(3 Hours)   [Total Marks : 100

N.B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** from remaining **six** questions.
(3) Assume **suitable** data if **required**.

1. (a) How does RC4 stream cipher work ?   5
   (b) Explain Knapsack algorithm with example.   5
   (c) What are the key principles of security ?   5
   (d) What is software reverse engineering ?   5

2. (a) Explain MD5 in detail.   10
   (b) Compare packet sniffing and packet spoofing. Explain the session hijacking   10
   attack.

3. (a) Explain one-time initialization process and processes in each round of   10
   Advanced Encryption Standard.
   (b) Explain IPSec protocols in detail. Also write applications and advantages   10
   of IPSec.

4. (a) What is Buffer overflow and incomplete mediation in Software Security.   10
   (b) Explain how threat precursors are used for Reconnaissance of network.   10

5. (a) How flaws in TCP/ IP can cause operating systems to become vulnerable ?   10
   Also explain how Kerberos are used for user authentication in Windows.   10
   (b) Based on packet filters and proxy servers what are different firewall
   configurations. What are the limitations of firewall ?

6. (a) What are different types of password ? Explain how they work with neat   10
   diagrams. What are the problems with passwords ?
   (b) What is Malware ? Explain Salami and Linearization attacks.   10

7. Write short notes on (any **four**) :—   20
   (a) Honey pots
   (b) CAPTCHA
   (c) SHA-1
   (d) Digital Rights Management
   (e) Multiple—level security model.

AGJ 2nd half (d+) 42

Con. 6529-11.   (REVISED COURSE)   MP–5605

(3 Hours)   [Total Marks : 100

N.B. : (1) Question No. **1** is **compulsory**.
   (2) Attempt any **four** questions out of remaining **six** questions.
   (3) Make **suitable** assumptions wherever **necessary** and **clearly** justify **them**.

Q1.Solve any <u>Four</u> :

A. What is near far problem in CDMA system?

B. Explain frequency reuse concept in cellular system.

C. Write short note on wireless local loop.

D. Explain personal access communication system.

E. Explain signally system No. 7.   20

Q2.

A. Explain WATM reference model with several access scenarios.   10

B. Explain Qos in mobile reference. How to improve the Qos in mobile
   adhoc networks.   10

Q3.

A. Draw and Explain architecture of GPRS system.   10

B. Explain main features of 3rd Generation mobile phone system. How do they   10
   achieve higher capacities and higher data rates ?

Q4.

A. Compare IEEE 802.11, HIPER LAN 2 and Bluetooth with regards to their adhoc
   capabilities, where is the focus of these technologies.   10

B. i. Name basic applications of satellite communication and describe the trends.   10

   ii. What are the general problems of satellite signals travelling from a satellite

   to a receiver?

Q5.

A.   Why is routing in multishop adhoc networks complicated, what are the special
   challanges.?
                                                                 10
B. Explain Hierarchical adhoc routing.
                                                                 10

[TURN OVER

Con. 6529-MP–5605-11. 2

Q6.

A. What are major differences between WAP 2.0, WAP 1.X and i-mode? What influenced the WAP 2.0 development? 10

B. i) What is mobile agent? What are the application domain in which Mobile Agent have potential development ?

05

ii) Explain Synchronize multimedia mark up language . 05

Q7.Write short note on any <u>four</u>: 20

A) M-commerce

B) Symbion OS

C) WML

D) Sync 4J

E) Wireless sensor Networks

F) Threats and security issued in Mobile computing.

Con. 6299-11.   (REVISED COURSE)   MP–5596

(3 Hours)   [Total Marks : 100

N.B. : (1) Question No. 1 is compulsory.
(2) Solve any four questions.

Q: 1 a) Define Reach & stroke, Degree of Freedom and Accuracy.   [20]
b) Given that coordinate transformation matrix is a rotation matrix and represents fundamental rotation, what is the axis of rotation (1, 2, or 3) and what is the angle of rotation? i.e. and θ

$$R_k(\theta) = \begin{bmatrix} 0.5 & 0 & -0.866 \\ 0 & 1 & 0 \\ 0.866 & 0 & 0.5 \end{bmatrix}$$

c) What is proximity sensor? Explain SONAR sensor.
d) Explain Heuristic function with example.

Q: 2 a) Yaw 90°, Pitch -90°, roll 90°. Rotations are performed about the fixed axes of F frame. Find coordinates of q w.r.t. fixed axis. i.e. [p]^F .,[P]M={0,0,0.8}^{T}.   [4]
b) Explain Goal based agent and Utility based Agent with diagram. State difference between them.   [8]
c) Explain steps in problem formulation with example.   [8]

Q: 3 a) Explain steps to convert Logical statements into Causal Normal Form.   [4]
b) Explain Learning Agent with diagram. Also explain inductive learning.   [8]
c) What is Uncertainty? Explain Bayesian network with example.   [8]

Q: 4 a) Explain Direct Kinematics of 4-axis SCARA Robot.   [10]
b) What is Configuration Space? Draw the Configuration space induced by the translation of the concave mobile part A on the fixed obstacle B.   [10]
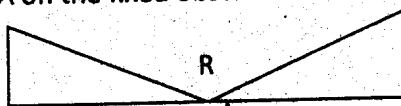
A   B

Q: 5 a) Explain Screw Transformation   [4]
b) Define rational agent. Explain task set properties of environment.   [8]
c) Explain steps in designing reactive behavioral system.   [8]

Q: 6 a) Draw and explain WUMPUS WORLD Environment with their Performance measure, Environment, Actuator, and sensor.   [10]
b) Explain A* search with example.   [10]

Q: 7 a) Derive the General lion-Co-ordinate transformation matrix T^* k-1.   [10]
b) Consider following facts   [10]
1. If maid stole the jewelry then butler was not guilty.
2. Either maid stole jewelry or she milk the cow
3. If maid milked the cow then butler got the cream.
4. Therefore if butler was guilty then he got the cream.
Prove that the conclusion (step 4) is valid using resolution.

2|12|2011   BE CMPN Sem -VII (Rev)
Digital Signal & Image
Processing

Con. 6146-11.   (REVISED COURSE)   **MP-5617**

(3 Hours)   [**Total Marks : 100**

N.B.:
1. Question No.1 is compulsory.
2. Attempt any four questions out of remaining six questions.
3. Figures to the right indicate full marks.
4. Answer to the questions should be grouped and written together.
5. Assume any suitable data wherever required but justify the same.

Q.1   Justify/ contradict following statements:
   a)   If the energy of the signal is finite its power is zero   5
   b)   Laplacian is better than gradient for detection of edges   5
   c)   Walsh transform is nothing but sequency ordered Hadamard transform   5
        matrix
   d)   All Image compression techniques are invertible   5

Q.2   a)   Find the following sequences are periodic or not. If yes find the fundamental   10
           time period.

           i) $x_1(n) = e^{j\left(\frac{\pi}{4}\right)^n}$ ii) $x_2(n) = 3 \sin\left(\frac{1}{8}\right) n$

      b)   Obtain linear convolution of two discrete time signals as below   10

           x (n) = u (n)

           h(n) = a^n u (n), a < 1
           Show that $y(n) = \frac{1-a^{n+1}}{1-a}$

Q.3   a)   Find cross- correlation between given signals   5
           x(n) = {1,2,0,1}
                      ↑
           y(n) = {4,3,2,1}
                      ↑

      b)   Find z- transform of x(n) and draw its ROC   10

           $x(n) = \left[0.5^n \sin\frac{\pi n}{4}\right] u(n)$

      c)   Determine auto-correlation of the following signal   5

           x(n) = {1,3,1,1}
                   ↑

Q.4   a)   Using 4 point FFT algorithm, calculate 2-D DFT of   10

           $f(x,y) = \begin{bmatrix} 0 & 0 & 3 & 1 \\ 1 & 1 & 2 & 2 \\ 2 & 2 & 1 & 3 \\ 1 & 1 & 2 & 4 \end{bmatrix}$

[TURN OVER

Q.4   b)   Write 8x8 Hadamard transform matrix and its signal flow graph. Using   10
           the Butterfly diagram, compute Hadamard transform for
           x(n) = { 1, 2, 3, 4, 1, 2, 1, 2}

Q.5   a)   Perform histogram equalization and draw new equalized histogram of   10
           the following image data

Gray Level	0	1	2	3	4	5	6	7
No. of pixels	790	1023	850	656	329	245	122	81

      b)   What is image segmentation? Explain the following methods of image   10
           segmentation.
           i)   Region growing
           ii)   Region splitting
           iii)   Thresholding

Q.6   a)   What are the different types of redundancies in digital image? Explain in   10
           detail.

      b)   For the 3 bit 4x4 size image perform following operations.   10
           i)   Thresholding $T = 4$
           ii)   Intensity level slicing with background, $r_1 = 2$ and $r_2 = 5$
           iii)   Bit plane slicing for MSB and LSB planes
           iv)   Negation

4	2	3	0
1	3	5	7
5	3	2	1
2	4	6	7

Q.7   Write notes on (any four) :   20
      i)   Discrete Cosine transform
      ii)   Wiener filter
      iii)   Difference between Low-pass filter and Median filter
      iv)   Hough transform
      v)   Homomorphic filter
      vi)   4, 8, m connectivity of image pixels

ws Sept-2011-

Con. 6873–11.   **(REVISED COURSE)**   **MP–5602**

(3 Hours)   [**Total Marks : 100**

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

Q1. [A] Explain Mc Culloch Pitts Neuron Model with help of an example.   05

     [B] Define Support, Core, Normality, Crossover points and α – cut for fuzzy set.   05

     [C] A neuron with 4 inputs has the weight vector $w = [1\ 2\ 3\ 4]^t$. The activation   05
function is linear, that is, the activation function is given by $f(net) = 2 * net$. If
the input vector is $X = [5\ 6\ 7\ 8]^t$, then find the output of the neuron.

     [D] Explain Fuzzy Extension principle with example.   05

Q2. [A] High speed rail monitoring devices sometimes make use of sensitive sensors to   10
measure the deflection of the earth when a rail car passes. These deflections
are measured with respect to some distance from the rail car and, hence are
actually very small angles measured in microradians. Let a universe of
deflection be $A = [1, 2, 3, 4]$ where A is the angle in microradians, and let a
universe of distances be $D = [1, 2, 5, 7]$ where D is distance in feet, suppose a
relation between these two parameters has been determined as follows:

$$R = \begin{array}{c|c|c|c|c|} & D_1 & D_2 & D_3 & D_4 \\ \hline A_1 & 1 & 0.3 & 0.1 & 0 \\ \hline A_2 & 0.2 & 1 & 0.3 & 0.1 \\ \hline A_3 & 0 & 0.7 & 1 & 0.2 \\ \hline A_4 & 0 & 0.1 & 0.4 & 1 \\ \hline \end{array}$$

Now let a universe of rail car weights be $W = [1, 2]$, where W is the
weight in units of 100,000 pounds. Suppose the fuzzy relation of W to A
is given by

$$S = \begin{array}{c|c|c|} & W_1 & W_2 \\ \hline A_1 & 1 & 0.4 \\ \hline A_2 & 0.5 & 1 \\ \hline A_3 & 0.3 & 0.1 \\ \hline A_4 & 0 & 0 \\ \hline \end{array}$$

Using these two relations, find the relation $R^T oS = T$
   a) Using max-min composition
   b) Using max-product composition

     [B] What is learning? Compare different learning rules.   10

Q3 [A] Explain Error back propagation training algorithm with the help of a flowchart.   10

     [B] Explain Genetic algorithm with the help of example.   10

Q4 [A] Explain Random Search method with example.   10

[TURN OVER

[B] A single neuron network using $f(net) = sgn(net)$ has been trained using the   10
pairs of (X_i, d_i) as given below :

$$X_1 = [1 \ \text{-}2 \ 3 \ \text{-}1]^t, \ d_1 = \text{-}1$$
$$X_2 = [0 \ \text{-}1 \ 2 \ \text{-}1]^t, \ d_2 = 1$$
$$X_3 = [\text{-}2 \ 0 \ \text{-}3 \ \text{-}1]^t, \ d_3 = \text{-}1$$

The final weights obtained using the perceptron rule are

$$W_4 = [3 \ 2 \ 6 \ 1]^t$$

Knowing that correction has been performed in each step for c=1,
determine the following weights :

(a) W_3, W_2, W_1 by backtracking the training.

(b) W_5, W_6, W_7 obtained for steps 4, 5, 6 of training by reusing the
sequence $(X_1, d_1), \ (X_2, d_2), \ (X_3, d_3)$

Q5 [A] Explain with example perceptron learning rule.   10

    [B] Explain with example gradient based optimization technique.   10

Q6 [A] Design a fuzzy logic controller for a train approaching or leaving a station. The 20
inputs are the distance from the station and speed of the train. The output is the
amount of break power used. Use four descriptors for each variable use
Mamdani Fuzzy model.

Q7   Write short notes on any **two** of the following   20
         [A.] TSP using simulated Annealing
         [B.] Kohonen's self organizing network
         [C.] Character Recognition using neural network
         [D.] RBF network

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Con. 6876–11.   (REVISED COURSE)   MP–5599

(3 Hours)   [Total Marks : 100

N.B. : (1) Question No. **1** is **compulsory**.
          (2) Attempt any **four** questions out of remaining **six** questions.
          (3) **All** questions carry **equal** marks.
          (4) Assume **suitable** data, if **necessary**.

1. (a) Explain any two types of Business Models used in E-Business.   **10**
   (b) Explain various session tracking techniques with suitable examples.   **10**

2. (a) Explain SET protocol in detail.   **10**
   (b) Define market segmentation. Explain any three marketing strategies in detail. **10**

3. (a) Explain the concept of Web Mashup in detail.   **10**
   (b) What are the success factors for implementation of E-business strategies. **10**

4. (a) Discuss various strategies for Web Auction.   **10**
   (b) Explain the important factors to be considered in server side programming. **10**

5. (a) Explain the concept of Enterprise Application Integration (EAI).   **10**
   (b) Write detailed note on 'Ecases'.   **10**

6. (a) Explain various E-commerce strategies for Virtual Communities.   **10**
   (b) Explain in detail the concept of Mobile Agent.   **10**

7. Write short note (any **two**) :–   **20**
       (a) SOA
       (b) XML
       (c) Cloud Computing
       (d) Web 2·0.

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