Ref No. : Ex/PG/Prod E/T/128A/2024

M.Prod.E 1st Year 2nd Semester Examination 2024

Subject: Intelligent manufacturing Systems

Time: 3 Hours | Full Marks: 100

(Use separate answer scripts for each part)

Group – 1 (60 marks)

Answer any three questions

1. Elucidate AHP and QFD model for selection of an intelligent robot for an automobile plant. (20)
2. Expound cloud manufacturing under a volatile market environment. (20)
3. Write a program in PROLOG to develop an expert system for selection of non-traditional manufacturing (NTM) process. (20)
4. Explicate FUZZY TOPSIS for performance evaluation of camera used in automated inspection plant. (20)
5. Write short notes on any two: (10x2=20)

   a) CIM

   b) Fuzzy Set Theory

   c) Resolution

   d) Decision table

[Turn over

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M.E. PRODUCTION ENGG. 1ST YEAR 2ND SEMESTER EXAMINATION 2024
INTELLIGENT MANUFACTURING SYSTEMS (PT)

Time: Three hours **Full Marks: 100**

Use separate answer scripts for each Part
Part II (40 Marks)

Answer any 4 questions

1.a) What is 'thresholding' operation in vision processing, and what type of image is obtained after 'thresholding'? 4
b) Discuss 'edge detection' technique of segmentation in vision processing. 6

2. Discuss briefly the following image processing steps in vision processing:
i) Feature extraction ii) Object recognition 5+5

3.a) Show a simplified model of an artificial 'neuron' in an artificial neural network (ANN) and explain its function. 5
b) What is meant by 'activation function' and what are the different activation functions used in ANN? 5

4. Discuss the step by step procedure for 'back-propagation' learning of a multi-layer feed-forward (MLFF) neural network using 'gradient descent' learning. 10

5.a) What is the effect of 'learning rate coefficient' in back-propagation learning? Also, discuss how back-propagation learning method may be modified by including a momentum coefficient in 'gradient descent' learning? 3+3
b) What do you mean by 'auto-associative' and 'hetero-associative' memories, and what are they used for? 4

6. Describe the operations in an auto-associative memory to form a 'connection' matrix from a set of bipolar patterns, and to recognize a noisy pattern using proper 'recall' equation. Discuss with suitable examples. 10