

N.B. : (1) Question No. 1 is **compulsory**.

(2) Attempt any **four** questions out of remaining **six** questions.

(3) Make **suitable** assumption wherever **necessary** and clearly **justify** them.

- Q. 1. (a) Which components are new in GPRS as compared to GSM? What is their purpose? [5]
- (b) What are the general problems of Mobile IP regarding the support of quality of service? [5]
- (c) Compare IEEE 802.11, HIPERLAN-2 and Bluetooth with regard to their ad-hoc Capability [5]
- (d) What is the simple scheme to solve the hidden terminal problem in wireless network? [5]
- Q. 2. (a) What are the main benefits of spread spectrum system? How can spreading be achieved? Explain the block diagram of FHSS transmitter and receiver. [10]
- (b) Elaborate on various handover mechanisms in cellular system. [10]
- Q. 3. (a) Explain UMTS architecture and its domains. [10]
- (b) How power management is achieved in ad-hoc and infrastructure modes of WLAN (802.11)? [10]
- Q. 4. (a) Explain WATM reference model with several access scenarios. [10]
- (b) Why traditional TCP is not suitable for mobile environment? Discuss about strengths and weaknesses of indirect-TCP, Snooping-TCP and M-TCP. [10]
- Q. 5. (a) Explain the tunneling mechanism of Mobile IP using IP-in-IP, minimal and generic routing encapsulation respectively. Discuss pros and cons of these three methods. [10]
- (b) Explain protocol architecture of DECT. [10]
- Q. 6. (a) How can higher data rates be achieved in standard GSM using additional schemes HSCSD, GPRS and EDGE? What are the main differences of these approaches? [10]
- (b) List the services offered by 3G mobile systems. Discuss the architecture of wireless local loop (WLL). [10]
- Q. 7. Write short notes on **any two** [20]
- (a) Capabilities of satellite in mobile communication
- (b) Wireless Telephony application
- (c) Bluetooth protocol stack
- (d) HIPERLAN-2

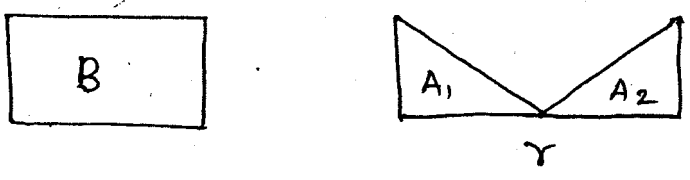
Lab
Con. 5870-10.

BE / Com / Sem III / REV
Robotics & AI
(REVISED COURSE)
(3 Hours)

9/12/10
GT-8853
[Total Marks : 100]

N.B. : (1) Question No. 1 is compulsory.
(2) Attempt any four questions out of remaining six questions.

- Q.1 a) Define Precision, Accuracy and Repeatability. For which type of robot is overall precision uniform and for which robots vertical precision uniform. 5
- b) Explain structure of agent that keeps track of the world. 5
- c) Draw joint diagram, link diagram. Define joint angle, joint distance, link length and link twist angle. 5
- d) List the sensors used for reactive robot and explain the GPS system. 5
- Q.2 a) What are the components of problem formulation. Hence formulate problem for vacuum cleaner and 8-puzzle game. 10
- b) Find the inverse kinematic solution of 4-axis SCARA Robot. 10
- Q.3 a) Explain with example Baye's Belief network and simple inference in belief network. 10
- b) Explain WUMPUS World environment giving its PEAS description. Explain how percept sequence is generated. 10
- Q.4 a) Explain configuration space method used in metric path planning. Hence draw configuration space for non-convex object A and obstacle B shown below 10



- b) Draw and Explain general model of learning agent. Hence Explain various methods of learning. 10
- Q.5 a) Describe Hill climbing algorithm. What are its limitations? 10
- b) Compute the joint variable vector $q=[q_1, q_2, q_3, q_4]^T$ for the following tool configuration vector of SCARA.
- $W(q)=[203.4, 662.7, 557, 0, 0, -1.649]^T$
- $a=[425, 375, 0, 0]^T$ mm
- $d=[877, 0, q_3, 200]^T$ mm 10
- Q.6 a) Consider the following statements.
- 1) Rimi is Hungry.
 - 2) If Rimi is Hungry she barks.
 - 3) If Rimi is barking then Raja is angry.
- Explain the sentences in Propositional Logic. 3
- Convert them into CNF Form. 3
- Prove that 'Raja is angry' Using Resolution. 4
- b) Derive the general link co-ordinate transformation matrix T^k_{k-1} 10

Q.7 Solve any two

20

- a) Compare and contrast BFS & DFS. And explain the search strategy developed to overcome the drawbacks of both.**
- b) Give steps in designing the Reactive behavioral system.**
- c) Give and explain A* algorithm.**
- d) Write short note on proximity sensors and representing knowledge in an uncertain domain.**

- N.B. :**
- 1) Question No. 1 is compulsory
 - 2) Attempt any four questions out of remaining six questions
 - 3) Figure to the right indicate full marks.

1. Justify the following statements. (any four) 20
 - (a) If the kernel of the image transform is separable and symmetric the transform can be explained in matrix form.
 - (b) Laplacian is not good edge detector.
 - (c) Lossy compression is not suitable for compressing executable files.
 - (d) Low pass filter is a smoothing filter.
 - (e) Unit step sequence is a power signal.

2. (a) List and prove any four properties of DFT 10
- (b) Find the circular convolution on the given two sequences $x_1(n) = \{1, -1, 2, -4\}$ 05
 $x_2(n) = \{1, 2\}$.
- (c) Compute the Hadamard of the image shown 05

2	1	2	1
1	2	3	2
2	3	4	3
1	2	3	2

3. (a) Give the classification of noise in images. Compare restoration and enhancement. 10
- (b) Three column vectors are given below. Show that they are orthogonal. Also generate all possible patterns. 10
 $x_1 = [1\ 1\ 1]$ $x_2 = [-2\ 1\ 1]$ $x_3 = [0\ -1\ 1]$.

4. (a) Equalize the given Histogram. What happens when we equalize it twice? Justify 10

Grey level	0	1	2	3
Number of pixels	70	20	7	3

- (b) Explain image segmentation using thresholding. How to apply thresholding to unevenly illuminated images. 10

5. (a) Explain log transformation. How is gamma correction done. 10
- (b) Determine the Z-transform of the following discrete time signals and also specify the region of convergence(ROC). 10
 - (i) $x(n) = \{1, 2, 3, 4\}$
 - ↑
 - (ii) $x(n) = \{1, 3, 5, 7\}$
 - ↑
 - (iii) $x(n) = \{1, 2, 3, 4, 5, 6, 7\}$
 - ↑

6. (a) Find the Huffman code for the following stream of data (28 points). 10
{1, 1, 1, 1, 1, 1, 1, 2, 2, 2, 2, 2, 2, 3, 3, 3, 3, 3, 4, 4, 4, 4, 5, 5, 5, 6, 6, 7}.
- (b) What do you mean by Gaussian noise and why is averaging filter used to eliminate it ? 05
- (c) List down the advantages and disadvantages of Wiener filter. 05
7. Write shortnotes (any two) 20
- (a) KL Transform.
- (b) JPEG compression.
- (c) Hough Transform
- (d) Classification of signals.
-

(3 Hours)

[Total Marks : 100

N.B. (1) Question No. 1 is compulsory.

(2) Attempt any four questions out of the remaining six questions.

1. (a) Explain support and core of a fuzzy set with examples. 20
 (b) Explain linearly separable and non-linearly separable patterns with examples.
 (c) Draw CANFIS architecture for Sugeno fuzzy model.
 (d) Model the following as fuzzy set using trapezoidal membership function :—
 "Numbers close to 10"
2. (a) Explain Errorback Propagation Algorithm with the help of flowchart. 12
 (b) Explain ADALINE (adaptive linear element). 8
3. Using Mamdani fuzzy model, Design a fuzzy logic controller to determine the wash time of a domestic washing machine. Assume that the inputs are dirt and grease on cloths. Use three descriptors for each input variables and five descriptors for the output variable. Derive a set of rules for control action and defuzzification. The design should be supported by figures wherever possible. 20
4. (a) Give the basic steps involved in simulated Annealing method. Explain how 'Traveling Salesperson Problem (TSP)' can be solved using simulated Annealing method. 12
 (b) Determine the weights after one iteration for Hebbian learning of a single neuron network starting with initial weight vector. 8

$$W = \begin{bmatrix} 1 \\ -1 \\ 0 \\ 0.5 \end{bmatrix}$$

inputs as

$$X_1 = \begin{bmatrix} 1 \\ -2 \\ 1.5 \\ 0 \end{bmatrix}$$

$$X_2 = \begin{bmatrix} 1 \\ -0.5 \\ -2 \\ -1.5 \end{bmatrix}$$

$$X_3 = \begin{bmatrix} 0 \\ 1 \\ -1 \\ 1.5 \end{bmatrix}$$

and $C = 1$. Use signum (bipolar binary activation function).

Con. 6652-GT-8850-10.

2

5. (a) Explain the major components of genetic algorithm. Give a simple genetic algorithm for maximization problem. 10
- (b) 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 :—

	b_1	b_2	b_3
a_1	0.4	0.5	0
a_2	0.2	0.8	0.2

Let S be a relation from B to C defined by matrix :—

	c_1	c_2
b_1	0.2	0.7
b_2	0.3	0.8
b_3	1	0

- Find (i) Max-min composition of R and S
(ii) Max-product composition of R and S.

6. (a) Explain ANFIS architecture with neat diagram. 10
(b) Explain perceptron convergence theorem for single layer perceptron. 10
7. Write short notes on any **four** of the following :— 20
- Radial basis function network
 - Printed character recognition
 - Inverse kinematics problem
 - Gradient descent method
 - Kohonen self organizing network.

Con. 6541-10.

(REVISED COURSE)

GT-8838

(3 Hours)

[Total Marks : 100

N.B: i) Question **No. 1** is compulsory

ii) Attempt any **Four** questions from Q2-Q-7

- 1) a) Give the advantages of e-Commerce over physical commerce. [5]
- b) What are features of internet payment methods? [5]
- c) What are the e-Business roles and challenges? [5]
- d) What are various online auction related services? [5]
- 2) a) Differentiate between: [10]
 - I) client/server approach and mobile agent approach
 - II) Web services and Web-based applications
- b) Explain the WAP model and its architecture. [10]
- 3) a) Explain the important factors in client side programming. [10]
- b) What are the various session tracking techniques, explain with example. [10]
- 4) a) Explain SET protocol in detail. [10]
- b) What are various marketing strategies? [10]
- 5) a) What is e-business and what are its main characteristics? [10]
- b) What are the benefits and limitations of e-business? [10]
- 6) a) Explain any three types of business models in e-Business. [10]
- b) Explain the strategic planning process in detail. [10]
- 7, Write short notes on (Any Two): [20]
 - I] Advertising on web.
 - II] SOA
 - III] Role of middleware technologies in e-Business
 - IV] Cloud computing .

System Security

(REVISED COURSE)

(3 Hours)

GT-8835

[Total Marks : 100]

ws Oct Sacn- 10 49

Con. 6132-10.

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.

- | | | |
|-------|---|----|
| 1. a) | Explain different kinds of controls provided to secure information. | 5 |
| b) | Does VPN use Link or End to End encryption? Justify your answer. | 5 |
| c) | What are the information security goals? Explain why the balance among different goals is needed. | 5 |
| d) | What are different types of malicious code? | 5 |
| 2. a) | Explain Advanced Encryption Standard Algorithm in detail. | 10 |
| b) | Write a note on Kerberos system that supports authentication in distributed system. | 10 |
| 3. a) | Explain control of access to general objects in operating system. | 10 |
| b) | Explain nonmalicious program errors with examples. | 10 |
| 4. a) | In RSA system the public key of a given user is $e = 7$ and $n = 187$ | |
| (i) | What is the private key of this user? | 4 |
| (ii) | If the intercepted ciphertext is $c = 11$ and sent to a user whose public key is $e = 7$ and $n = 187$. What is the plaintext? | 4 |
| (iii) | What are the possible approaches to defeating the RSA algorithm? | 2 |
| b) | What is spoofing? Explain the session hijacking attack. | 10 |
| 5. a) | List functions of Intrusion Detection System. Explain and differentiate signature based and anomaly based IDS | 10 |
| b) | Write a detail note on Biometrics Techniques. | 10 |
| 6. | Write a detail note on (any two) : | 20 |
| a) | SSL Handshake Protocol | |
| b) | Key exchange using Diffie Hellman algorithm | |
| c) | Data Encryption Standard (symmetric key algorithm) | |
| 7. a) | Explain how threat precursors are used for reconnaissance of network. | 10 |
| b) | Explain Denial of Service attacks. | 10 |