25/05/17

Sem VII   Comp   (CBGS)

Q. P. Code : 811600

(3 Hours)

Total Marks : 80

N.B.  1. Question No. 1 is **compulsory**
    2. Attempt any three (3) out of remaining five (5) questions
    3. Assume suitable data if **necessary** and **justify** the assumptions
    4. Figures to the **right** indicate full marks

Q1      Attempt an four (4) from the following

[A]   Define AI. What are applications of AI?    [05]

[B]   Define heuristic function. Give an example heuristics function for 8-   [05]
puzzle problem. Find the heuristics value for a particular state of the
Blocks World Problem.

[C]   Compare Model based Agent with Utility based Agent.    [05]

[D]   What are the problems/frustrations that occur in hill climbing   [05]
technique? Illustrate with an example

[E]   What is supervised learning and unsupervised learning? Give example   [05]
of each.

Q2  [A]   Consider the search problem below with start state S and goal state G. The   [10]
transition costs are next to the edges and the heuristic values are next to the
states. What is the final cost using A * search.
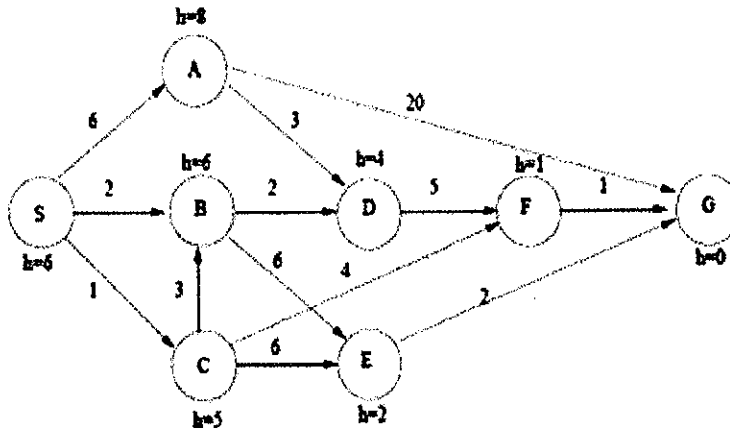


[B]   Explain the architecture of Expert System. What are advantages and   [10]
limitations of Expert System?

Q3  [A]   Explain with example various uninformed search techniques.    [10]

[B]   Illustrate Forward chaining and backward chaining in propositional logic with   [10]
example

**[TURN OVER]**

Q4  [A]  Apply alpha-Beta pruning on following example considering first node as          [10]
         MAX
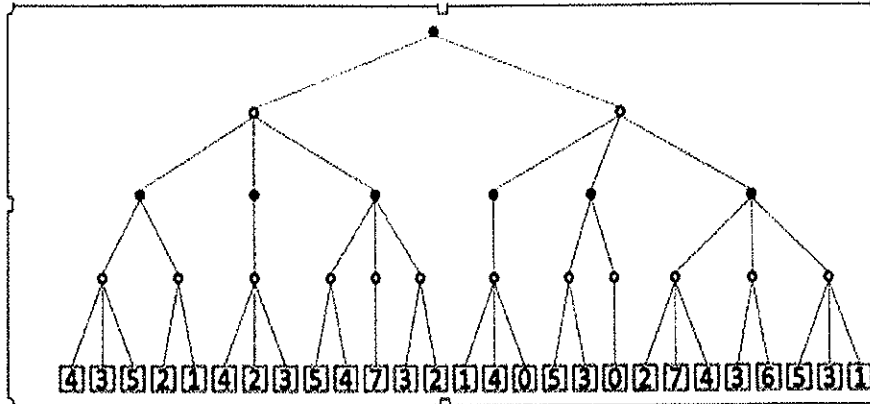


    [B]  Explain a partial order planner with an example.                                  [10]


Q5  [A]  Consider the following facts about dolphins:                                      [10]

         Whoever can read is literate. Dolphins are not literate. Some dolphins are
         intelligent.

         (i) Represent the above sentences in first order predicate logic (FOPL).
         (ii) Convert them to clause form
         (iii)Prove that **"Some who are Intelligent cannot read"** using
             resolution technique
    [B]  What is Uncertainty? Explain Bayesian Network with example                        [10]


Q6       Write short note on any two of the following:                                     [20]

             (i)   Steps in Natural Language Processing

             (ii) Decision Tree Algorithm with an example

             (iv) Genetic Algorithms

Note : 1. **Question 1 is compulsory.**
2. **Attempt any 3 questions out of the rest.**
3. **Make suitable assumptions whenever necessary and justify them**
4. **Each question carries equal marks.**

Q1.
a) Use the Play fair cipher with the keyword : "MEDICINE" to encipher the message "The greatest wealth is health". (5)

b) Explain key rings in PGP. (5)

c) Briefly define idea behind RSA and also explain (10)

1) What is the one way function in this system?
2) What is the trap door in this?
3) Give Public key and Private Key.
4) Describe security in this system.

Q2)a) Explain DES, detailing the Feistel structure and S-block design (10)

b) Consider a Voter data management system in E-voting system with sensitive and non-sensitive attributes. (10)

1) Show with sample queries how attacks ( Direct, Inference) are possible on such data sets
2) Suggest 2 different ways to mitigate the problem.

Q 3)
a) Explain Diffie-Hellman Key exchange algorithm with suitable example. Also explain the problem of MIM attack in it (10)

b) What are Denial of Service attacks? Explain any three types of DOS attacks in detail (10)

Q 4)
a) IPSec offers security at n/w layer. What is the need of SSL? Explain the services of SSL protocol? (10)

b) What are the types of firewalls? How are firewalls different from IDS (10)

Q 5)a) What are the various ways in which public key distribution is implemented. Explain the working of public key certificates clearly detailing the role of certificate authority. (10)

b) Why are Digital Signatures & Digital certificates required? What is the significance of Dual Signature. (10)

Q6     Attempt any 4 (20)

a) SHA-1
b) Timing and Storage Covert Channel
c) Session Hijacking and Spoofing
d) Blowfish
f) S/MIME

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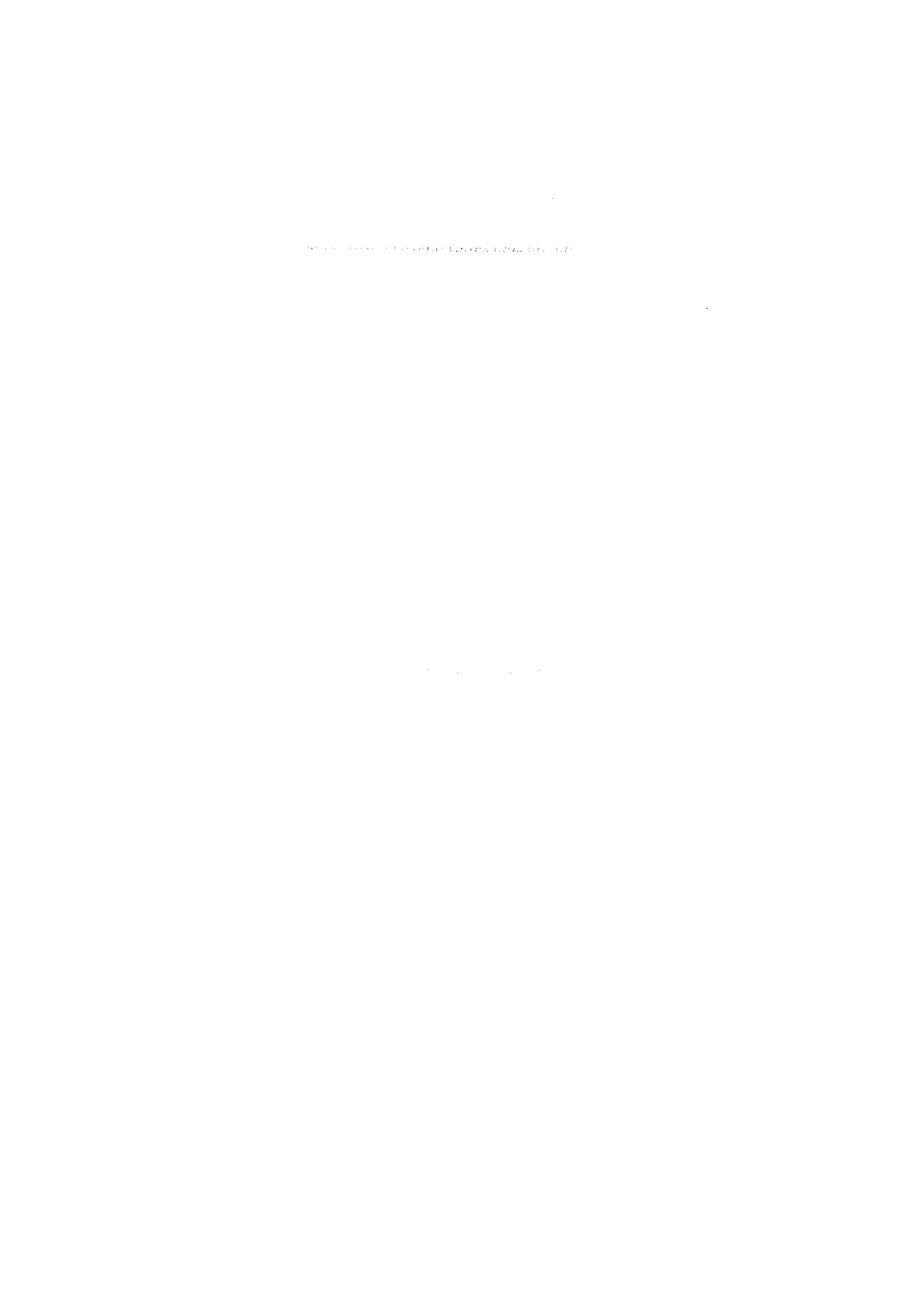
Q. P. Code : 621502

**Duration 3 hours**                     **Maximum marks 100**

N.B. 1. Question No. 1 is **compulsory**
   2. Attempt any **four** out of remaining **Six**
   3. Assume suitable data if **necessary** and **justify** the assumptions
   4. Figures to the **right** indicate full marks

Q1. [A] Define Soft computing. Distinguish between soft computing and hard computing.                                                                    [05]

   [B] Explain different Fuzzy membership functions.                        [05]

   [C] Determine all possible alpha level sets and strong alpha level sets for the following fuzzy set                                                 [05]
   A={(1,0.2), (2,0.5), (3,0.8), (4,1), (5,0.7), (6,0.8)}

   [D] Model the following as fuzzy set using suitable membership function "numbers close to 15".                                                      [05]

Q2 [A] Explain error back propagation training algorithm with flowchart.    [10]

   [B] What are different types of encoding, selection, crossover and mutation in Genetic Algorithm?                                                [10]

Q3 [A] State and explain Hebb's learning rule.                              [10]

   [B] Explain linear separability. Why can a single layer of perceptron not be used to solve linear inseparable problems.                            [10]

Q4 [A] Let A={$a_1$, $a_2$}, B={$b_1$, $b_2$, $b_3$}, C={$c_1$, $c_2$}.      [10]
   Let R be a relation from A to B defined by matrix.

$$R = \begin{array}{c} \\ a_1 \\ a_2 \end{array} \begin{array}{c} b_1 \quad b_2 \quad b_3 \\ \left[ \begin{array}{ccc} 0.6 & 0.5 & 0 \\ 0.1 & 0.5 & 0.4 \end{array} \right] \end{array}$$

   Let S be a relation from B to C defined by

$$S = \begin{array}{c} \\ b_1 \\ b_2 \\ b_3 \end{array} \begin{array}{c} c_1 \quad c_2 \\ \left[ \begin{array}{cc} 0.2 & 0.7 \\ 0.4 & 0.6 \\ 1 & 0 \end{array} \right] \end{array}$$

   Find
      a) max-min composition of R and S
      b) max-product composition of R and S

   [B] With the help of a flow chart explain the working of Learning Vector Quantization                                                              [10]

[TRUN OVER]

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Q5   [A]   Determine the weights after four steps of training for perceptron     [10]
learning rule of single neuron network starting with initial weights :-
W=[0 0 $]^t$, inputs as $X_1$=[2 2$]^t$, $X_2$= [1 -2$]^t$, $X_3$=[-2 2$]^t$, $X_4$=[-1 1$]^t$, $d_1$=0,
$d_2$=1, $d_3$=0, $d_4$=1, and c=1.

    [B]   Explain RBF and compare it with MLP.       [10]

Q6     Design a fuzzy logic controller to determine the wash time of a    [20]
domestic washing machine. Assume that the inputs are dirt and grease
on clothes. Use three descriptors for each variable. Clearly indicate that
if clothes are soiled to a larger degree, the wash time will be required
more.

Q7     Write short notes on any **two** from the following       [20]

    [A]   Derivative free optimization
    [B]   Character recognition using neural network.
    [C]   ANFIS

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Q. P. Code : 622701

(3 hours)                                    Total Marks: 80

N.B.   1. Question **No. 1** is compulsory
       2. Attempt any **three** out of remaining
       3. Assume suitable data if **necessary** and justify the assumptions
       4. Figures to the **right** indicate full marks

Q1  A  Compare IIR systems with FIR systems.                                              05

    B  State whether   $x[n] = \sin(n\pi/3)$  is an energy or power signal with proper       05

       justification.

    C  If $x[n] = \{1,2,2,1,3,1\}$ is a periodic signal. Plot it in circular representation for   05
       i)x [-n]          ii)x [n-2]        iii)x [n+2]     iv)x [-(n-2)]    v)x [-(n+2)]
    D  State BIBO stability criterion for LTI systems. Determine the range of values of   05
       'p' and 'q' for the stability of LTI system with impulse response:
       $$h[n] = p^n \qquad ; n < 0$$
       $$\quad\;\; = q^n \qquad ; n \geq 0$$

Q2  A  Check whether the system  $y[n] = a^n\, u[n]$ is:                                       10
       i)   Static or Dynamic
       ii)  Linear or Non-linear
       iii) Causal or Non-Casual
       iv)  Shift variant or Shift Invariant

    B  Check the periodicity of the following signals and if periodic, find their           10
       fundamental period.
       i) $\cos(n/6) \cdot \cos(n\pi/6)$
       ii) $\sin(2\pi n/3) + \cos(2\pi n/5)$

Q3  A  Determine the output response of the LTI system using time domain method            10
       ,whose input is $x[n] = 3\,\delta[n+1] - 2\,\delta[n] + \delta[n-1] + 4\,\delta[n-2]$ and
       $h[n] = 2\,\delta[n-1] + 5\,\delta[n-2] + 3\,\delta[n-3]$.
    B  If a continuous time signal $x(t) = \sin(2\pi \times 2000t) + 2\sin(2\pi \times 1000t)$ is   10
       sampled at 8000 samples /sec. Find out the 4-point DFT of it. Sketch the phase
       and magnitude spectrum.

Q4  A  Explain any five properties of DFT.                                                  10

    B  Compute linear convolution of the causal sequences $x[n] = \{2,-3,1,-4,3,-2,4,-1\}$   10
       and  $h[n] = \{2,-1\}$  using overlap save method.

[TURN OVER]

Q5 A Compute circular convolution of the causal sequences x[n] = {1,-1,1,-1} and 10
h[n] = {1,2,3,4} using radix- 2 DIT FFT method.

B If the DFT of x[n] is X (k) = {2,-j3,0,j3} using DFT properties ,find : 10
i) DFT of x[n-2]
ii) Signal energy
iii) DFT of x*[n]
iv) DFT of $x^2$ [n]
v) DFT of x[-n]

Q6 A Explain the significance of Carl's Correlation Coefficient Algorithm in digital 10
signal processing. Evaluate Carl's Coefficient for two causal sequences
x[n] = {2,4,4,8} and y[n] = {1,1,2,2}.

B i) Calculate the percentage saving in calculations in a 64 point radix-2 FFT 5
systems with respect to the number of complex additions and multiplications
required, when compared to direct DFT system.

B ii) Write a detailed note on DSP processor. 5