

Code : 1PE412

M.Tech. II Semester Regular Examinations, July/August 2014
ARTIFICIAL INTELLIGENCE & EXPERT SYSTEMS
(CAD/CAM)

Time: 3 hours

Max Marks: 60

Answer any FIVE of the following
All questions carry equal marks (12 Marks each)
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- 1. a) Explain the tic-tac-toe problem and write the data structures for the same 6M
b) Write an algorithm to solve the tic-tac-toe problem using A.I techniques 6M
- 2. a) Write about the heuristic search technique Generate-and-test 6M
b) Write the search algorithm using simulated annealing 6M
- 3. a) Distinguish between procedural knowledge and declarative knowledge 6M
b) Write briefly about logic programming 6M
- 4. a) Explain with an example, how instance is represented and about Isa relationships 6M
b) Write briefly about computable functions and predicates 6M
- 5. a) Describe briefly, the logic used for non-monotonic reasoning 6M
b) Write short notes on Fuzzy logic 6M
- 6. a) Describe about the expert system shells 6M
b) Explain the process of knowledge acquisition to build expert systems 6M
- 7. Explain in detail, the various performance measures used for machine learning 12M
- 8. a) Write briefly about the expert system MYCIN 6M
b) Define the basic operators of Genetic algorithms and how they are applied for machine learning 6M

Code : 1PE521

M.Tech. II Semester Regular Examinations, July/August 2014
ADVANCED OPTIMIZATION TECHNIQUES
(CAD/CAM)

Time: 3 hours

Max Marks: 60

Answer any FIVE of the following
All questions carry equal marks (12 Marks each)
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1. Write a note on
 - i. Objective function 04
 - ii. Objective function surfaces 04
 - iii. Applications of optimization techniques 04

2. Maximize $f = 8x_1 + 4x_2 + x_1x_2 - x_1^2 - x_2^2$
 subject to

$$\begin{matrix} 2x_1 + 3x_2 & 24 \\ -5x_1 + 12x_2 & 24 \\ x_2 & 5 \end{matrix}$$
 by applying Kuhn-Tucker conditions. 12M

3. Use Big M method
 Maximize $Z = 3x_1 - x_2$
 subject to the constrains

$$\begin{matrix} 2x_1 + x_2 & 2 \\ x_1 + 3x_2 & 3 \\ x_2 & 4 \\ x_1, x_2 & 0 \end{matrix}$$
12M

4. Solve the following assignment problem

		Job				
		1	2	3	4	5
Person	A	8	4	2	6	1
	B	0	9	5	5	4
	C	3	8	9	2	6
	D	4	3	1	0	3
	E	9	5	8	9	5

12M

5. Minimize of $f = 2x_1^2 + x_2^2$ using steepest descent method with the starting point (1,2). 12M

6. Explain the general iteration procedure adopted in GA for constrained optimization. 12M

7. a) Write a note on Pareto Analysis with respect to multi objective GA. 06M
 b) Differentiate between GA and GP. 06M

8. Explain in detail the general optimization model of a machining process with suitable examples. 12M

Code : 1PE523

M.Tech. II Semester Regular Examinations, July/August 2014
COMPUTER INTEGRATED MANUFACTURING
(CAD/CAM)

Time: 3 hours

Max Marks: 60

Answer any FIVE of the following
All questions carry equal marks (12 Marks each)
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1. a) The table below defines the precedence relationships and elemental times for a new model toy. Assuming cycle time as 1.1 min., design assembly line and compute balanced delay for your solution.

Work element	1	2	3	4	5	6	7	8	9	10
Element time (min.)	0.5	0.3	0.8	0.2	0.1	0.6	0.4	0.5	0.3	0.6
Immediate predecessor	-	1	1	2	2	3	4,5	3,5	7,8	6,9

8M

- b) Explain different transfer mechanisms used in automated production line. 4M
2. What are the advantages and disadvantages of Numerical Control (NC) production methods compared to manual production methods? 12M
3. Discuss (i) Adaptive control machining system (ii) Adaptive control optimization system 12M
4. With an example discuss the mechanism of Material Requirement Planning(MRP) 12M
5. a) What are the benefits of Group Technology? 6M
- b) With an example explain the concept of composite part. 6M
6. a) What are the functions of Materials Handling System in FMS? 6M
- b) Explain any two layout configurations used in FMS. 6M
7. Discuss the main elements of Lean Manufacturing. 12M
8. a) What is simulation? Explain different types of simulation 8M
- b) Explain how Activity Cycle Diagram (ACD) is useful for simulation 4M

Code : 1PE524

M.Tech. II Semester Regular Examinations, July/August 2014

MECHATRONICS

(CAD/CAM)

Time: 3 hours

Max Marks: 60

*Answer any FIVE of the following
All questions carry equal marks (12 Marks each)*

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1. a) What is a mechatronic system? Briefly explain about the basic components of a mechatronic system with neat sketch? 6M
- b) List the advantages and disadvantages of a mechatronic systems? 6M
2. a) Explain the following terms 6M
 - i. Sensitivity
 - ii. Hysteresis
 - iii. Resolution
- b) What is a proximity sensor? Explain the working of an eddy current Proximity sensor. 6M
3. a) Compare hydraulic actuators and pneumatic actuators 6M
- b) Sketch and explain the construction and working of a stepper motor. 6M
4. a) Draw a neat sketch showing the microarchitecture of Intel 8051 microcontroller 6M
- B) Draw timer circuit for PLC ladder programming and explain sequence of operations. 6M
5. a) Explain 6M
 - i) Nonlinear controller
 - ii) Continuous controller
 - iii) Discrete controller
- b) Elaborate how the process control is done with the help of an example 6M
6. a) Compare Analog and Digital controllers 6M
- b) Discuss characteristics of P, I and D controllers and their role in control systems 6M
7. a) What are different types of logic gates? Give their truth tables and explain briefly. 6M
- b) Explain briefly about multiplexers with a neat sketch. 6M
8. a) 'Data communication has become back bone of modern industry'. Explain why? 5M
- b) Elaborate the use of computers in computer integrated manufacturing 7M

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M.Tech. II Semester Regular Examinations, July/August 2014

ROBOTICS

(CAD/CAM)

Time: 3 hours

Max Marks: 60

*Answer any FIVE of the following
All questions carry equal marks (12 Marks each)*

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1. a) Define the term "Robot"? Classify the robots based on their configurations and draw the suitable schematic diagrams. 8M
b) Define degree of freedom for a robot joint? Explain various robot characteristics. 4M
2. a) Name any three types of end effectors of robots. State the advantages of each. 6M
b) Explain about homogeneous Transformations in Robotic kinematics. 6M
3. a) What is forward and reverse kinematics of a Robot? Explain with 2-degree freedom robot arm 6M
b) Describe about D-H Transformation for forward Kinematics problems of planar 3 dot manipulator. 6M
4. a) What do you mean by Jacobean? Derive the Jacobean matrix for a planar 2 link revolute jointed manipulator. 6M
b) Explain Yaw-Pitch-Roll (YPR) transformation with an example. And draw the respective diagrams 6M
5. a) Name the different types of drives systems used for a robot 6M
b) Establish the dynamic model of a one-axis robot (Inverted Pendulum) with Lagrangian-Euler formulation 6M
6. a) What is "Trajectory Planning"? Describe it in block diagram form. 6M
b) Explain a 3-5-3 trajectory plan to represent a pick and place movement for an assembly operation 6M
7. a) Explain the term "Robot Actuation" and feedback components. 6M
b) Using block diagram differentiate between a close-loop and an open-loop robot control operation with details of actuators, encoders and type of actuator, motion control signals. 6M
8. a) Explain the use of robots in the field of arc welding. 6M
b) Explain simple pick-and-place operation of the robot. 6M

Code : 1PE525

M.Tech. II Semester Regular Examinations, July/August 2014

RAPID PROTOTYPING

(CAD/CAM)

Time: 3 hours

Max Marks: 60

*Answer any FIVE of the following
All questions carry equal marks (12 Marks each)*

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1. a) What is Rapid Prototyping? What is the need of Rapid Prototyping in manufacturing industry 6M
b) Classify of Rapid Prototyping systems. Briefly explain each one. 6M
2. a) Explain the principle of Stereo Lithography. Sketch and explain working of Stereo Lithography machine. 6M
b) What are the important process parameters in Stereo Lithography technique? Explain its effect on product quality. 6M
3. a) Explain the principle and process parameters of fusion decomposition technique. 8M
b) What are the applications of fusion decomposition technique? 4M
4. a) Explain working principle of solid ground curing technique. 8M
b) What are the applications of Laminated Object manufacturing? 4M
5. a) Explain different Laser generation methods. 6M
b) Explain the principle and process details of Laser Sintering. 6M
6. a) Explain the working of thermal jet printer. 4M
b) Explain the principle and applications of 3D printing. Also mention its advantages and limitations. 8M
7. a) Differentiate direct and indirect rapid tooling with example. 6M
b) Explain laminate tooling in detail. 6M
8. a) Explain the concept of surface digitizing and its applications. 7M
b) Explain data transfer to solid models. 5M
