ANJUMAN-I-ISLAM'S
AKTC KALSEKAR TECHNICAL CAMPUS
INNOVATIVE TEACHING   EXUBERANT LEARNING

Knowledge Resource & Relay Centre (KRRC)

AIKTC/KRRC/SoET/ACKN/QUES/2022-23/   Date: 25/01/23

School: SoET-REV. C-SCHEME   **Branch:** EXTC   **SEM:** VI

To,
Exam Controller,
AIKTC, New Panvel.

Dear Sir/Madam,

Received with thanks the following **Semester/Unit Test-I/Unit Test-II (Reg./ATKT)** question papers from your exam cell:

Sr. No.	Subject Name	Subject Code	Format SC	Format HC	No. of Copies
1	Electromagnetics and Antenna	ECC601		✓	
2	Computer Communication Networks	ECC602		—	
3	Image Processing and Machine Vision	ECC603		—	
4	Artificial Neural Network and Fuzzy Logic	ECC604		✓	
5	Department Level Optional Course II	ECC605		—	

Note: SC – Softcopy, HC - Hardcopy

(Shaheen Ansari)
Librarian, AIKTC

ET.
7/12/22

Sem - VI - CBCS - KT

[Time: Three Hours]   **| Marks:80|**

N.B: 1. **Question number one is compulsory**
     2. **Attempt any three out of remaining**

Q.1	**Attempt any FOUR:**		(20)
	a.	Derive wave equation for electric fields.	
	b.	Define the terms near field and far field for antenna	
	c.	Derive continuity equation for electric fields	
	d.	Explain ground wave propagation	
	e.	Why Maxwells equations need to be modified for time varying fields	

Q.2	a.	Define loop antenna. Mention the disadvantages of loop antenna	(10)
	b.	Design rectangular micro strip antenna for 2.4 GHZ frequency using FR-4 Substrate of dielectric value 4.4 & thickness 1.6mm.	(10)

Q.3	a.	Compare broadside and end fire array.	(10)
	b.	Derive FRIIS Transmission Equation & Explain its Significance	(10)

Q.4	a.	With neat sketch explain parabolic Reflector antenna. List feed mechanism used	(10)
	b.	Derive wave equations for magnetic fields and explain what is TEM wave	(10)

Q.5	a.	Explain H-plane sectoral horn a antenna and describe various configuration of horn	(10)
	b.	antenna	(10)
		What are the advantages of array antenna? Describe principle of pattern multiplication and sketch radiation pattern of a 3-element array separated at $\lambda/2$	

Q.6	Write short notes on (any four questions, each carry five marks)		(20)
	a)	Sky wave propagation	
	b)	Power in EM wave	
	c)	Retarded potential	
	d)	Equivalent noise temperature of antenna	
	e)	Radiation pattern	

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Sem – VI – CBCS – ICT   ET.

(3 Hours)   **Total Marks: 80**

N.B. : (1) Questions No.**1** is **compulsory**.
       (2) Solve any **three** questions out of **remaining**
       (3) Draw neat labeled diagram whenever necessary
       (4) Assume suitable data if necessary

Q1	Answer **any four** questions	
a.	Write any four properties of fuzzy sets.	05
b.	With necessary equations, list the different types of activation functions used in Neural networks	05
c.	What do you mean by K means algorithm? Where is it used?	05
d.	If A and B are two fuzzy sets with membership functions: $\mu_a(\chi) = \{1, 0.2, 0.2, 0.7\}$ and $\mu_b(\chi) = \{0.2, 0.6, 0.4, 0.5\}$, find the union and intersection between two fuzzy sets.	05
e.	What is the use of pooling and padding in CNN architectures?	05

Q2.a. Develop perceptron network to implement two input AND function. Consider inputs and the outputs as unipolar. Assume initial weights and bias value equal to zero. Consider learning rate equal to 1.   **10**

b. Discuss linearly separable and linearly non-separable classification functions each with a graph.   **10**

Q3.a. Construct a Kohonen Self Organizing map to cluster given vectors   [0 0 1 1],   [1 0 0 0], [0 1 1 0] and [0 0 0 1]. The number of clusters to be formed is 2. Consider the learning rate as 0.5. The weight matrix is given by   **10**

$$w_{ij} = \begin{bmatrix} 0.2 & 0.9 \\ 0.4 & 0.7 \\ 0.6 & 0.5 \\ 0.8 & 0.3 \end{bmatrix}$$

b. Draw the architecture of simple Convolution neural network. Discuss the use of CNN in deep learning   **10**

Q4.a. Construct a discrete Hopfield network to store the patterns   [1 1 1 1 1],   [1 -1 -1 1 -1], [-1 1 -1 -1 -1]. Calculate the energy of the stored patterns.   **10**

b. What are the various types of neural network architectures? With neat diagram, briefly discuss the architectures.   **10**

Q5.a. With neat flow chart, describe the various steps used in the training process of error back propagation algorithm.   **10**

b. What is Support Vector Machine (SVM)? Analyze binary classifier using SVM.   **10**

Q6.a. What is defuzzification? Explain any two methods of defuzzification.   **10**

b. Design a fuzzy controller to decide the wash time of a washing machine.   **10**

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