [4]

b) Explain what do you mean by base load and peak load power plants. Why are base load plants loaded heavily? [6]

OR

11 a) Write down some specific definitions of air pollution . [5]

b) Enumerate the power plant pollutants of most concern. [5]

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

Department Of Mechanical Engineering

B.Tech 4th Year 1 Sem

Model Paper - VI

Power Plant Engineering

Time : 3 Hours Max.Marks : 75

Note : This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units . Answer any one full question from each unit. Each question carries 10 marks and may have a,b,c as sub questions .

Part – A

1) What are renewable and non - renewable energy sources?
2) What are the different ash handling systems?
3) What are the functions of cooling system and lubrication system of IC engine?
4) What is the purpose of intercooler in gas turbine power plant?
5) Explain about penstock?
6) What is the working principle of magneto hydrodynamic power plant?
7) State some advantages of Pressurized Water reactor?
8) What is breeding in nuclear reactor?
9) Define load curve and maximum demand.
10) What do understand by acid rains? What are the reasons of this?

Part - B

1) Describe the working of demineralizing water treatment system with a neat sketch.
   OR
2) Explain the working of different types of draught used in thermal power plant

3) Sketch the lay put of a diesel engine power plant. Explain the different components of diesel engine power plant.

OR

4) What are the merits and demerits of a gas turbine power plant over other thermal power plant? Explain the construction and operation of combustion system of a gas turbine power plant

5) Sketch the layout of hydroelectric power plant and list the advantages and disadvantages of hydroelectric power plant.

OR

6) What do you understand by MHD? Explain the working principle of MHD with neat sketch.

7) What is BWR? Explain with a neat sketch about the working of BWR.

OR

8) What is nuclear fission? List down some safety measures for nuclear power plants.

9) What do you mean by depreciation? Enumerate and explain briefly various methods used to calculate the depreciation cost.

OR

10) a) Explain the various methods to reduce the pollution.

b) What are the effects of SO2, NO2 and hydrocarbons on the human and crop lives?

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
Department Of Mechanical Engineering
B.Tech 4th Year 1 Sem

Model Paper - V

Power Plant Engineering

Time : 3 Hours Max.Marks : 75

Note : This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units . Answer any one full question from each unit.
Each question carries 10 marks and may have a,b,c as sub questions .

Part - A

1) Name the four major circuits in steam power plant.
2) Discuss briefly about the properties of coal.
3) What is supercharging of IC engine?
4) Write short notes on combined cycle power plant.
5) What is the use of surge tank?
6) What is a fuel cell?
7) What is meant by nuclear fission?
8) Name the different components of nuclear reactor?
9) Define connected load and demand factor.
10) Write short notes on pollution due to nuclear power plants.

Part - B

1) What is energy? What are its different forms? Discuss with reference to Indian scenario.

OR

2) Make neat sketch and explain the working of
   i. Chain stoker
   ii. Spreader stoker
3) With a neat diagram discuss the wet sump lubrication system pertaining to a diesel engine.

OR

4) What are the essential components of a simple open cycle gas turbine plant?How inter cooling and regeneration help in improving thermal efficiency of the plant?

5) What are the factors considered in selecting a prime mover for a hydro electric power plant and explain.

OR

6) With a neat sketch explain briefly about HAWT.

7) Describe with a neat sketch construction and working of PWR.

OR

8) Give the construction and working of gas cooled reactor.

9) a)What is the significance of load curves and load duration curves?

b)explain briefly about capital cost and operational cost.

OR

10) Name important gaseous pollutants discharged by thermal power plants.

How are they controlled.

MALLAREDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

Department Of Mechanical Engineering

B. Tech 4 Year 1 Sem-

Model Paper - I

CAD/ CAM

PART A (25 Marks)

1. a. What is clipping? (2M)
b. Explain the benefits of CAD? (3M)
c. What is sweep representation? (2M)
d. What are the requirements of geometric modeling? (3M)
e. Write about NC part programming. (2M)
f. Enumerate the advantages of computer assisted part programming when compared to manual part programming? (3M)
g. Write about part families? (2M)
h. Explain the MICLASS coding system with an example? (3M)
i. Write about types of manufacturing systems? (2M)
j Explain the benefits of applications and advantages of CAQC with CAD CAM systems? (3M)

PART B (50 Marks)

1. Explain the concept of various co ordinate systems required for geometric display systems. Give an example?

OR

2. Define the term product life cycle also compare and contrast between the product cycle in a conventional manufacturing environment?

3. Describe with the help of neat sketches the major surface entities provided by the CAD/CAM systems.

OR

4. Explain the importance of vertex, edge and face table in the boundary representation of solid modeling?

5. Briefly discuss the following NC motion control system of point to point, straight cut and contouring?

OR

6. What is meant by a machining centre? Discuss the features of a CNC turning centre with a neat diagram.

7. Explain the part design and manufacturing attributes giving examples?.

OR

8. Explain the guide lines and benefits of implementing GT?

9. With a CIM circle diagram explain communication network the system?

OR

10. What are the functions of machine vision? Describe the procedure of machine vision?

MALLAREDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

Department Of Mechanical Engineering

B. Tech 4 Year 1 Sem

Model Paper - II

CAD/CAM

PART A (25 Marks)

1. a. What is rendering and explain it effects? (2M)
b. What is aliasing? Describe different methods of carrying anti-aliasing? (3M)
c. What are the different types of curve fitting techniques? (2M)
d. Explain extrude and loft commands in CAD software package? (3M)
e. Differentiate between the CNC and DNC (2M)
f. Discuss the salient features of machining centers? (3M)
g. Write the Benefits of CAPP? (2M)
h. Discuss the benefits of group technology? (3M)
i. Discuss about Loop layout in Flexible Manufacturing System. (2M)
j. Define computer aided quality control? Explain how it is implemented? (3M)

PART B (50 Marks)

2. A triangle lamina has corners P, Q, R the coordinates of the points are (20, 20), (40, 25), (30, 40) respectively. The lamina is rotated about P through 300^0 in clockwise direction. Obtain the transformation matrix and calculate the new coordinates of the triangle.

OR

3. Discuss the concept of obtaining a rotation about an arbitrary point in XY plane?

4. What are the primitive elements in CAD? Give the classification of geometric modeling systems based on their capabilities?

OR

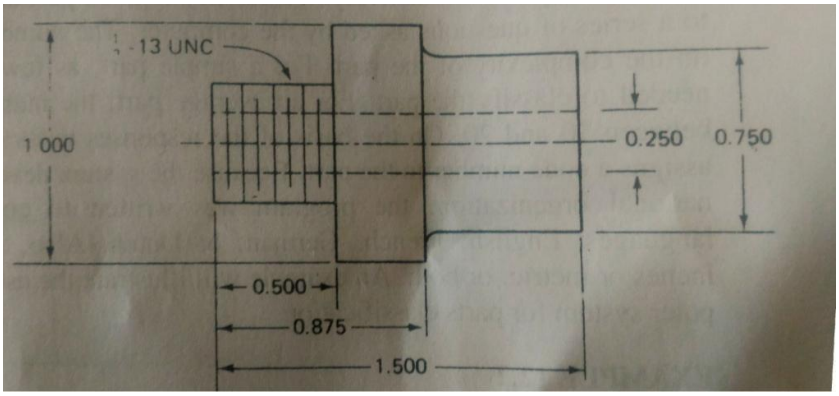
5. A cubic Bezier curve is defined by the control points as (20, 20), (60, 80), (120,100) and (150, 30). Find the equation of the curve and its midpoint.

6. With a block diagram explain main features of CNC machine tools with feed back?

OR

7. Write about the Horizontal and vertical axis machining centre in a CNC?

8. Develop the Optiz form code with justification for the component shown in figure.



OR

9. Define MRP? Write about Concepts, Inputs and Outputs of Material Requirement Planning.

10. With a block diagram explain the computerized elements of CIM system?

OR

11. With the help of schematic diagram explain the measurement system based on scanning laser beam system explain its applications in CAQC systems?

MALLAREDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

Department Of Mechanical Engineering

B. Tech 4 Year 1 Sem

CAD/CAM

Model Paper - III

PART A (25 Marks)

1. a. Discuss about the Editing Commands of CAD. (2M)
b. Briefly explain the working of refresh display and DVST? (3M)
c. write the applications of Bezier curves? (2M)
d. What is importance of layers in drafting? Explain with an example? (3M)
e. Discuss the advantages and disadvantages of NC. (2M)
f. Write about Adaptive Control? (3M)
g. What are the benefits of Manufacturing Requirement Planning? (2M)
h. Explain about the retrieval type process planning. (3M)
i. Discuss about the Open field layout in Flexible Manufacturing Systems. (2M)
j. What are the types of CMM? State the applications? (3M)

PART B (50 Marks)

2. What is display unit? Discuss screen buffer and scanning related to CAD system?

OR

3. Briefly discuss various input devices for the graphics and state their functions?

4. Explain the constructive solid geometry for the representation of solids?

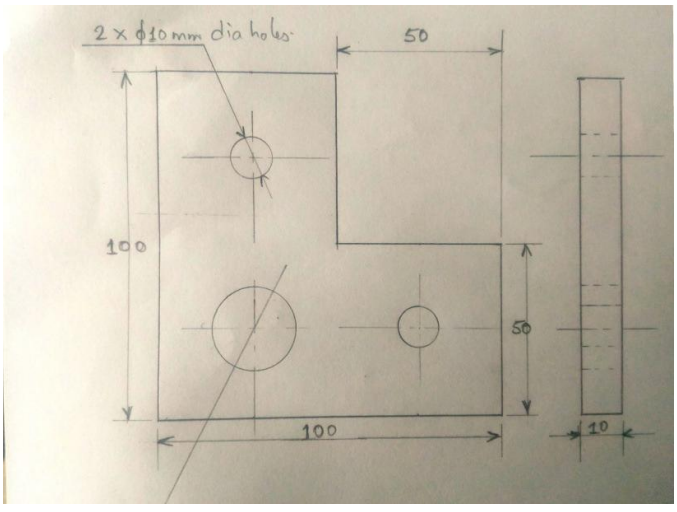
OR

5. Describe with the help of neat sketches the major surface entities provided by the CAD CAM systems?

6. Under what circumstances the adaptive control machining system is used? Discuss briefly?

OR

7. The component to be machined is shown in figure. Write a program using canned cycles to drill all the holes shown in figure.



8. What are the part families? What are the methods used for grouping of parts?

OR

9. What is meant by CAPP? Briefly explain the generative type process planning?

10. Describe different types of material handling systems used in CIM briefly?

OR

11. Discuss the role of computer networks in CIM?

MALLAREDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

Department Of Mechanical Engineering

B. Tech 4 Year 1 Sem

CAD/CAM

Model Paper - IV

PART A (25 Marks)

1. a. Define curve fitting? Explain? (2M)
b. Explain the Z buffer algorithm for hidden surface removal? (3M)
c. What is the importance of layers in drafting? Explain with an example. (2M)
d. What is the Bezier surface? Discuss the properties of Bezier surface. (3M)
e. Write about NC part program? (2M)
f. Discuss about point-point and contouring modes. (3M)
g. Write about process and product layout? (2M)
h. Explain generative type process planning (3M)
i. Write about the equipment of FMS control? (2M)
j. State the advantages of CIM in manufacturing industry? (3M)

PART B (50 Marks)

2. What are the various types of co ordinate systems used to input store?

OR

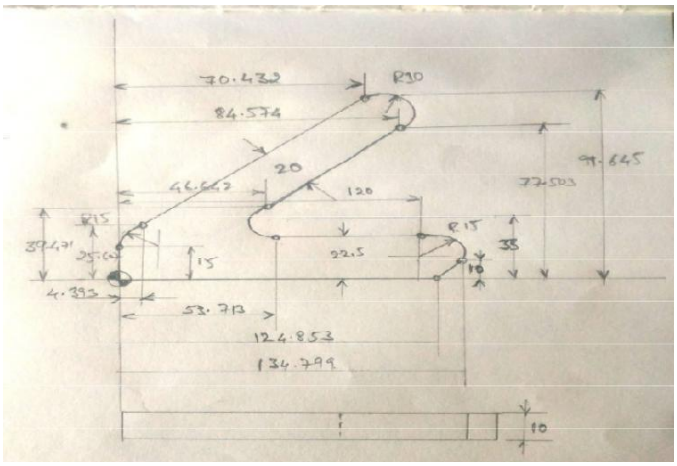
3. Briefly describe the types of storage devices used in computers.

4. What are the differences and applications of coons and Bezier surfaces?

OR

5. Describe the Euler-Poincare formula for boundary representation of solid modeling with an example?

6. The components to be machined shown in the figure. Write a program using cutter radius compensation to cut the external contour.



OR

7. What is meant by a machining centre? Discuss the features of a CNC turning centre with a neat diagram.

8. What is meant by CAPP? Compare and contrast retrieval and generative CAPP systems.

OR

9. Define part family in GT? Explain one method of parts coding system

10. Discuss various types of contact inspection methods with neat diagram.

OR

11. What is meant by CIM? Illustrate the importance of CIM in modern manufacturing systems.

MALLAREDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

Department Of Mechanical Engineering

B. Tech 4 Year 1 Sem

CAD/CAM

Model Paper - V

PART A (25 Marks)

1. a. Define Bezier surface (2M)
b. Explain three dimensional transformations with an example? (3M)
c. Write about three Boolean operations in used in solid modeling (2M)
d. Explain various facilities that are useful for geometric entities in CAD drafting system? (3M)
e. Write about Coordinate system and motion group of preparatory functions. (2M)
f. Differentiate between manual part programming and computer aided part programming in CNC machines? (3M)
g. Discuss the benefits of group technology (2M)
h. Explain retrieval type process planning. (3M)
i. Write the benefits of FMS? (2M)
j. Explain the application of machine vision in computer aided inspection? (3M)

PART B (50 Marks)

2. Explain the concept of various co ordinate systems required for geometric display systems. Give an example?

OR

3. What is data base structure? Explain the popular database model with an example?

4. Explain the importance of clipping? Give the details of method used for line clipping?

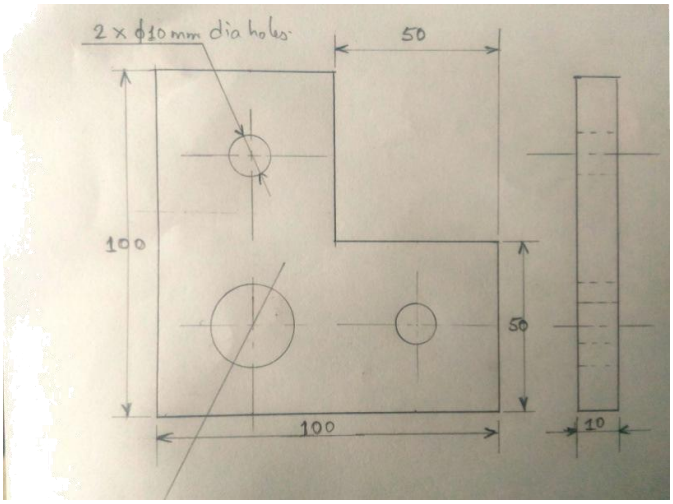
OR

5. Explain Bezier curve and B-Splines for CAD applications.

6. Briefly discuss the following NC motion control system of point to point, straight cur and contouring?

OR

7. The component to be machined is shown in figure. Write a program using canned cycles to drill all the holes shown in figure.



8. Define Group Technology. Explain the guidelines and benefits of implementing GT.

OR

9. What is meant by CAPP? Compare and contrast retrieval and generative CAPP systems.

10. Discuss the principle of material handling. Name and describe the five types of material handling devices?

OR

11. What is meant by CIM? Discuss the various principles of material handling systems.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF MECHANICAL ENGINEERING
B.TECH IV- YEAR, I-SEM
ICS MODEL PAPER – 1

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PART – A 25M

1. a. Define calibration.

   b. Explain the following terms,

      i) Speed of response

      ii) Time constant

      iii) Dead zone

   c. What are the various materials used for thermocouple?

   d. Distinguish between Gas and Vapour pressure thermometer?

   e. List out advantages and limitations of direct method of level measurement?

   f. Differentiate between vibrometer and accelerometer?

   g. What is a strain gauge? Classify different types.

   h. Write advantages of Mechanical strain gauges?

   i. What are requirements of control systems?

   j. What is closed loop control system? Give an example.

PART – B 50M

2. What standard inputs are considered for obtaining dynamic characteristics of measurement system? Plot the signals.

OR

3. a. What are the desired, interfering and modifying inputs for a measurement system? How do they affect the output? What is the method of input signal filtering?

   b. Classify measuring instruments.

4. a. Give the classification of inductive transducers indicating their principles.

   b. Describe the constructional features of,

      i) Bellow type gauges

      ii) Diaphragm type gauges and show how their output signals are processed for indication.

OR

5. a. Explain the thermocouple laws and also their practical significance.
   b. Explain the working principle of piston gauge with a neat sketch.
6. a. What is the principle of ultrasonic flow meter? Explain the operation of ultrasonic flow meter with neat sketch.
   b. Discuss the following mechanical tachometers:
      i) Vibrating reed tachometer
      ii) Centrifugal force tachometer
      iii) Slipping clutch tachometer

OR

7. a. Enumerate the principle of operation of the following,
      i) Capacitive level indicator
      ii) Ultrasonic level measuring instrument

   b. Describe the function of stroboscope and explain how speed of a roatating shaft can be measured by single pattern and multiple pattern discs.

8. a. Explain the method of measuring force using strain gauges.
   b. Explain the working principle of sling psychrometer with sketch.

OR

9. a. Distinguish between two-gauge bridge system and four gauge bridge system for strain measurements.
   b. Explain the measurement of force using,
      i) strain gauge torsion meter.
      ii) Electrical torsion meter.

10. What are the basic elements of a control system? Explian.

OR

11. What is a servo mechanism? Explain its features.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF MECHANICAL ENGINEERING
B.TECH IV- YEAR, I-SEM
ICS MODEL PAPER – II

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PART – A 25M

1. a. Define linearity.

   b. What do you mean by instrumentation? Write the objective of instrumentation.

   c. Describe the reasons for the popularity of the Bourdon tube element for pressure measurement.

   d. Explain merits of pirani gauge.

   e.List out the important of calibration of flow measuring instruments.

   f. Explain how a vibrometer is calibrated to measure acceleration.

   g. Name the various types of strain gauges for different applications.

   h. Define the following:

      i) Dry air

      ii) Moist air

      iii) Dry bulb temperature.

   i. What is open loop control system? Give an example.
   j. How water level in a boiler is controlled?

PART – B 50M

2. How do second order instruments respond to ramp input?

OR

3. a. A precise instrument need not be accurate. Explain.

   b. Briefly explain about dynamic performance characteristics.

4. a. Write the construction and principles of a piezo electric transducer.

   b. With the help of diagram explain the construction, working and principal features of bourdon tube pressure gauge.

OR

5. a. Discuss various types of elastic pressure sensing elements used in electrical transducers.

   b. Explain the bellows arrangement used to measure absolute pressure gauge and differential pressure gauge.

6. a. Explain hot wire anemometer.

   b. Explain the construction, principle of working and advantages of LVDT accelerometers.

OR

7. a. Explain the use of rotameter for flow measurement.

   b. What is a seismic type velocity transducer? Expalin its construction with help of a neat diagram.

OR

8. a. Explain the mounting procedure of strain gauges.

   b. How is dew point temperature measured?

OR

9. a. What is load cell? Explain principle and working of electric load cells.

   b. List out the properties of materials used for strain gauges.

10. Distinguish between manual control system and automatic control systems.

OR

11. Define transfer function and establish an expression for the value of transfer function for temperature control system.

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B.TECH IV- YEAR, I-SEM
ICS MODEL PAPER – III

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PART – A 25M

1. a. What do you mean by the term calibration? Explain it.
   b. Differentiate between threshold and resolution.
   c. What are the various factors effecting the accuracy of dead weight testers?
   d. List the limitations of elastic diaphragm gauge.
   e. What are the advantages and disadvantages of centrifugal speed tachometer?
   f. What is flow visualization?
   g. What are requirements of a strain gauge?
   h. What are load cells? Name the application of load cells.
   i. What are the features of open loop system?
   j. Explain why negative feedback is invariably preferred in closed loop systems.

PART – B 50M

2. Explain the dynamic response characteristics of first order instruments to step, ramp and sinusoidal inputs.

OR

3. a. What is measurement system and explain its elements?

   b. Briefly explain about dynamic performance characteristics.

4. a. Expalin the construction and working of pyrometer.

   b. List the types of thermal conductivity gauges. Explain their operation in the measurement of low pressure.

OR

5. a. Describe the following pyrometers,
      i) Infrared pyrometer
      ii) Optical pyrometer.

   b. Distinguish between RTD and thermistors.

6. Explain the measurement of liquid level using,
    i) Bubbler level indicator
    ii) Magnetic type level indicator

OR

7. a. Explain the construction and working of stroboscope. State its advantages and limitations.
   b. Explain the principles of seismic instruments for measuring acceleration.
8. a. Explain how a strain gauge is used for measurement of torque.

   b. How is dew point temperature measured?

OR

9. a. Explain the working principle of optical torsion meter.

   b. List out the properties of materials used for strain gauges.

10. a. Differentiate between open and closed loop systems.
    b. Distinguish between manual control system and automatic control systems.

OR

11. Explain with the help of a block diagram the working of a variable speed D.C. drive control system. State its characteristics and applications.

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B.TECH IV- YEAR, I-SEM
ICS MODEL PAPER – IV

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PART – A 25M

1. a. Explain the following terms,

   i) Speed of response

   ii) Time constant

   iii) Dead zone

   b. Define linearity.

   c. Distinguish between Gas and Vapour pressure thermometer?

   d. Describe the reasons for the popularity of the Bourdon tube element for pressure measurement.

   e. Differentiate between vibrometer and accelerometer?

   f. List out the important of calibration of flow measuring instruments.

   g. Write advantages of Mechanical strain gauges?

   h. Name the various types of strain gauges for different applications.

   i. What is closed loop control system? Give an example.

   j. What is open loop control system? Give an example.

PART – B 50M

2. a. What are the desired, interfering and modifying inputs for a measurement system? How do they affect the output? What is the method of input signal filtering?
   b. Classify measuring instruments.

OR

3. How do second order instruments respond to ramp input?

4. a. Explain the thermocouple laws and also their practical significance.
   b. Explain the working principle of piston gauge with a neat sketch.

OR

5. a. Write the construction and principles of a piezo electric transducer.

   b. With the help of diagram explain the construction, working and principal features of bourdon tube pressure gauge.

6. a. Enumerate the principle of operation of the following,
   iii) Capacitive level indicator
   iv) Ultrasonic level measuring instrument

   c. Describe the function of stroboscope and explain how speed of a Rotating shaft can be measured by single pattern and multiple Pattern discs.

OR

7. a. Explain hot wire anemometer.

   b. Explain the construction, principle of working and advantages of LVDT accelerometers.

8. a. Distinguish between two-gauge bridge system and four gauge bridge system for strain measurements.
   b. Explain the measurement of force using,
   i) Strain gauge torsion meter.
   ii) Electrical torsion meter.

OR

9. a. Explain the mounting procedure of strain gauges.

   b. How is dew point temperature measured?

10. What is a servo mechanism? Explain its features.

OR

11. Distinguish between manual control system and automatic control systems.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF MECHANICAL ENGINEERING
B.TECH IV- YEAR, I-SEM
ICS MODEL PAPER –V

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PART – A 25M

1. a. What do you mean by the term calibration? Explain it. b.What do you mean by instrumentation? Write the objective of Instrumentation.

   c. What are the various factors effecting the accuracy of dead weight testers?

   d. What are the various materials used for thermocouple?

   e. What are the advantages and disadvantages of centrifugal speed tachometer?

   f. Explain how a vibrometer is calibrated to measure acceleration.

   g. What is a strain gauge? Classify different types.

   h. What are load cells? Name the application of load cells.

   i. How water level in a boiler is controlled?

   j. What is closed loop control system? Give an example.

PART – B 50M

2. Explain the dynamic response characteristics of first order instruments to step, ramp and sinusoidal inputs.

OR

3. a. What standard inputs are considered for obtaining dynamic characteristics of measurement system? Plot the signals.

   b. What are the desired, interfering and modifying inputs for a measurement system? How do they affect the output? What is the method of input signal filtering?

4. Write the construction and principles of a piezo electric transducer.

OR

5. a. Explain the construction and working of pyrometer.
   b. Explain the working principle of piston gauge with a neat sketch.

6. What is the principle of ultrasonic flow meter? Explain the operation of ultrasonic flow meter with neat sketch.

OR

7. Explain the principles of seismic instruments for measuring acceleration.
8. a. Explain the use of rotameter for flow measurement.

   b.What are the basic elements of a control system? Explian.

OR

9. a. Explain the method of measuring force using strain gauges.
   b. Explain the working principle of sling psychrometer with sketch.

10. a. Distinguish between manual control system and automatic control systems.

    b. How is dew point temperature measured?

OR

11. What is a servo mechanism? Explain its features.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF MECHANICAL ENGINEERING
B.TECH IV- YEAR, I-SEM
ROBOTICS
MODEL PAPER –I

PART A (25 MARKS)

1)

a) What is meant by position and orientation of robot? [2]

b) Name the four basic arm configurations that are used in robotic manipulators? [3]

c) Define homogeneous transformation matrix. [2]

d) Draw any two Euler angle systems and show rotation and angles. [3]

e) Define forward kinematic model and inverse kinematic model. [2]

f) What is Jacobian of a robot system? [3]

g) Derive the jacobian matrix for the 2 link planar manipulator? [2]

h) Define trajectory planning. [3]

i) Define the terminology of trajectory planning. [2]

j) Write the applications of robot in industries [3]

PART B (50 MARKS)

2) Draw and explain the four basic configurationsof robot.

OR

3) Explain the different types of joints used in robotswith neatsketch.

4) Compute the homogeneous transformation representinga translation of 3 units along the x-axis followed by a rotatingof $\pi/2$ about the current z-axis followed by a translation of 1 unitalong the fixed y-axis. Sketch the frame. What arethe coordinates of the o1 with respect to the original frame ineach case.

OR

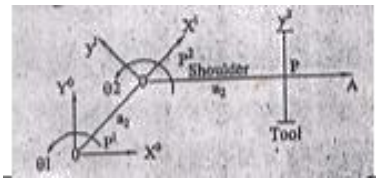
5) Give Euler angles representation for the RPY system andderive the rotationmatrix.\

6) Explain the importance of homogenoustransformations.

OR

7) For the vector v=25i+10j+20k, perform a translation bya distance of 8 in the x-direction, 5 in the y-direction and 0in thez-direction.

8) Find the manipulator jacobian matrix j(q) of the two-axis planer articulated robot shown in figure.



OR

9) Determine the time required for each joint RRR manipulator to travel the following distances using slew motion;

joint 1, 100 ^{0}; joint 2, 30 ^{0}; and joint 3, 60^{0}. Alljoints travel at a rotation velocity of 15 ^{0}/s.

10) What are the considerations of Robots in material handling?
OR

11) What are the features of robot in machine loading and unloading applications?

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B.TECH IV- YEAR, I-SEM
ROBOTICS
MODEL PAPER –II

PART A (25 MARKS)

1)

a) Define the work envelope. [2]

b) Describe the role of arm and wrist of a robotic manipulator. [3]

c) Why DH convention does not give unique frame assignment for a given manipulator? [2]

d) Explain the factors on which the number of solutions to given inverse kinematics model depend. [3]

e) Write the advantages Newton-Euler formulations [2]

f) Define the following terms

1) Path

2) Trajectory

3) Spline [3]

g) What is quantization error? [2]

h) Make a list of limitations of two dimensional vision systems. [3]

i) What type of manipulator is generally used in applications? [2]

j) What are essential characteristics of a spot welding manipulator? [3]

PART B (50 MARKS)

2) What are the considerations in gripper selection and design. Explain?

3) What are the advantages and disadvantages of magnetic grippers?Explain the two categories of magnetic grippers?

4) Find the composite rotation matrix that represents a rotation of θ angle about OZ

axis followed by a rotation of θ angle about OV axis followed by a rotation of α angle about the OW axis.

5) Explain the roll pitch and yaw angle system?

6) The link parameter table of a SCARA robotic manipulator is given below Find the jocobian matrix of manipulator.

Table: Link parameter table of SCARA robot

Axis	Θ	d	a	A
1	Θ_1	d_1	a_1	180^0
2	Θ_2	0	a_2	0
3	0	d_3(variable)	0	0
4	Θ_4	d_4	0	0

7) Derive the expression for joint torques of a planar R-P manipulator by using Lagrange- Euler formulations.

8) Explain the working of DC Servo Motor.

9) Discus the principle of a Resolver.

10) What are the considerations of Robots in processing applications?

11) What are the features of Robot in machine loading and unloading applications?

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B.TECH IV- YEAR, I-SEM
ROBOTICS
MODEL PAPER –III

PART A (25 MARKS)

1)

a) What are the advantages of cylindrical arm configurations? [2]

b) Discuss the differences between polar arm and articulated arm configurations? [3]

c) What do you understand by screw transformations? Where these transformations can be used? [2]

d) "The forward kinematic model of a manipulator depends on the choice of home position of the manipulator." Comment on this statement. [3]

e) What are closed form solutions to inverse kinematics problem? [2]

f) Define the terms of following

1) Knot points
2) Path update rate
3) Spline [3]

g) Make a list of internal or status sensors used in robotic manipulators. [2]

h) What tasks can be performed by a robotic vision system? [3]

i) What characteristics an arc welding robotic system must have? [2]

j) Why robots are useful in industries? [3]

PART B (50 MARKS)

2)Explain the Engelburgers factors in gripper selection and design.

OR

3)What are the advantages and disadvantages of magnetic grippers? And Explain the two categories of magnetic grippers.

4)What do you mean by Homogenious coordinates? For the point 2i-3j+7k perform the following operations

i) Rotate 60^0 about the OY axis ii) Then transalate 10 units along OZ axis

OR

5) Explain the Eulerian angle syatem I.

6) Discus the D-H symbolic notation and explain the D-H method of assignment of coordinate planes.

OR

7) What is a Geometric Jacobian? And explain.

8)Find the Jacobian matrix of a planar two link revolute jointed manipulator.

OR

9) Determine the time require for each joint of a 3 axis RRR manipulator to travel the following distances using slew motion; joint 1,100^0 ; joint 2,30^0; joint 3,60^0 . All joints travel at arotation velocity of 15^0/s.

10) Find the expression for the joint motion parameters by using cubic polynomial fit in the joint space scheme.

use the following data : θ_0=20,θ_f=70,t=3 sec.

OR

11) What are the considerations of robot in material handling?

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B.TECH IV- YEAR, I-SEM
ROBOTICS
MODEL PAPER –IV

PART A (25 MARKS)

1)a) How many degrees of freedom are normally provided in the arm of a manipulator? [2]

b) Define the following

1) Load carrying capacity

2) Work volume

3) End-effector. [3]

c) What are fundamental rotation matrices? [2]

d) Explain why homogeneous coordinates are required in modeling of robotic manipulators. [3]

e) What are global and local scale factors? [2]

f) Define the DH parameters? [3]

g) Write the differences between joint space and Cartesian space technique. [2]

h) What is quantization error? How it can be corrected or minimized? [3]

i) What is the minimum number of degrees of freedom for assembling? [2]

j) What are essential characteristics of a spot welding manipulator? [3]

PART B (50 MARKS)

2) What are the basic components of robotic system? Explain the functions of each of the components with a diagram.

OR

3) What is the work envelope of a robot? Discuss its features in detail.

4)Briefly explain about the following

I) Homogeneous coordinates ii) Homogeneous transformation

OR

5) For the point 3i+7j+5k perform the following operation: Transalate 6 units along Y then raotate 30^0 about X.Find the rotation transformation matrix.

OR

6)Perform the forward transformation for the 4 axis microbot using the following data:

Link	a	α	θ	d
1	0	-90	θ_1	d_1
2	a_2	0	θ_2	0
3	a_3	0	θ_3	0
4	a_4	90	θ_4	0

7) Consider a two link robot arm and assume that each link is 1m long. The robot arm is require to move from an initial position (x,y)=(1.96,0.50) to a final position (x,y)=(1.00,0.075). The initial and final velocity and acceleration are zero. Determine the coefficients of a cubic polynomial at each joint to accomplish the motion.

OR

8) Under what conditions a hydraulic motor is preffered, compared to stepper or DC servomotor. Briefly explain the functioning of a hydraulic motor.

9)Derive the expressions for joint torques of a planar RR manipulator by using Lagrange- Euler formulations.

10) What are the considerations of the robot in processing applications.

OR

11) What are the features of robot in assembly operations.

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B.TECH IV- YEAR, I-SEM
ROBOTICS
MODEL PAPER –V

PART A (25 MARKS)

1)

a) Name the four basic components of a robot system. [2]

b) Describe the functions of four basic components of a robot. [3]

c) Write the fundamental rotation matrix in x direction. [2]

d) Explain briefly equivalent angle representation. [3]

e) Explain why homogeneous coordinates are required in modeling of robotics manipulators [2]

f) What are parameters for a link for kinematic modeling?[3]

g) Why solutions to inverse kinematic problem are generally difficult? [2]

h) Briefly explains Jacobian Inverse [3]

i) What are the singularities of a manipulator? [2]

j) What is a skew symmetric matrix? How this matrix is related to the angular velocity of a link of an n degree of manipulator? [3]

PART B (50 MARKS)

2) State some applications of Robotics in various fields including agriculture, medical and defense areas.

OR

3) How do you classify robot end-effector? Discuss in detail.

4) Define rotation transformation and explain how to represent the transformation for rotation of an angle ‘ ’ about x, y and z axis.

OR

5) What is a forward kinematics problem? Explain Denavit-Hartenberg convection for selecting frames of reference in robotic application.

6) Find the manipulator Jacobian matrix J(q) if the five axis spherical co-ordinate robot.

OR

7) Explain Direct and Inverse dynamics with a block diagram applied to a simple task.

8) A manipulator with a single link is to rotate from (0) = 30^0 to (2)= 100^0 in 2 seconds. The joint velocity and acceleration are both zero at the initial and final positions.

a) Determine the coefficients of a cubic polynomial that accomplishes the motion.

b) Determine the coefficients of a quartic polynomial that accomplishes the motion. and

c) Determine the coefficients of a quantic polynomial that accomplishes the motion.

OR

9) Under what conditions a hydraulic motor is preferred compared to stepper or DC servomotor. Briefly explain the functioning of a hydraulic motor.

10) Write a short note on assembly applications of the robots in industry.

OR

11) Write the non-industrial applications of robots.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF MECHANICAL ENGINEERING
B.TECH IV- YEAR, I-SEM
UNCONVENTIONAL MACHINING PROCESSES
MODEL PAPER-1

PART A

1] a)What are traditional machining methods?[3]
b) Mention Classification of modern machining processes? [2]
c) What are considerations in machining process selection?[3]
d) Explain elements of the processes?[2]
e) Write about economic considerations?[3]
f) Mention few application of USM?[2]
g) Explain mechanics of metal removal?[3]
h) Write notes on surface finish? [2]
i) Importance of accuracy of cut? [3]
j) What is maskants in machining processes? [2]

PART B

Answer any five of the following **5*10=50**

2) Explain the reasons that lead to the development of Unconventional machining process. [10]

OR

Explain with the help of Neat sketch the working of USM.[10]

3)Describe the variables that affect the metal removal rate in Abrasive jet machining. [10]

OR

Discuss the basic principles of Electro chemical machining using a neat sketch. [10]

4) Explain the principle of operation of metal removal in electro discharge machining Operation. [10]

OR

Explain maskants and etchants in case of CHM. [10]

5) What are the advantages of water circulation in the torch of the PAM? [10]

OR

Compare EBM and LBM on the following aspects: [10]

6) State application of Plasma and chemical machining processes [10]

OR

What are the advantages of water circulation in the torch of the PAM? [10]

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DEPARTMENT OF MECHANICAL ENGINEERING
B.TECH IV- YEAR, I-SEM
UNCONVENTIONAL MACHINING PROCESSES
MODEL PAPER-2

PART A

1] a) Write notes on MRR? [3]
b) What are process parameters in USM? [2]
c) What are Abrasives used in machining processes? [3]
d) What is basic principle involved in Abrasive water jet machining? [2]
e) Write about tool design in ECM? [3]
f) Draw power circuit of EDM? [2]
g) Write EDM principle and application? [3]
h) What are thermal features in EBM? [2
i) Mention applications of laser beam machining? [3]
j) Differentiate between cutting speed and accuracy of cut? [2]

PART B

Answer any five of the following 5X10=50

2) What are the various factors considered while selecting modern machining process? And explain their applications. [10]

OR

Explain the process parameters that are affecting USM process. [10]

3) Explain the working principal of AWJM and also explain various abrasives those can be used in the process. [10]

OR

Explain MRR, tool design, surface finish in ECM. [10]

4) Discuss the model proposed by Shaw regarding the metal removal rate and obtain an expression for MRR.[10]

OR

How the developments in the area of materials are partly responsible for evaluation of advanced machining techniques?[10]

5) Describe about the importance of supply voltage, break down voltage, charging resistance, gap setting and die electric strength of gap in electro discharge machining.

OR

Sketch the Rotary pulse generator used in EDM process and mention its ad-vantages over Relaxation circuit.[10]

6) Explain MRR, accuracy of cut and surface finish in case of PAM process. [10]

OR

Explain principal of CHM process. [10]

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B.TECH IV- YEAR, I-SEM
UNCONVENTIONAL MACHINING PROCESSES
MODEL PAPER3

PART A

1] a) What are the machining considerations? [3]
b) Write about material selection for UCMP [2]
c) What is Ultrasonic Machining process, give one example? [3]
d) What are recent developments in UCMP? [2]
e) What are process variables in AJM? [3]
f) How you define MRR? [2]
g) Explain economic aspects of ECM? [3]
h) What are factors effecting EDM? [2]
i) What is theory of electron beam machining? [3]
j) Write application of plasma for machining? [2]

PART B

Answer any five of the following **5X10=50**

2) Explain energy sources and mode of material involved in modern machining process.[10]

OR

Explain advantages, disadvantages and applications of Ultrasonic machining process[10]

3) What are the elements affecting WJM process? [10]

OR

Explain ECH and ECD process. [10]

4) a) Explain Electric Discharge grinding process.[6]
b) What is the characteristics machined surface in case of EDM?[4]

OR

What are the characteristics of dielectric fluids used in EDM? Also give meaning of dielectric fluid. [10]

5) What are the various LASERS used in practice for machining and explain the requirements of LASERS. [10]

OR

Compare EBM and LBM on the following aspects: [10]

6) What are the advantages of water circulation in the torch of the PAM? [10]

OR

Explain the advantages of dual gas and water injected plasma torch.[10]

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DEPARTMENT OF MECHANICAL ENGINEERING
B.TECH IV- YEAR, I-SEM
UNCONVENTIONAL MACHINING PROCESSES
MODEL PAPER-4
PART A

1] a) What are economic considerations in machining processes? [3]
b) What is need for non-traditional machining methods? [2
c) What are mechanics of metal removal process parameters? [3]
d) Mention process variables in WJM? [2]
e) Mention chemical machining principles? [3]
f) What you mean by mask ants? [2]
g) What do you understand by NTD? [3]
h) Mention wire EDM Principle? [2]
i) What do you mean by electro chemical honing? [3]
j) Write Abrasives used in machining processes? [2]

PART B

Answer any five of the following 5X10=50

2) Explain the advantages, disadvantages and applications of modern machining processes.[10]

OR

What are the different transducers used in the process of USM? [10]

3) a) What are the different materials can be machined in AJM? [6]
b) Mention different abrasives used in AJM? [4]

OR

Derive an expression for MRR in case of ECM process. [10]

4) a) Explain how the spark is produced in EDM process? [5]
b) Explain surface finish and machining accuracy in case of EDM process. [5]

OR

Explain power circuits used in Electric Discharge Machining process. [10]

5) Differentiate between EBM and LBM considering at least five aspects?[10]

OR

Compare the edge production in EBM and LBM. What are the factors influencing edge for maintain in both the processes?[10]

6(a) Explain the advantages of dual gas and water injected plasma torch.

(b)How the power supply and gas supply control the MRR and quality of the machined surfaces?[10]

OR

(a) What are the advantages of water circulation in the torch of the PAM?[5]
(b) Why the surface finish and tolerance obtained are poor in plasma Arc machining?[5]

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B.TECH IV- YEAR, I-SEM
UNCONVENTIONAL MACHINING PROCESSES
MODEL PAPER-5

PART A

1] a) What are mechanics of metal removal process parameters? [3]
b) Mention process variables in WJM? [2]
c) What do you mean by electro chemical honing? [3]
d) Write Abrasives used in machining processes? [2]
e) Explain economic aspects of ECM? [3]
f) What are factors effecting EDM? [2]
g) What is theory of electron beam machining? [3]
h) What are Abrasives used in machining processes? [3]
i) What is basic principle involved in Abrasive water jet machining? [2]
j) What are the recent developments in UCMP, mention examples? [2]

PART B

Answer any five of the following **5X10=50**

2 a) Give the classification of modern machining process.[5]
b) Explain the importance of modern machining process.[5]

OR

What are the different transducers using in USM? Explain[10].

3) a) What are the materials can be machined by using WJM and AWJM?[5]
b) Explain WJM with neat sketch.[5]

OR

Explain electrolysis process used in ECM process?[10]

4)State Application and advantages of EDM Process?[10]

OR

Sketch the Rotary pulse generator used in EDM process and mention its advantages over Relaxation circuit. [10]

5) Explain the advantages of dual gas and water injected plasma torch.[10]

OR

How the power supply and gas supply control the MRR and quality of the machined surfaces?[10]

6) Why the surface finish and tolerance obtained are poor in plasma Arc machining?[10]

OR

What are the advantages of water circulation in the torch of the PAM?[10]