

AR13

Code: 13EE1002

SET-2

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

I B.Tech II Semester Supplementary Examinations, July-2016

BASIC ELECTRICAL AND ELECTRONICS ENGINEERING
(Common to CIVIL & MECH)

Time – 3 hours

Max. Marks: 70

PART – A

Answer all questions

[10 x 1M = 10M]

1. a) State Krichoff's current Law.
b) Distinguish between a Branch and a node of a circuit.
c) Why commutator is employed in d.c.machines?
d) How will you change the direction of rotation of d.c.motor?
e) Give the emf equation of a transformer and define each term.
f) State two types of induction motors
g) Mention the two types of MI instruments
h) Mention the two main differences between an ammeter and a voltmeter
i) What are the advantages of transistors?
j) Draw the V-I Characteristics of SCR

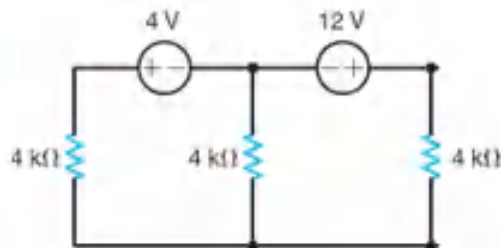
PART-B

Answer one question from each unit

[5 x12 =60 M]

UNIT-1

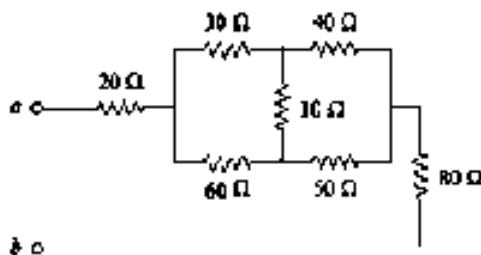
2. a) State and explain Kirchhoff's laws
b) Find the currents in all branches in a given circuit



[6M+6M]

(OR)

3. a) Discuss about voltage and current division principles.
b) Obtain the equivalent resistance R_{ab} by using star-delta transformation.



[6M+6M]

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UNIT-II

4. a) Explain the principle of operation of a DC Generator.
b) A 4 pole DC generator has per pole flux of 80mWb and winding is connected in lap with 960 conductors. Calculate the generated EMF on open circuit when it runs at 400 rpm.

[6M+6M]

(OR)

5. a) Explain the operation of 3 point starter with a neat sketch.
b) Derive the expression for torque developed in the armature of a DC motor

[6M+6M]

UNIT-III

6. a) A 100 KVA transformer has 600 turns on the primary and 100 turns on the secondary winding. The primary is connected to 3000 V, 50 Hz supply.

Analyze:

- i) Full load primary current
ii) The induced voltage in the secondary winding iii) Max Flux.
b) Explain speed torque characteristics of 3- ϕ induction motor.

[6M+6M]

(OR)

7. a) Derive an expression for the EMF of an Ideal transformer.
b) Explain working principle of 3-phase alternator.

[6M+6M]

UNIT-IV

8. Explain the working Principle of PMMC instrument

(OR)

9. Explain different types of moving iron instruments

[12M]

UNIT-V

10. Describe the working of SCR with neat diagrams. Also explain its V-I characteristics.

(OR)

11. Explain the operation of full wave bridge rectifier with neat diagram.

[12M]

**ENGINEERING MATHEMATICS-II
(Common to EEE & ECE)****Time: 3 hours****Max Marks:70****PART-A****Answer all questions****[10 x 1 = 10M]**

1. a) Define transcendental equation.
- b) Write the normal equations for a straight line.
- c) Newton's backward interpolation formula.
- d) Simpson's 1/3 rule
- e) Write Picard's approximate formula.
- f) Find Laplace transform of $\cos at$?
- g) Find $L^{-1} \left[\frac{1}{(s-a)^2 + b^2} \right]$?
- h) Find $L^{-1} \left[\frac{1}{s^3} \right]$.
- i) Solve $p + q = 1$.
- j) Write one dimensional wave equation.

PART-B**Answer one question from each unit****[5 x 12 = 60M]****UNIT-I**

2. a) By using the bisection method, find an approximate root of the equation $\sin x = 1/x$, that lies between $x=1$ and $x=1.5$.
 - b) Find by the Newton's method, the real root of the equation $3x = \cos x + 1$. [6M + 6M]
- (OR)**
3. a) Fit a second degree parabola to the following data:

x	1.0	1.5	2.0	2.5	3.0	3.5	4.0
y	1.1	1.3	1.6	2.0	2.7	3.4	4.1

- b) Derive the normal equations for the curve of the type $y = ae^{bx}$ by the method of least squares. [6M + 6M]

UNIT-II

4. a) In the table below, the values of y are consecutive terms of a series of which 23.6 is the 6th term. Find the first and tenth terms of the series:

x	3	4	5	6	7	8	9
y	4.8	8.4	14.5	23.6	36.2	52.8	73.9

- b) Evaluate (i) $\Delta \tan^{-1} x$ (ii) $\Delta(e^x \log 2x)$ [6M + 6M]

(OR)

5. a) Given that

x	1.0	1.1	1.2	1.3	1.4	1.5	1.6
y	7.989	8.403	8.781	9.129	9.451	9.750	10.031

Find $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ at $x = 1.1$ b) Use the Trapezoidal rule to estimate the integral $\int_0^2 e^{x^2} dx$ taking 10 intervals. [6M + 6M]**UNIT-III**6. a) Find by Taylor's series method the value of y at $x = 0.1$ and $x = 0.2$ to five places of decimalsfrom $\frac{dy}{dx} = x^2y - 1, y(0) = 1$.b) Using Euler's method, find an approximate value of y corresponding to $x = 1$, given that $\frac{dy}{dx} = x + y$ and $y = 1$ when $x = 0$. [6M + 6M]**(OR)**7. a) Using Runge-Kutta method of fourth order, solve $\frac{dy}{dx} = \frac{y^2 - x^2}{y^2 + x^2}$ with $y(0) = 1$ at $x = 0.2, 0.4$.

b) Apply Milne's method, to find a solution of the differential equation

 $y' = x - y^2$ in the range $0 \leq x \leq 1$ for the boundary conditions $y = 0$ at $x = 0$. [6M + 6M]**UNIT-IV**8. a) Find the Laplace transform of $\frac{\cos \sqrt{t}}{\sqrt{t}}$.b) Evaluate $L\left\{t \int_0^t \frac{e^{-t} \sin t}{t} dt\right\}$. [6M + 6M]**(OR)**9. a) Find the inverse Laplace transform of $\log \frac{s^2 + 1}{s(s+1)}$.

b) Solve by using Laplace transforms, the equation

 $y''' + 2y'' - y' - 2y = 0$ given $y(0) = y'(0) = 0$ and $y''(0) = 6$. [6M + 6M]**UNIT-V**10. a) Solve $(x^2 - yz)p + (y^2 - zx)q = z^2 - xy$.b) Solve $\frac{\partial^3 z}{\partial x^3} - 2 \frac{\partial^3 z}{\partial x^2 \partial y} = 2e^{2x} + 3x^2y$. [6M + 6M]**(OR)**11. a) Solve by the method of separation of variables $\frac{\partial^2 z}{\partial x^2} - 2 \frac{\partial z}{\partial x} + \frac{\partial z}{\partial y} = 0$.b) A string is stretched and fastened to two points l apart. Motion is started by displacing the string in the form $y = a \sin(\pi x/l)$ from which it is released at time $t = 0$. Show that the displacement of any point at a distance x from one end at time t is given by $y(x, t) = a \sin(\pi x/l) \cos(\pi ct/l)$. [6M + 6M]

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SET-1

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
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I B.Tech II Semester Supplementary Examinations, July-2016

**DATA STRUCTURES
(Common to CSE and IT)**

Time: 3 Hours

Max Marks: 70

PART – A

Answer all questions

[10 x 1=10M]

1. (a) Define time complexity.
(b) Define tail recursion.
(c) List the examples for Linear data structures.
(d) What are the ways to represent a Queue?
(e) List the examples for Sorting by exchange?
(f) Write the node structure of Singly linked list.
(g) What are the different ways to represent a binary tree?
(h) Construct binary search tree for 10, 20, 30, 5, 8, 4.
(i) Define an Isolated Vertex.
(j) Define an acyclic graph.

PART – B

Answer one question from each unit

[5 x 12= 60M]

UNIT – I

2. a) What is binary recursion? Explain with an example program. [6M+6M]
b) Write a recursive program to generate 'n' Fibonacci terms, where n is positive.
(OR)
3. a) Write short notes on the methodology for designing a recursive algorithm. [6M+6M]
b) Write a recursive function to calculate the sum of squares of first n natural numbers.

UNIT-II

4. a) Write an algorithm to implement the operations of Stack using Linked Lists. [6M+6M]
b) Write an algorithm to insert a node at the end of a circular doubly linked list.
(OR)
5. a) Write a program to implement the operations of a Queue using Arrays.
b) State and explain different ways of representing a Linked List. [6M+6M]

UNIT-III

6. a) Write a recursive linear search program.
b) Write an algorithm to sort the list of elements using Bubble Sort. [6M+6M]
(OR)
7. a) Trace the algorithm of Selection sort for sorting L={16, 36, 4, 22, 100, 1, 54}.
b) Write the algorithm for Quick Sort. [6M+6M]

UNIT-IV

8. a) Explain different tree traversal techniques with suitable examples.
b) Write the algorithm for deleting an element from a BST. [6M+6M]

(OR)

9. a) Write and explain non-recursive Pre-order traversal algorithm of a Binary tree. [6M+6M]
b) Construct a BST from the given traversals
Post order: 1 3 5 4 2 8 7 9 6
In order: 1 2 3 4 5 6 7 8 9

UNIT-V

10. a) Explain different operations that are performed on a Graph with suitable examples.
b) Write breadth first search algorithm. [6M+6M]

(OR)

11. a) Explain different types of graph representations with suitable examples .

- b) Write short notes on Shortest Path algorithm. [8M+4M]