

AR18

CODE: 18IET321

SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

III B.Tech I Semester Regular Examinations, March, 2021

FUNDAMENTALS OF FUZZY LOGIC

Time: 3 Hours

Max Marks: 60

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

UNIT-I

1. The membership functions of two Fuzzy sets A, B are given as $\mu_A(x) = \frac{x}{x+1}$, $\mu_B(x) = 2^{-x}$, $x \in [1, 2, 3, 4, 5]$ then find the values of (i) $A \cup B$, (ii) $A \cap B$, (iii) A^c , (iv) B^c , (v) De-Morgan's Law: (a) $(A \cup B)^c = A^c \cap B^c$, (b) $(A \cap B)^c = A^c \cup B^c$. 12M

(OR)

2. Let $X = \{x_1, x_2\}$, $Y = \{y_1, y_2\}$ and $Z = \{z_1, z_2, z_3\}$. Let R be a relation given by $\begin{matrix} x_1 & y_1 & y_2 \\ x_2 & 0.5 & 0.3 \\ & 0.2 & 0.6 \end{matrix}$ and S be a relation given by $\begin{matrix} y_1 & z_1 & z_2 & z_3 \\ y_2 & 0.1 & 0.4 & 0.2 \\ & 0.6 & 0.5 & 0.3 \end{matrix}$ then (i) $R \circ S$ by max-min composition (ii) $R \cup S$, (iii) $R \cap S$ (iv) R^c (v) S^c (vi) $R^c \cap S^c$. 12M

UNIT-II

3. For $A = \left\{ \frac{1}{x_1}, \frac{0.5}{x_2}, \frac{0.7}{x_3} \right\}$, $B = \left\{ \frac{0.6}{y_1}, \frac{1}{y_2} \right\}$, $A' = \left\{ \frac{0.9}{x_1}, \frac{0.6}{x_2}, \frac{0.7}{x_3} \right\}$ over the universal sets $X = \{x_1, x_2, x_3\}$ and $Y = \{y_1, y_2\}$. Suppose we have fuzzy proposition P as a rule expressed as Rule p: If x is A then y is B, fact q: x is A' . Then find the conclusion B' using generalized Modus Ponens rule. 12M
- (OR)
4. Let $X = \{a, b, c, d\}$, $Y = \{1, 2, 3, 4\}$ and the fuzzy sets are $A = \{(a, 0), (b, 0.8), (c, 0.6), (d, 1)\}$, $B = \{(1, 0.2), (2, 1), (3, 0.8), (4, 0)\}$, $C = \{(1, 0), (2, 0.4), (3, 0.1), (4, 0.8)\}$. Determine the implication relations $R = (A \times B) \cup (\tilde{A} \times C)$. 12M

UNIT-III

5. Construct a fuzzy set using "Lagrange's Interpolation" method for the following data: $\{(0, 0), (0.5, 0.2), (0.8, 0.9), (1, 1), (1.2, 0.9), (1.5, 0.2), (2, 0)\}$. 12M
- (OR)
6. a) Explain the "Direct method with one expert" in construction of a fuzzy set. 6 M
Give an example.
- b) Explain the "Direct method with multiple experts" in construction of a fuzzy set. 6 M
Give an example.

UNIT-IV

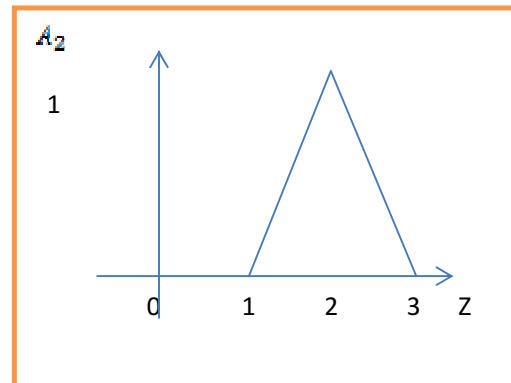
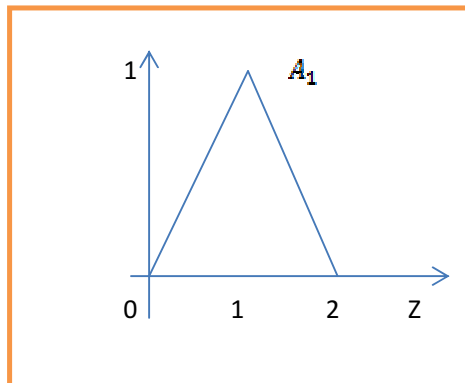
7. a) Explain the process of Fuzzification. 6 M
 b) Explain the working of “Fuzzy Rule Base”. 6 M

(OR)

8. Design a Fuzzy controller for a train of a station whose inputs are distance (D) from a station of range 0 to 100 Km and Speed of a train (S) of range 0 to 80 km per Hour. Use 3 linguistic variables for input variables like Small Distance (SD), Medium Distance (MD), Large Distance (LD) for distance and Low Speed (LS), Medium Speed (MS), High Speed (HS) for Speed. The output is Break power (P) used to control the train. Use 5 linguistic variables like Very small break power (VSP), small break power (SP), Medium break power (MP), Large break power (LP), Very Large break power (VLP) for the output variable break power. Find the break power (P) when the train is at a distance (D) = 50 km and speed of the train (S) = 60 km. per hour. 12M

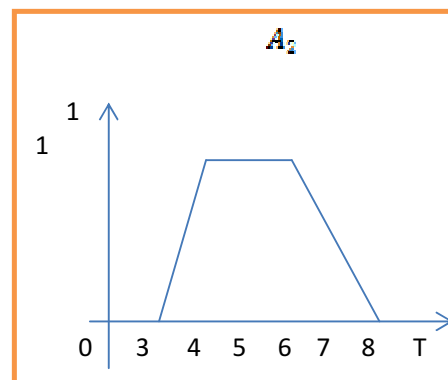
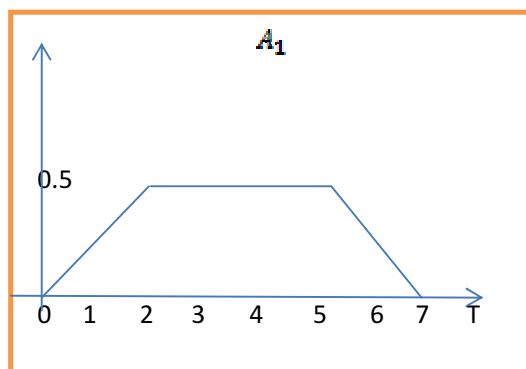
UNIT-V

9. For the two fuzzy sets A_1 & A_2 as shown below, Calculate the defuzzified value of Z^* using (a) Centroid Method (b) Center of Sums method (3) Mean of Maxima method. 12M



(OR)

10. Given two fuzzy sets A_1 & A_2 as shown below, Calculate the defuzzified value of T^* using (a) Centroid Method, (b) Center of Sums method, (c) Mean of Maxima method. 12M



AR18

CODE: 18IET324

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)**

III B.Tech I Semester Regular Examinations, March, 2021

RENEWABLE ENERGY SOURCES

Time: 3 Hours

Max Marks: 60

Answer ONE Question from each Unit

Each Questions Carry 12 Marks

All parts of the Question must be answered at one place

UNIT-I

1. a) What is the difference between extraterrestrial and terrestrial solar radiations? [6M]
b) Explain the different types of instruments for measuring solar radiation. [6M]
(OR)
2. a) Define Solar energy, Solar constant and why solar energy as an option. [6M]
b) Explain the working of a Pyranometer solar energy measuring instrument? [6M]

UNIT-II

3. a) What are the main components of Flat plate solar collector, Explain the function of each? [6M]
b) Explain various applications of solar energy. [6M]
(OR)
4. a) Enumerate the different types of concentrating type collectors? [6M]
b) What are the advantages and Disadvantages of Photo voltaic solar energy conversion. [6M]

UNIT-III

5. a) What are the major factors for wind flows on earth? [6M]
b) Describe Horizontal and Vertical axis type wind turbines. [6M]
(OR)
6. a) What is biomass? Explain the benefits of using biomass for energy generation. [6M]
b) Explain the process of anaerobic digestion. [6M]

UNIT-IV

7. a) Discuss about various types of geothermal resources? [6M]
b) State the advantages and disadvantages of geothermal energy? [6M]
(OR)
8. a) Explain the principle of Tidal power Generation. [6M]
b) Discuss about various tidal power conversion plants. [6M]

UNIT-V

9. a) Explain the principles of direct energy conversion and examples. [6M]
b) Explain the principle of MHD power generation [6M]
(OR)
10. a) Discuss about thermo electric power generator and examples. [6M]
b) Discuss about working principle of operation of fuel cell and advantages. [6M]

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SET-1

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)**

III B.Tech I Semester Regular Examinations, March,2021

PRINCIPLES OF MECHANICAL MEASUREMENTS

Time: 3 Hours

Max Marks: 60

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

UNIT-I

1. Distinguish between the following. 12M
i. Accuracy and precision
ii. Resolution and Threshold
iii. Reproducibility and repeatability
iv. Dead zone and Hysteresis

(OR)

2. Explain the following terms: 12M
i. Speed of response
ii. Sensitivity
iii. Dead time
iv. Dead Zone

UNIT-II

3. Describe the construction, working of Bourdon tube pressure gauge for measurement of pressure. 12M

(OR)

4. Explain the different techniques used for measurement of flow velocity. Explain the working of ultrasonic flow meter. 12M

UNIT-III

5. What is thermocouple? With a neat sketch explain its construction, working principle and applications. 12M

(OR)

6. Explain working of mercury in glass thermometer with neat sketch. 12M

UNIT-IV

7. Describe in detail the construction and working of an inductive and a capacitive transducers to measure linear displacement. 12M

(OR)

8. Differentiate between resistive, inductive, capacitance type transducers. 12M

UNIT-V

9. Explain principle and working of proving ring and its applications. 12M

(OR)

10. Describe in detail the construction and working of dynamometer. 12M

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SET-1

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)**

III B.Tech I Semester Regular Examinations, March,2021

JAVA Programming

Time: 3 Hours

Max Marks: 60

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

UNIT-I

- | | | |
|-------------|---|-----------|
| 1. a) | List and explain Java Buzzwords, in detail. | 6M |
| b) | Explain the conditional instructions in detail. | 6M |
| (OR) | | |
| 2. a) | Discuss the principles of object oriented languages in detail | 6M |
| b) | Explain the data types available in Java. | 6M |

UNIT-II

- | | | |
|-------------|---|-----------|
| 3. a) | What is a method? Explain method overloading concept with one example | 6M |
| b) | Explain the usage of constructor and types of constructors in Java. | 6M |
| (OR) | | |
| 4. a) | Explain final keyword with example | 6M |
| b) | Explain constructor overloading concept with one example | 6M |

UNIT-III

- | | | |
|-------------|---|-----------|
| 5. a) | Write different types of inheritances in Java and give an example for each | 6M |
| b) | Explain the concept of method overriding with one example | 6M |
| (OR) | | |
| 6. a) | Describe the various forms of implementing interface. Give an example of JAVA code for each case. | 6M |
| b) | Explain super keyword with example. | 6M |

UNIT-IV

- | | | |
|-------------|---|-----------|
| 7. a) | What is exception? Explain the syntax of try block and catch block with an example. | 6M |
| b) | Give a detail note on packages in java with examples. | 6M |
| (OR) | | |
| 8. a) | Explain User Defined Exceptions with one example | 6M |
| b) | Explain Built-in Exceptions in java with one example | 6M |

UNIT-V

- | | | |
|-------------|--|-----------|
| 9. a) | Explain thread life cycle in Java with example. | 6M |
| b) | Explain Thread Priorities with one example | 6M |
| (OR) | | |
| 10. a) | Write a java program to implement Thread Synchronization | 6M |
| b) | Write a java program for creating multiple threads | 6M |

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SET-1

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
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III B.Tech I Semester Regular Examinations, March,2021

PYTHON Programming

Time: 3 Hours

Max Marks: 60

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

UNIT-I

1. a) State the history of PYTHON. 6M
b) Explain PYTHON environment setup and execute program in different ways. 6M
- (OR)**
2. a) Classify the basic data types in PYTHON with an example. 6M
b) Explain the type conversion in PYTHON with an example. 6M

UNIT-II

3. a) Illustrate conditional suites (if, if...else, if...elif...else) in PYTHON. 6M
b) Differentiate loop control statements (break, continue, pass) in PYTHON. 6M
- (OR)**
4. a) Explain the concept of line 'indentation' with a PYTHON program. 6M
b) Write a PYTHON program to test whether a number is even or odd. 6M

UNIT-III

5. a) Define the operation of slicing or indexing in PYTHON sequence. 6M
b) Define string. Explore the operations on string with a PYTHON program. 6M
- (OR)**
6. a) Define list. Explore the operations on list with a PYTHON program. 6M
b) Define function. Explore the 'built-in' and 'user-defined' functions in PYTHON. 6M

UNIT-IV

7. a) Define Error. Classify the Errors in a PYTHON program. 6M
b) Write a PYTHON program to handle single and multiple exceptions. 6M
- (OR)**
8. a) Define file. Explore the file input and output functions in PYTHON. 6M
b) Write a PYTHON program to count no. of lines, words and characters in a text file. 6M

UNIT-V

9. a) State the features of OOPs in PYTHON. 6M
b) Differentiate 'class' and 'object' with a suitable PYTHON program. 6M
- (OR)**
10. a) Differentiate Encapsulation and Abstraction in PYTHON. 6M
b) Illustrates the concept of Inheritance with a PYTHON program. 6M

**ADVANCED CODING-I
(Common to CSE & IT)****Time: 3 Hours****Max Marks: 60**

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

UNIT-I

1. a) Define Function. Explain user defined functions in python with example. 8
b) Given an array arr[] of N positive integers, the task is to find the maximum difference between any two elements of the array. Without using sorting. 4

Sample Test case:

input: arr[] = {2, 1, 5, 3}

Output: 4

(OR)

2. a) What is the difference between Mutable and Immutable Sequence? Explain with example. 8
b) Write the code for the following problem (Implement in Python). 4
Given an array of n sorted integers and a target, print the indices of the two numbers such that they add up to target. using two pointer approach .

Sample Test case:

input: 4

nums = [2,7,11,15]

target = 9

output: 0,1

Because nums[0]+nums[1]==9

UNIT-II

3. What are OOP principles? Explain each with example. 12

(OR)

4. a) Define Exception. Explain exception handling in python with example. 8
b) Explain about constructor in python. Give example. 4

UNIT-III

5. a) What are Efficiency measures of an Algorithm? Explain. 6

Find the time complexity of the following code?

sum = 0;

for i in range(1,n+1):

j=1

while(j<=n):

sum+=j

j+=2

- b) Explain Characteristics of an algorithm. 6

(OR)

6. a) Design $O(\log n)$ time algorithm for computing $x^n \% m$. 6
- b) Evaluate time complexity for all the operations in a Linked List consists of N nodes. 6

UNIT-IV

- a) Design an algorithm to compute x, y such that $ax + by = \text{GCD}(a, b)$ using extended Euclidean algorithm. 6

Sample Test case:

Input : 30 40

Output : 1 -1

- b) A happy number is a number defined by the following process: Starting with any positive integer, replace the number by the sum of the squares of its digits, and repeat the process until the number equals 1 (where it will stay), or it loops endlessly in a cycle which does not include 1. Those numbers for which this process ends in 1 are happy numbers. 6

Sample Test case:

Input: 19

Output: happy number

Explanation:

$$1^2 + 9^2 = 82$$

$$8^2 + 2^2 = 68$$

$$6^2 + 8^2 = 100$$

$$1^2 + 0^2 + 0^2 = 1$$

(OR)

8. a) Write a python code to Count the number of prime numbers in the given range using Sieve of Eratosthenes. 6

Sample Test case:

Input : 50

Output : 15

- b) Write a python code to Count trailing zeros in factorial of a number 6

Sample Test case:

Input : 5

Output : 1

UNIT-V

9. a) What is the advantage of Circular Linked List over Single Linked List. 8
Write pseudo code for Insert and Delete operations in Circular Linked List.
- b) Write the applications of Stack and Queue. 4

(OR)

10. a) Write an algorithm for the following operations on Double Linked List. 8
i) Insert at the begin
ii) Traversing the list in reverse
- b) Write pseudo code for en-queue and de-queue operations on Queue. 4

AR18

CODE: 18IET32B

SET-1

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)**

III B.Tech I Semester Regular Examinations, March,2021

**COMPETITIVE PROGRAMMING-I
(Common to All)**

Time: 3 Hours

Max Marks: 60

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

UNIT-I

1. a) Write a program for converting an Octal value into HexaDecimal? 6M
- b) Write a program for converting a Decimal value into Binary value? 6M

(OR)

2. a) Count the number of divisors of given number using $O(\sqrt{n})$. 6M
- b) What is the procedure for converting a decimal value into binary with an example? 6M

UNIT-II

3. a) Given an array containing n distinct numbers in the range $[0, n]$, return the only number in the range that is missing from the array? 6M
input: 3
nums = [3,0,1]
output: 2
- b) Given n positive integers, find the minimum and maximum values that can be calculated by summing. In this sum one of the integers removed at a time. 6M
input : 1 2 3 4 5
Out put: 10 14

(OR)

4. a) Given an array nums and a value val, removes all instances of that value inplace and print the new length and array after removal. 6M
(Don't use any extra memory)
input: nums= [0,1,2,2,3,0,4,2]
val= 2
output: 5
- b) Given a sorted array of n integers , create a new array containing squares of all the number of the input array in the sorted order. 6M
input: 5
[-2,-1,0,2,3]
output: [0,1,4,4,9]

UNIT-III

5. a) Write a java program to create a class Rectangle. The class has attributes Length and Width. It should have methods that calculate Area and Perimeter of the Rectangle. It should have readAttributes() method to read Length and Width from the user. 6M
- b) Write a java program to illustrate method overloading and method overriding. 6M

(OR)

6. a) Write a java program for STACK ADT using interfaces. 6M
- b) Write java program to demonstrate the use of subclass. 6M

UNIT-IV

7. a) Write a java program to implement the concept of exception handling by using predefined exceptions. 6M
- b) Write a java program that implements bank transactions using user defined exception . 6M

(OR)

8. a) Write a java program to identify the significance of finally block in handling exceptions. 6M
- b) Write a java program that implements Array Index out of bound Exception using built-in-Exception. 6M

UNIT-V

9. a) What is the time, space complexity of following code & explain in detail: 6M
- ```
int a = 0, b = 0;
for (i = 0; i < N; i++) {
 a = a + rand();
}
for (j = 0; j < M; j++) {
 b = b + rand();
}
```

- b) Write a java program for Linear Search using recursion. 6M

**(OR)**

10. a) Find out both time complexity and space complexity for binary search 6M
- b) Write a java program for Tower of Hanoi problem. 6M

**FUNDAMENTALS OF FUZZY LOGIC**

**Time: 3 Hours**

**Max Marks: 70**

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

**UNIT-I**

1. Let A be the fuzzy set of below average students, B be a fuzzy set of average students and C be a fuzzy set of above average students defined as **14 M**

$$A = \{(x_1, 0.6), (x_2, 0.5), (x_3, 0.3), (x_4, 0.2)\}, B = \{(x_1, 0.5), (x_2, 0.8), (x_3, 1), (x_4, 0.6)\}$$

$$C = \{(x_1, 0.6), (x_2, 0.8), (x_3, 0.9), (x_4, 1)\}, \text{Find } 1. (A \cup B) \quad 2. (B \cup C) \quad 3. (A \cup B) \cup C$$

$$4. (A \cap B) \cap C \quad 5. (A \cap B)^c \quad 6. A^c \cap B^c \quad 7. A^c \cup B^c$$

(OR)

2. Consider a set  $C = \{AITAM, GMRIT, Venkateshwara\}$  and four category of faculty **14 M**

$F = \{Lectures, Asst. Professors, Assoc. Professors, Professors\}$  affecting the four colleges and students of four different branches.  $S = \{ECE, EEE, CSE, CIVIL\}$ .

Let  $R_1$  be the relation  $C \times F$  and  $R_2$  be the relation  $F \times S$  as

$$R_1 = \begin{matrix} C_1 \\ C_2 \\ C_3 \\ C_4 \end{matrix} \begin{bmatrix} F_1 & F_2 & F_3 & F_4 \\ 0.6 & 0.6 & 0.9 & 0.8 \\ 0.1 & 0.2 & 0.9 & 0.8 \\ 0.9 & 0.3 & 0.4 & 0.8 \\ 0.9 & 0.8 & 0.1 & 0.2 \end{bmatrix} \text{ and}$$

$$R_2 = \begin{matrix} F_1 \\ F_2 \\ F_3 \\ F_4 \end{matrix} \begin{bmatrix} S_1 & S_2 & S_3 & S_4 \\ 0.8 & 0.8 & 0.8 & 0.9 \\ 0.8 & 0.8 & 0.8 & 0.9 \\ 0.8 & 0.8 & 0.8 & 0.9 \\ 0.8 & 0.8 & 0.7 & 0.9 \end{bmatrix} \text{ find the association between the colleges and students}$$

$R_1 \circ R_2$  by max – min composition and by min – max composition

**UNIT-II**

3. Let  $X = \{x_1, x_2, x_3\}$ ,  $Y = \{y_1, y_2\}$  be the universal sets, **14 M**

$A = \left\{ \frac{0.6}{x_1}, \frac{0.9}{x_2}, \frac{1}{x_3} \right\}$ ,  $B = \left\{ \frac{0.6}{y_1}, \frac{1}{y_2} \right\}$ ,  $B' = \left\{ \frac{0.5}{x_1}, \frac{0.9}{x_2}, \frac{1}{x_3} \right\}$  be the fuzzy sets. Suppose we have fuzzy propositions, Rule P: If x is A then y is B

Fact Q: y is  $B'$  then estimate  $A'$  using generalized Modus Tollens rule.

(OR)

4. Let  $X=\{a,b,c,d\}$ ,  $Y = \{1,2,3,4\}$  and the fuzzy sets are  $A=\{(a, 0), (b,0.8),(c,0.6),(d,1)\}$ ,  $B=\{(1,0.2),(2,1),(3,0.8), (4,0)\}$ ,  $C=\{(1,0),(2,0.4)(3,0.1)(4,0.8)\}$ . Determine the implication relation: If x is A then y is B i.e( $A \Rightarrow B$ ). **14 M**

### UNIT-III

5. Find and construct a fuzzy set using “Lagranges Interpolation” method for the following data:  $\{(0,0), (0.5,0.2), (0.8,0.9), (1,1), (1.2,0.9), (1.5,0.2), (2,0)\}$ . Draw the diagrams. **14 M**

(OR)

6. Construct a fuzzy set using “Least square curve fitting” for the following data  $\{(0,0), (0.5,0.2), (0.8,0.9), (1,1), (1.2,0.9), (1.5,0.2), (2,0)\}$ . Using

$$f(x, \alpha, \beta, \gamma) = \gamma e^{\frac{-(x-\alpha)^2}{\beta}}$$

### UNIT-IV

7. a) Explain Fuzzy Controllers with diagram and given an example. **7 M**

- b) Explain the working of “Fuzzy Rule Base”. **7 M**

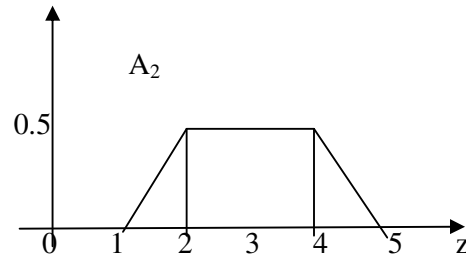
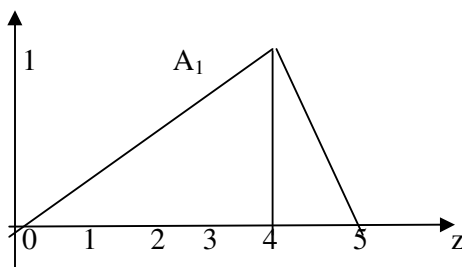
(OR)

8. a) Explain the working of “Fuzzy Inference Engine” **7 M**

- b) Explain the process of Fuzzification. **7 M**

### UNIT-V

- 9 Fuzzy set  $A_1$  &  $A_2$  are given by **14 M**

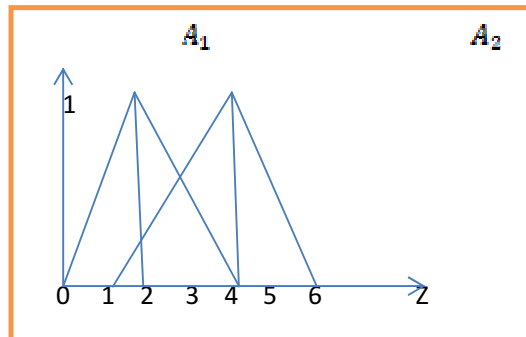


Calculate the defuzzified value  $Z^*$  using 1. Centroid Method 2. Center of Sums method

(OR)

- 10 For the union of two fuzzy sets  $A_1$  &  $A_2$  as shown below, find the defuzzified value of **14 M**

·  $Z^*$  using 1. Centroid method 2. Mean of Maxima method.



# AR16

**CODE: 16OE3032**

**SET-2**

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)**

**III B. Tech I Semester Regular/Supplementary Examinations, March-2021**

## **ENVIRONMENTAL IMPACT ASSESSMENT**

**Time: 3 Hours**

**Max Marks: 70**

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

### **UNIT-I**

1. a) Determine what are the various environmental and socio-economic parameters to be considered during assessment and evaluation of project site and justify your report for final submission. 8M
- b) Characterize what is life cycle analysis and describe in detail about the main elements of EIA. 6M

**(OR)**

2. a) Describe what is comprehensive EIA and Interpret the need of environmental base maps for assessment and evaluation of a project site along with their significance. 7M
- b) If a developmental project is needs to be assessed, evaluate what are the various stages involved and will be stepped up for the final approval. 7M

### **UNIT-II**

3. a) Define impact trees, develop first order, second order, third order and higher order impacts using a tool impact trees with an example. 8M
- b) Describe the merits and demerits with the matrix method. 6M

**(OR)**

4. a) Enumerate what is Delphi approach, describe any two criteria's for the selection of an EIA method. 6M
- b) Describe how do you evaluate a road project using Cost/Benefit analysis as a tool. 8M

### **UNIT-III**

5. a) Determine what kind of evaluation parameters required for the assessment of flora. 8M
- b) Interpret what kind of alternate remedies provided to prevent devegetation by mining activity. 6M

**(OR)**

6. a) List any 6 causes and environmental effects each by degradation and deforestation along with detailed explanation. 7M
- b) Determine the main evaluation parameters required to be evaluated for the assessment of wildlife. 7M

### **UNIT-IV**

7. a) Define environmental audit, reveal the main stages involved in pre-audit activity. 7M
- b) Prepare an environmental audit report to a paper and pulp mill. 7M

**(OR)**

8. a) Describe what is environmental performance audit and interpret the stages involved during conducting on-site environmental audit. 8M
- b) Derive a detailed audit protocol before conducting an environmental audit at an organization. 6M

### **UNIT-V**

9. a) State the objectives and provisions provided under Water (Prevention & Control of Pollution) Act-1974 of India. 7M
- b) Prepare an EIS draft report to a thermal power project for final hearing. 7M

**(OR)**

10. a) Describe the objectives and provisions provided under EPA-1986. 8M
- b) Determine the functions of Central Pollution Control Boards with respect to water pollution control. 6M

# AR16

**CODE: 16OE3033**

**SET-2**

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)**

**III B.Tech I Semester Supplementary Examinations, March-2021**

## **ENERGY AUDIT CONSERVATION AND MANAGEMENT**

**Time: 3 Hours**

**Max Marks: 70**

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

### **UNIT-I**

1. a) Define Energy Audit, Energy Index, Cost Index And Load Profiles. 8 M  
b) Explain energy audit of industries. 6 M  
(OR)
2. Identify various energy conservation schemes. 14 M

### **UNIT-II**

3. Describe organization of energy management program. 14 M  
(OR)
4. a) Discuss Principles of Energy Management. 10 M  
b) Explain Planning, Promoting. 4 M

### **UNIT-III**

5. Find different loss in electrical motors. 14 M  
(OR)
6. a) Explain different factors affecting energy efficient motors. 6 M  
b) Identify the characteristics of a electrical motor depends on variable speed and variable duty cycle. 8 M

### **UNIT-IV**

7. a) Define Power factor, classify the methods of improvement. 8 M  
b) Explain about Energy Instruments. 6 M  
(OR)
8. Outline about Good lighting system design and practice. 14 M

### **UNIT-V**

9. Explain different Depreciation Methods. 14 M  
(OR)
10. a) Illustrate the life cycle costing analysis. 7 M  
b) What is replacement analysis? 7 M

# AR16

**CODE: 16OE3034**

**SET-1**

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)**

**III B.Tech I Semester Regular/Supplementary Examinations, March, 2021**

## **ELEMENTS OF WORKSHOP TECHNOLOGY**

**Time: 3 Hours**

**Max Marks: 70**

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

### **UNIT-I**

1. a) Classify methods of manufacturing processes and explain any two methods of manufacturing 6M  
b) Explain any two basic workshop processes. 8M  
(OR)
2. Explain steps of casting process with neat sketch. 14M

### **UNIT-II**

3. a) Describe any three Marking tools used in carpentry with neat sketches 6M  
b) Explain any three saws used in carpentry with neat sketches. 8M  
(OR)
4. What are the Carpentry joints? And explain half lap joint and mortise and tenon joint with neat sketches. 14M

### **UNIT-III**

5. a) Explain any three Holding Devices used in fitting with neat sketches. 7M  
b) Explain types of Hacksaws in fitting with neat sketches. 7M  
(OR)
6. What are the striking used in fitting and explain with neat sketches? 14M

### **UNIT-IV**

7. a) Explain tong used in fitting with neat sketch 7M  
b) Explain the use of anvil and swage block with neat sketches. 7M  
(OR)
8. Briefly describe any three Forging operations with neat sketches 14M

### **UNIT-V**

9. a) Explain any three stakes used in sheet metal work with neat sketches. 7M  
b) Explain seam joint in sheet metal work with neat sketch 7M  
(OR)
10. Explain any three types of shearing operations with neat sketches. 14M

# AR16

**CODE: 16OE3035**

**SET-2**

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)**

**III B.Tech I Semester Supplementary Examinations, March-2021**

**INTRODUCTION TO SIGNAL PROCESSING**

**Time: 3 Hours**

**Max Marks: 70**

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

## UNIT-I

1. a) Explain the properties of linearity and time invariance of a system and give one example each. 8M  
b) Find the linear convolution between the given sequences  $x_1(n)$  and  $x_2(n)$ . 6M  
 $x_1(n) = \{-1, -2, 2, 3, 1\}$  and  $x_2(n) = \{2, 8, 9, -9, 3\}$  using graphical method  
(OR)
2. a) Explain about auto correlation and cross correlation. 7M  
b) Find the correlation between  $x_1(n)$  and  $x_2(n)$ . 7M  
 $x_1(n) = \{-2, -3, -4, 4, 5, 6\}$  and  $x_2(n) = \{-1, 0, 1, -2, 0, 1\}$

## UNIT-II

3. a) List all the properties of DFT with expressions and derive any three properties 10M  
b) Derive the relationship between DFT and Z-Transform 4M  
(OR)
4. a) Find the DFT of the sequence  $x(n) = \{1, 2, 3, 4, 5\}$ . 6M  
b) Find the linear convolution between the sequences  $x_1(n)$  and  $x_2(n)$  using DFTs and IDFTs. 8M  
 $x_1(n) = \{1, 2, 3, 4\}$  and  $x_2(n) = \{4, 5, 6, 7\}$ .

## UNIT-III

5. a) Calculate the total number of complex multiplications and complex additions in N-point radix-2 DITFFT algorithm 6M  
b) Find the DFT of the sequence  $x(n) = \{1, 1, 1, 1, 0, 0, 0, 0\}$  using radix-2 DITFFT algorithm. 8M  
(OR)
6. a) Find the IDFT of the sequence  $x(n) = \{1, 0, 1, 0, 1, 0, 1, 0\}$  using DITFFT radix-2 algorithm. 8M  
b) Draw the butterfly structure of radix -2 DITFFT algorithm for  $N=8$ . 6M



#### UNIT-IV

7. a) Explain the design procedure for designing digital IIR filters from analog using bilinear transformation. 7M  
b) Explain the procedure for designing analog IIR Butterworth filter 7M

(OR)

8. a) Determine the system function  $H(s)$  using Chebyshev filter approximation that meets the following specifications. 10M  
i) 3dB ripple in the passband  $0 \leq |\omega| \leq 0.3\pi$  ii) At least 30 dB attenuation in the stopband  $0.35\pi \leq |\omega| \leq \pi$ .  
b) Find the digital filter transfer function  $H(z)$  from the analog filter transfer function  $H(s) = (1+2s-7s^2+3s^3)/(1+3s^2)$  using bilinear transformation with  $T=2\text{sec}$ . 4M

#### UNIT-V

9. a) Compare IIR and FIR filters 4M  
b) The desired frequency response of a low pass filter is 10M

$$H_d(e^{jw}) = \begin{cases} e^{-j3w} & -\frac{3\pi}{4} \leq w \leq \frac{3\pi}{4} \\ 0 & \text{elsewhere} \end{cases}$$

Determine  $H(e^{j\omega})$  for  $N=7$  using Hamming window

(OR)

10. a) Explain the steps to design a digital FIR filter using windowing techniques. 7M  
b) Explain the Hanning window. Draw the neat sketch of hamming window for  $N=11$ . 7M

# AR16

**CODE: 16OE3037**

**SET-1**

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)**

**III B.Tech I Semester Supplementary Examinations, March-2021**

**FUNDAMENTALS OF COMPUTER GRAPHICS**

**Time: 3 Hours**

**Max Marks: 70**

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

## **UNIT-I**

1. a) Explain various applications of computer graphics 10M
- b) Explain briefly Pixel and Frame buffers. 4M

**(OR)**

2. a) Explain the construction and working of CRT Display. 7M
- b) Write about various input devices. 7M

## **UNIT-II**

3. a) Explain briefly DDA Algorithm 7M
- b) Rasterize a line by using DDA algorithm having end point coordinates as (5,2) & (10,6). 7M

**(OR)**

4. a) Explain briefly Bresenham's line drawing algorithm. 7M
- b) Rasterize a line by using Bresenham's algorithm for slope ( $m < 1$ ) having end point coordinates as (5,2) & (10,6). 7M

## **UNIT-III**

5. a) Explain briefly all 2D Geometrical transformations 8M
- b) Rotate a triangle at A(0,0), B(6,0) and C(3,3) by 90 degrees about origin in both clockwise and anticlockwise directions 6M

**(OR)**

6. a) Define a shearing. Shear a unit square whose vertices are at (0,0), (0,2), (2,0) and (2,2) by
  - i) 2 units along x-axis
  - ii) 3 units along y-axis
- b) Explain the homogeneous coordinates Matrix representations. 6M

## **UNIT-IV**

7. a) Explain the Cohen-Sutherland line clipping algorithm with an example. 7M
- b) Write a difference between a window and viewport. 7M

**(OR)**

8. a) Describe Sutherland-Hodgeman Polygon clipping algorithm what are its limitations 6M
- b) Explain 3D basic transformations 8M

## **UNIT-V**

9. a) What is hidden surface? Explain it with any algorithm. 7M
- b) Explain Z-buffer algorithm 7M

**(OR)**

10. a) Discuss painter's algorithm in detail. 7M
- b) Briefly explain back-face detection algorithm. 7M

# AR13

CODE: 13EC3017

SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)

III B.Tech. I Semester Supplementary Examinations, March, 2021

## PULSE AND DIGITAL CIRCUITS (Electrical and Electronics Engineering)

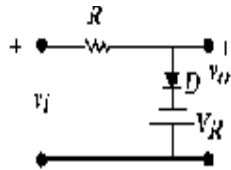
Time: 3 Hours

Max Marks: 70

### PART-A

ANSWER ALL QUESTIONS

[1 x 10 = 10 M]

1. a) Define non-Linear Wave shaping.  
b) List any two applications of RC Low Pass Circuit  
c) Reproduce the output waveform of the circuit if the input voltage is a sinusoidal waveform.
- 
- d) Reproduce the expression for time constant of RL circuit.
  - e) Draw the V-I Characteristic of a practical diode
  - f) List any two applications of Bistable Multivibrator
  - g) List any two factors on which LTP of a Schmitt trigger depends.
  - h) Find the value of time period of a Monostable Multivibrator if  $RC=1\text{ sec}$ .
  - i) List any two applications of Sampling Gates
  - j) Define Sampling Gates.

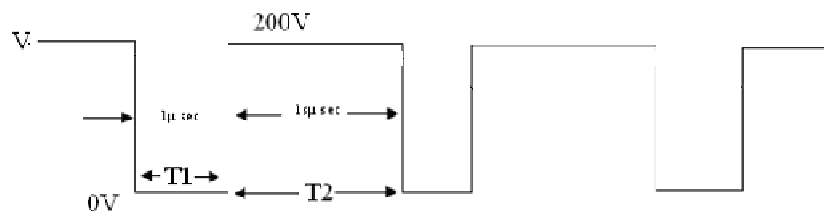
### PART-B

Answer one question from each unit

[5x12=60M]

#### UNIT-I

- 2 a) Show the output waveform if a periodic waveform shown below is applied to an RC Low pass circuit whose time constant is  $15\mu\text{sec}$ .  $T_1=1\mu\text{sec}$  &  $T_2=15\mu\text{sec}$ . 6M



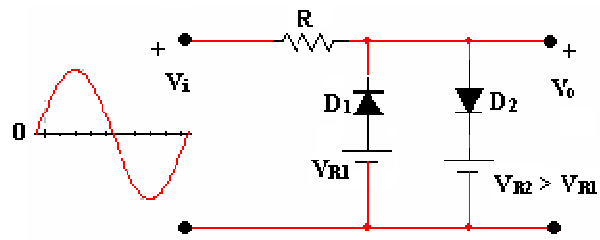
- b) What is an attenuator? How can an uncompensated attenuator be modified as a compensated attenuator. 6M
- (OR)
- 3 a) Justify that Low pass RC circuit can be used as an integrator. 6M  
b) Reproduce the response of a High -pass RC circuit for different time constants if the input signal given is a Square wave. 6M

#### UNIT-II

4. a) State and Prove clamping circuit theorem. 6M  
b) Explain the operation of clamper circuit and list any two applications. 6M

(OR)

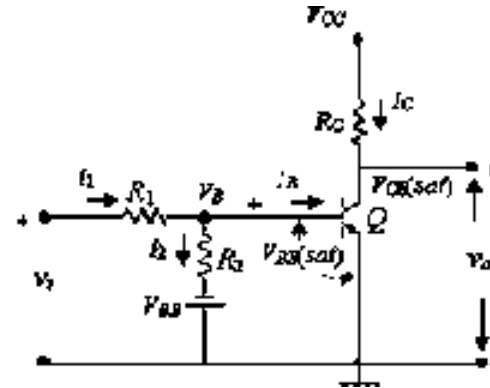
5. a) Draw the transfer characteristics of the circuit and draw the equivalent circuit of it for comparing the input amplitude with  $V_{R1}$  and  $V_{R2}$ .



- b) Explain the operation of series clipper.

### UNIT-III

6. a) Explain how a transistor can be used as switch and for the circuit shown below, if Determine the values of  $R_c$ ,  $R_1$  and  $R_2$  if the e input signal changes from 0 to 25V.  $V_{CC}=25$  V and  $V_{BB}=-25$ V,  $I_{C(sat)}=4$ mA,  $I_{B(sat)}=0.3$ mA and  $h_{FE}=50$ .



- b) Explain the saturation parameters of transistor and their variation with temperature

(OR)

7. a) Explain the operation of bistable multivibrator  
b) Explain transistor as a switch.

### UNIT-IV

8. a) Explain the operation of Monostable multivibrator with suitable waveforms.  
b) Explain the operation of Schmitt Trigger
- (OR)
9. a) Explain the operation of Collector Coupled Astable Multivibrator  
b) Design Astable Multivibrator with the given specifications: silicon devices are used with  $h_{FE \min} = 40$ ,  $V_{CC}=10$ V,  $I_C(sat) = 5$ mA, frequency of oscillations be 5KHz,  $V_{CE(sat)} = 0.2$  V,  $V_{BE(sat)} = V_{\sigma} = 0.7$ V .

### UNIT-V

10. a) Define sweep speed error and Displacement error.  
b) Explain the operation of transistor Bootstrap time base generator.

(OR)

11. a) Explain how miller circuit will improve the linearity of sweep waveform  
b) Show that the sweep speed error of the circuit is

$$\% \text{ sweep speed error} = \frac{V_i}{V} (1 - \beta - R_i / R_1)$$

