

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET
(AUTONOMOUS)

M.Tech. II-Semester *Regular Examinations, November 2012*
Artificial Intelligence & Expert Systems
(CAD/CAM)

Max. Marks: 60

Time: 03 Hours

Answer *any five* questions

All Questions carry equal marks (12 Marks each)

1. What is Production System? Explain the different characteristics of production system. 12M
2. Explain the AO* algorithm with suitable example 12M
3. Write short notes on 6+6
 - (i). Forward vs Backward Reasoning
 - (ii). Matching
4. What is Resolution? How to apply Resolution technique for Propositional Logic, Explain. 12M
5. Using Rule based system, Compute Certainty Factor(CF), MB and MD using the following observations $MB[h, s_1]=0.3$, $MB[h, s_2]=0.2$ 12M
6. Explain about Learning Classification Patterns 12M
7. Discuss about General Learning process and performance measures. 12M
8. Write short notes on 6+6
 - (i). MYCIN
 - (ii). Intelligent Editors

**ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET
(AUTONOMOUS)**

M.Tech. II-Semester Regular Examinations, November 2012

**Computer Integrated Manufacturing
(CAD/CAM)**

Max. Marks: 60

Time: 03 Hours

Answer any five questions

All Questions carry equal marks (12 Marks each)

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| 1. a. Explain | 9M |
| i. Fixed automation | |
| ii. Programmable automation | |
| iii. Flexible automation | |
| b. Explain about automated flow line. | 3M |
| 2. Write short notes on | 12M |
| i. Basic components of NC system | |
| ii. NC coordinate system | |
| iii. NC Motion control system | |
| 3. a. Discuss NC controllers technology used in DNC | 6M |
| b. Explain hierarchical structure of computers in manufacturing | 6M |
| 4. a. With an example explain the mechanism of Material Requirement Planning (MRP) | 6M |
| b. Explain briefly the generative and retrieval CAPP systems | 6M |
| 5. a. Explain opitz part coding system | 6M |
| b. What is production flow analysis? How does it help for the formation of part families and machine cells. | 6M |
| 6. a. Explain the various components of Flexible manufacturing system | 9M |
| b. What are the benefits of FMS? | 3M |
| 7. a. Explain how the six sigma concept and total productive maintenance are useful in achieving in lean production. | 8M |
| b. Compare the lean and agile manufacturing paradigms. | 4M |
| 8. a. Define simulation. Explain different types of simulation | 8M |
| b. with an example, explain how activity cycle diagram (ACD) is constructed | 4M |

**ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET
(AUTONOMOUS)**

**M.Tech. II-Semester Regular Examinations, November 2012
Mechatronics
(CAD/CAM)**

Max. Marks: 60

Time: 03 Hours

Answer any five questions

All Questions carry equal marks (12 Marks each)

1. a. Explain what is meant by mechatronics and discuss the basic elements of a mechatronic system. 6M
- b. Discuss the difference between an open loop and a closed loop control system with an example. 6M
2. a. Sketch and explain the working principle of a piezo electric sensor. 6M
- b. Describe the working of a diaphragm pressure gauge with a neat sketch. 6M
3. a. Discuss the working of spool valve and poppet valve. 6M
- b. Explain the working of variable reluctance and permanent magnet stepper motors. 6M
4. a. Explain about programmable logic controller. 6M
- b. Describe the basic structure of a microcontroller. 6M
5. a. Discuss about linear and nonlinear control systems. 6M
- b. Explain continuous and discrete control systems. 6M
6. a. Explain the principles of analog to digital and digital to analogue converters. 6M
- b. Describe the different types of control modes. 6M
7. a. Define what is a flip-flop and explain the working of any two flip-flops. 6M
- b. Explain the principle and uses of multiplexers. 6M
8. a. Describe different communication protocols. 6M
- b. Explain different network topologies. 6M

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**ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET
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M.Tech. II-Semester Regular Examinations, November 2012

***Rapid Prototyping*
(CAD/CAM)**

Max. Marks: 60

Time: 03 Hours

Answer any five questions

All Questions carry equal marks (12 Marks each)

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| 1. a. | Discuss the evolution of RP process and compare it with the evolution of CAD | 6M |
| b. | Explain the growth of application of RP in industry | 6M |
| 2. a. | Explain the SLA RP process chain and discuss the effect of various process Parameters that affect the SLA RP process. | 8M |
| b. | Mention the applications of SLA RP process. | 4M |
| 3. a. | List different types of solid based RP process. Explain FDM process with a neat sketch. | 8M |
| b. | What are the various factors that affect FDM process | 4M |
| 4. a. | Illustrate the working of LOM RP process with a neat sketch. Also mention the applications of it. | 8M |
| b. | List the various types of materials used for LOM and SGC process | 4M |
| 5. a. | What is meant by sintering? With a neat diagram explain the working of SLS RP System | 8M |
| b. | Discuss the advantages, limitations and applications of SLS RP process | 4M |
| 6. a. | Discuss the working principle of Principle of Thermal jet printer and Sander's model maker | 8M |
| b. | List the important features of object Quadra System | 4M |
| 7. a. | Explain silicon rubber tooling and spray metal tooling process. | 6M |
| b. | Discuss the working of Quick cast and Rapid Tool process | 6M |
| 8. a. | Describe Vacuum casting and surface modification process | 6M |
| b. | Explain surface digitization and surface generation from point cloud process. | 6M |

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**ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET
(AUTONOMOUS)****M.Tech. II-Semester Regular Examinations, November 2012****Robotics
(CAD/CAM)****Max. Marks: 60****Time: 03 Hours**

Answer any five questions**All Questions carry equal marks (12 Marks each)**

1. a. Explain the components of a robotic system. **6M**
- b. What are the laws that govern robotics? **6M**
2. a. What are the various types of grippers used for robots? **5M**
- b. List the various considerations in the selection and design of a gripper. **7M**
3. Explain the D-H representation of forward kinematic equations of robots. **12M**
4. State and explain the differential motions of a frame translation and rotation, rotating about a general axis. **12M**
5. Explain the Lagrangian equations of motion for a two-degree of freedom robot arm. **12M**
6. What is trajectory planning? Explain in brief the third order polynomial trajectory planning. **12M**
7. State the importance of sensors in robotics. Explain about proximity and range sensors. **12**
8. What are the various types of robot programming? Discuss in detail about lead through programming. **12**

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**ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET
(AUTONOMOUS)**

**M.Tech. II-Semester Regular Examinations, November 2012
Advanced Optimization Techniques
(CAD/CAM)**

Max. Marks: 60

Time: 03 Hours

Answer any five full questions

All Questions carry equal marks (12 Marks each)

1. a. What are Kuhn-Tucker conditions and where are they used? 6M
 b. Optimize $Z = 2x_1^2 + x_2^2 + 3x_3^2 + 10x_1 + 8x_2 + 6x_3 - 100$ 6M
 Subject to $x_1 + x_2 + x_3 = 20$
 $x_1, x_2, x_3 \geq 0$
2. Use (Big-M or 2-phase) simplex method to: 12M
 Maximize $Z = 3x_1 + 5x_2 + 4x_3$
 Subject to $x_1 + x_2 + x_3 = 10$
 $2x_1 + x_2 + 2x_3 \geq 16$
 $x_1 + 4x_2 + 3x_3 \leq 24$
 $x_j \geq 0 (j = 1, 2, 3)$
3. A company is faced with the problem of assigning six different machines to five different jobs. The costs estimated in hundreds of rupees are given in the table below. Solve the problem assuming that the objective is to minimize the total cost. 12M

		Jobs				
		1	2	3	4	5
Machines	1	2.5	5	1	6	2
	2	2	5	1.5	7	3
	3	3	6.5	2	8	3
	4	3.5	7	2	9	4.5
	5	4	7	3	9	6
	6	6	9	5	10	6

4. Minimize $f(x_1, x_2) = x_1^4 - 2x_1^2x_2 + x_1^2 + x_2^2 + 2x_1 + 1$ by the simplex method. Perform two steps of reflection, expansion, and/or contraction. 12M
5. a. How do Genetic Algorithms differ from traditional forms of optimization? 6M
 b. What are the drawbacks of genetic algorithms? 6M
6. Explain the concept of random population generation in genetic programming. 12M
7. What are the different techniques available for the solution of multi-objective genetic algorithms? 12M
8. Explain in detail, the steps involved in optimizing the weight of a cantilever beam. 12M
