

GANPAT UNIVERSITY
M. TECH SEM- II CAD/CAM REGULAR EXAMINATION- APRIL-JUNE 2015
3ME214: Robotics and Intelligent Manufacturing

TIME: 3 HRS

TOTAL MARKS: 60

- Instructions:** (1) This Question paper has two sections. Attempt each section in separate answer book.
 (2) Figures on right indicate marks.
 (3) Be precise and to the point in answering the descriptive questions.

SECTION: I

- Q.1 Train ART1 network for following data. (10)
 • Inputs $I = [0 \ 0 \ 1 \ 0 \ 1]$
 • $A=1, B=1.5, C=5, D=0.9, \rho=0.9$.

OR

- Q.1 (a) For following data, determine cluster centres using vector quantization method. Take 1 iteration. Take threshold = 2. (05)

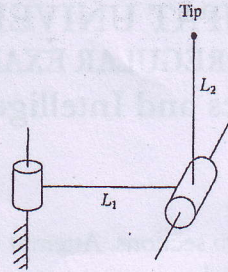
No.	X	Y	No.	X	Y
1	2	3	7	6	4
2	3	3	8	7	4
3	2	6	9	2	4
4	3	6	10	3	4
5	6	3	11	2	7
6	7	3	12	3	7

- (b) Using perceptron learning law, determine weights and bias for two inputs OR logic. (05)
- Q.2 (a) Explain effect of parameter variations for Gaussian membership function. (05)
 (b) Draw block diagram of fuzzy inference system in general. Explain each block in detail. (05)
- OR
- Q.2 (a) Name and explain different defuzzification techniques. (05)
 (b) Write a short note on simulated annealing process. (05)
- Q.3 (a) Explain AND-OR graph for solution search. (05)
 (b) Draw and explain local maximum, plateau, ridge, global minima and global maximum in terms of optimum solution. (05)

SECTION: II

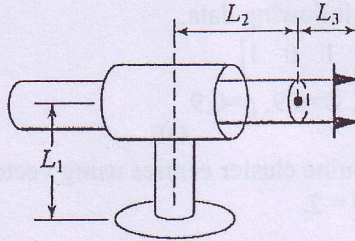
- Q.4 (a) Frame {B}, which is rotated relative to frame {A} about \hat{Z} by 30° , translated 12 units in \hat{X}_A , and translated 8 units in \hat{Y}_A . Find ${}^A P$, where ${}^B P = [5.0 \ 9.0 \ 0.0]^T$. (04)
 (b) Discuss Compound and Inverting transformation. (06)
- OR
- Q.4 (a) A frame {M} which rotated relative to frame {L} about \hat{Z} by 60° then about \hat{X} by 30° then translate 3 units in \hat{X} and 6 units in \hat{Z} . If ${}^M P = [2 \ 5 \ 1]^T$ then find ${}^L P$. (05)
 (b) Discuss Cayley's formula for orthogonal matrices. (05)
- Q.5 (a) Solve the 2R planner manipulator Inverse Kinematics problem using algebraic solution method. (05)

- (b) Find the DH parameters and transformation matrices for the figure given below, also find 0T_n , where n is the last link. (05)



OR

- Q.5 (a) Find the DH parameters and transformation matrices for the figure given below, also find 0T_n , where n is the last link. (04)



- (b) Define following terms (06)
1. Jacobian
 2. Singularity
 3. Dexterity

Q.6 Do as Directed

- (a) Discuss following Geometric problems with cartesian path (06)
1. Intermediate points unreachable
 2. Start and goal reachable in different solution.
- (b) Discuss force control, position control and hybrid control with suitable examples. (04)

-----END OF PAPER-----

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