

**AR13**

**Set-01**

**Code No: 13CS1002**

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

**I B.Tech II Semester Regular Examinations, August -2014**

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

**Time: 3 hours**

**Max.Marks:70**

**PART –A**

**Answer All Questions**

**[10X1 =10M]**

1.
  - a) How time Complexity is measured of a given algorithm?
  - b) What is a data structure?
  - c) What is the Big Oh notation of Logarithmic time?
  - d) What is inserting and traversing in data structures?
  - e) Give Prefix Expression of  $A + (B/C) - D$ .
  - f) Explain the terms push and pop for stack
  - g) State name of any four sorting techniques?
  - h) Construct a Binary Search Tree from the given values. Consider the first value as the root value. Values: 45, 23, 29, 85, 92, 7, 11, 35, 49, 51
  - i) Describe complete binary tree.
  - j) What is traversal method in a Graph?

**PART – B**

**Answer one question from each unit**

**[5X12=60M]**

**Unit – I**

2.
  - a) What is difference between recursion and iteration?
  - b) Write a program for prime checking of a number using recursion? [6M+6M]
- (OR)**
3.
  - a) Describe different asymptotic notations used for algorithm analysis.
  - b) What is data structure? Explain different types of data structure used in C. [6M+6M]

**Unit-II**

4.
  - a) Evaluate postfix expression  $AB + C * D$  if  $A=2$ ,  $B=3$ ,  $C=4$  and  $D=5$ .
  - b) Translate the infix expression into its equivalent prefix expression
    - a)  $(A-B) * (D/E)$
    - b)  $(A+B-D) / (E-F) + G$[6M+6M]
- (OR)**
5.
  - a) Write an algorithm for the basic operations of Queue.
  - b) Explain different types of linked list with examples. [6M+6M]

**Unit-III**

6. a) Analyze the time complexity of Selection Sort with example.  
 b) Show step by step process in sorting number by Merge Sort  
 56,57,92,38,44,90,61,73 . [6M+6M]

**(OR)**

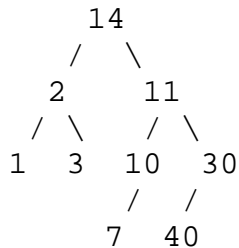
7. a) Explain the basic principle of Insertion sort with example .  
 b) Write a C program to implement the Quick Sort. Analyze its timing requirement. [6M+6M]

**Unit-IV**

8. a) What is a binary tree and its advantages?  
 b) Draw a full binary tree with at least 6 nodes.. [6M+6M]

**(OR)**

- 9) Here is a small binary tree:



Write the order of the nodes visited in:

- A. An in-order traversal:  
 B. A pre-order traversal:  
 C. A post-order traversal:

[12M]

**Unit-V**

10. a) Explain the prim's algorithm with a suitable example.  
 b) Describe different graph traversal methods with examples. [6M+6M]

**(OR)**

11. a) Write an algorithm for finding the path between any two nodes of a graph?  
 b) Explain Dijkstra's shortest path algorithm with an example. [6M+6M]

Code: 13EE1002

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

I B.Tech II Semester Regular Examinations, August 2014

BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

(Common to MECH &amp; CIVIL Branches)

Time – 3 hrs

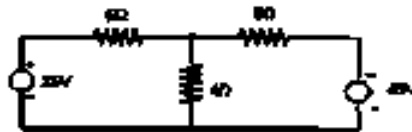
Max Marks: 70

**PART-A****Answer all questions****[10 x1M=10M]**

1. a) What are active and passive elements?
- b) What is the equivalent capacitance when two capacitors are connected in series?
- c) Classify DC generators.
- d) Losses in DC motor.
- e) What do you understand by regulation in transformer?
- f) Draw slip torque characteristics in Induction motor.
- g) Classify Indicating instruments.
- h) Principle of operation of MI instruments.
- i) Draw symbols of diode and SCR.
- j) What is a rectifier?

**PART-B****Answer one question from each unit****[5 X12 =60M]****UNIT- 1**

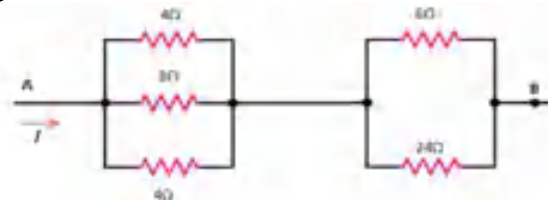
2. a) Using Kirchhoff's laws, find the current in various resistors in the circuit shown in below figure (6+6)



- b) Two resistors 4  $\Omega$  and 6  $\Omega$  are connected in parallel. If the total current is 30A, find the current through each resistor.

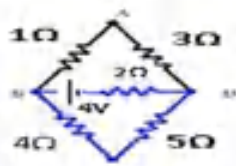
**(OR)**

3. a) A battery having an EMF of 12V is connected across terminals AB of the



circuit shown in below figure. Find the total power absorbed by the circuit. (6+6)

- b) In the network shown in below figure, find the current in each branch and the current in the battery.



**UNIT-2**

4. a) Explain the characteristics of a DC generator. (6+6)  
b) A 220V DC shunt motor is taking a current of 30A. Armature and shunt field resistances are 0.2 and 100 respectively. Iron and friction losses amount to 500W. Find the efficiency of the motor.
- (OR)
5. a) Derive the torque equation of a DC motor. (6+6)  
b) The armature of a 6- pole, 600 rpm lap wound generator has 90 slots. If each coil has 4 turns, calculate flu per pole required to generate an emf of 288 volts.

**UNIT -3**

6. a) Derive EMF equation of a single phase transformer. (6+6)  
b) Explain in brief the regulation of an alternator using Synchronous Impedance method.
- (OR)
7. a) Explain the principle of operation of an Induction motor. (6+6)  
b) In 100KVA transformer, the iron loss is 1.2KW and full load copper loss is 2KW. If the load power factor is 0.8 p.f lagging, find efficiency at full load.

**UNIT- 4**

8. a) Classify Moving Iron Instruments and explain them in brief. (6+6)  
b) A moving coil milliammeter with a resistance of 1.6 is connected with a shunt of 0.228 . what will be the current flowing through the instrument if it is connected in a circuit in which a current of 200mA is flowing?
- (OR)
9. Illustrate the principle of operation of PMMC Instrument. 12M

**UNIT -5**

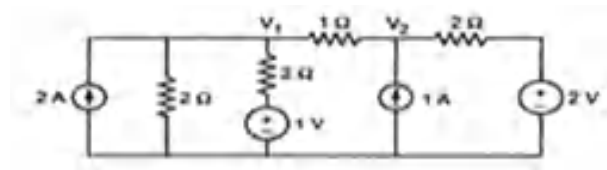
10. a) Explain the principle of operation of Bridge rectifier. (6+6)  
b) Explain the principle of operation of SCR.
- (OR)
11. a) Explain how a transistor acts as an amplifier. (6+6)  
b) Describe the constructional features of P-N-P Junction Transistor.

**Code: 13EE1001****ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)****I B.Tech II Semester Regular Examinations, August-2014  
FUNDAMENTALS OF ELECTRICAL ENGINEERING  
(Electrical and Electronics Engineering) (Re-Admitted)****Time: 3 hours****Max Marks: 70****PART – A****Answer all questions****[10X1=10M]**

1. a) State kirchoff's current law
- b) Define Ideal voltage source
- c) What is the significance of 'J' operator
- d) Write the relation between self inductance and mutual inductance
- e) The coefficient of coupling between two coils is 0.6. What does it mean?
- f) Define Magneto Motive force
- g) Define Deflecting torque
- h) What are the three torques produced in measuring instrument?
- i) Define Fuse
- j) List the different types of switches

**PART – B****Answer one question from each unit****[5X12=60M]****UNIT-I**

2. a) Explain the concept of source transformation [6M]
  - b) Explain the various types of sources used in DC circuits [6M]
- OR**
3. a) Explain the difference between independent and dependent source with suitable examples. [6M]
  - b) Determine  $V_1$  and  $V_2$  using source transformation technique [6M]

**UNIT-II**

- 4.a) In an electrical circuit R, L and C are connected in parallel.  $R = 10 \Omega$ ,  $L = 0.1 \text{ H}$  and  $C = 100 \mu\text{F}$ . The circuit is energized with supply at 230 V, 50 Hz. Calculate (i) the impedance ii) current taken from the supply (iii) power factor of the circuit and power consumed by the circuit. [6M]
- b) Define the following terms [6M]
  - i) Instantaneous value
  - ii) Average value
  - iii) Effective value

**OR**

5. a) Explain the sinusoidal response of series RL circuit [6M]  
b) A sine wave of  $V(t) = 200 \sin 50t$  is applied to a  $10 \Omega$  resistor in series with a coil. The reading of a voltmeter across the resistor is 120V and across the coil, 75V. Calculate the power and reactive volt-amperes in the coil and the power factor of the circuit [6M]

**UNIT-III**

6. a) Two coils of 1500 and 200 turns are wound on a common magnetic circuit of reluctance 250,000 AT/Wb. Find the mutual inductance when the leakage flux is neglected. If the self inductance of the two coils are 2H each, calculate the net inductance if the fluxes in the two coils  
a) oppose each other  
b) Aid each other  
c) Coefficient of coupling [6M]  
b) What is the purpose of dot convention and how do you establish dots? [6M]

OR

7. a) Derive the relation between self inductance, mutual inductance and coefficient of coupling. [6M]  
b) Define and state the units of following parameters [6M]  
i) Magnetic flux ii) Magnetic flux density iii) Reluctance

**UNIT-IV**

8. With a neat sketch explain the working of PMMC instrument and derive the torque equation of PMMC instrument [12M]

OR

9. With the help of neat diagram, explain the working of Moving Iron instrument? Derive the expression for deflecting torque of Moving iron instruments? [12M]

**UNIT-V**

10. a) Explain about all Electrical Wiring accessories in detail. [6M]  
b) What are the factors affecting the wiring system [6M]  
OR  
11. Explain the procedure to estimate the cost selection of interior wiring system [12M]

Code: 13BS1002

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

**I B.Tech II Semester Regular Examinations, August, 2014**

**ENGINEERING MATHEMATICS-II**

**(Common to EEE & ECE)**

Time: 3 Hours

Max. Marks: 70

**PART – A**

Answer all questions

[10×1=10 M]

1. a) Write Newton-Raphson method iteration formula for finding  $\sqrt{N}$ .
- b) State principle of least squares.
- c) Show that  $\int_0^1 x^2 dx = \frac{1}{3}$ .
- d) State Simpson's  $1/3^{\text{rd}}$  rule.
- e) Using Euler's method find  $y(0.1)$  for  $dy/dx = x + y$ ,  $y(0) = 1$  and  $h = 0.1$ .
- f) Write the second order Runge - Kutta formula.
- g) Find  $L\{\cos at \cos bt\}$ .
- h) State convolution theorem.
- i) Solve  $z = px + qy + \sqrt{1 + p^2 + q^2}$ .
- j) State one-dimensional heat equation.

**PART-B**

Answer one question from each unit

[5×12=60 M]

**Unit – I**

2. a) Find a positive root of  $x^3 - x = 1$  correct to two decimal places by bisection method.
- b) Find the root of the equation  $x^3 = 2x + 5$  by iteration method.

[6M+6M]

**(OR)**

3. a) Fit a straight line of the form  $y = a + bx$  to the following data:

x:	0	5	10	15	20
y:	7	-11	16	20	26

- b) Fit an exponential curve  $y = ae^{bx}$  to the following data:

x:	1	2	3	4	5
y:	2.6	3.3	4.2	5.4	6.9

[6M+6M]

**Unit – II**

4. a) From the following table, estimate the number of students who obtained marks between 40 and 45:

Marks:	30-40	40-50	50-60	60-70	70-80
No. of students	31	42	51	35	31

- b) Using Lagrange's interpolation formula, calculate  $f(3)$  from the following table:

x:	0	1	2	4	5	6
f(x):	1	14	15	5	6	19

[6M+6M]

**(OR)**

5. a) Find the first and second derivatives of  $f(x)$  at  $x = 1.5$  if

x	1.5	2.0	2.5	3.0	3.5	4.0
f(x)	3.375	7.000	13.625	24.000	38.875	59.000

- b) Evaluate  $\int_0^1 \frac{1}{1+x^3} dx$  by using Simpson's  $\frac{3}{8}$  rule. [6M+6M]

### Unit – III

6. a) Obtain  $y(0.1)$  given  $y' = \frac{y-x}{y+x}$ ,  $y(0) = 1$  by Picard's method.

- b) Apply Runge – Kutta method to find  $y(0.1)$  and  $y(0.2)$  where  $\frac{dy}{dx} = x^2 - y$  and  $y(0) = 1$ .

[6M+6M]

(OR)

7. Given  $y' = x(x^2 + y^2)e^{-x}$ ,  $y(0) = 1$ , find  $y$  at  $x=0.1, 0.2$  and  $0.3$  by Taylor's series method and compute  $y(0.4)$  by Milne's method. [12M]

### Unit – IV

8. a) Find the Laplace transform of  $\int_0^t \frac{\sin u}{u} du$ .

- b) Find the inverse Laplace transform of  $\frac{s+1}{(s^2+2s+2)^2}$ . [6M+6M]

(OR)

9. a) Find  $L\{(t^2 + e^{-t}) \sin 3t\}$ .

- b) Solve  $y'' + 5y' + 6y = 5e^t$ ,  $y(0) = 2$ ,  $y'(0) = 1$  using Laplace transforms. [6M+6M]

### Unit – V

10. a) Form the partial differential equation by eliminating arbitrary function from  $z = f(y/x)$ .

- b) Solve  $x^2(y-z)p + y^2(z-x)q = z^2(x-y)$ .

[6M+6M]

(OR)

11. Solve completely  $\frac{\partial^2 y}{\partial t^2} = c^2 \frac{\partial^2 y}{\partial x^2}$ , representing the vibrations of a string of length  $l$  fixed at

both the ends, given that  $y(0,t) = 0$ ,  $y(l,t) = 0$ ,  $y(x,0) = f(x)$  and  $\frac{\partial y}{\partial t}(x,0) = 0$ ,  $0 < x < l$

[12M]