

Time: 3 Hours

Max Marks: 70

PART-A

ANSWER ALL QUESTIONS

[1 x 10 = 10 M]

1. a) What is the critical hydraulic gradient of a soil, if specific gravity of soil solids is 2.7 and void ratio is 0.50?
- b) Distinguish between the residual soil and transported soil
- c) What is the value of compression Index for a undisturbed sample whose liquid limit is 60%?
- d) Compaction by vibratory roller is best method of compaction for which soils?
- e) Keep the shrinkage limit, liquid limit, and plastic limit of a cohesive soil in descending order?
- f) If a soil is having $G = 2.71$, $n = 40\%$, and $w = 20\%$, what is the degree of saturation?
- g) Differentiate between GW and GP soils
- h) What is over consolidation ratio?
- i) What is Quick Sand condition?
- j) What is effective stress at a depth of 4 m below the water surface line in a 10m deep swimming pool?

PART-B

Answer one question from each unit

[5x12=60M]

UNIT-I

2. a The laboratory test results of a soil sample are given below: Percentage finer than 4.75 mm = 60, percentage finer than 0.075 mm = 30, liquid limit=35%, Plastic limit = 27%, Classify the soil as per IS1478:1970. **4**
- b A soil sample is tested for liquid limit using Casagrande's apparatus and the following data is obtained from the test. Determine the liquid limit of soil. **8**

Water Content (%)	43.1	45.1	47.5	49.5	51.9	53.9
No. of Blows (N)	60	45	38	25	20	13

(OR)

3. a Draw the Casagrande plasticity chart and clearly explain different components **6**
- b If the porosity of the soil sample is 35% and the specific gravity of its particles is 2.7, What will be the void ratio, bulk unit weight, dry unit weight, saturated unit weight and submerged unit weight? **6**

UNIT-II

4. a Write a short note on different factors affecting coefficient of permeability 6
b Define total, neutral and effective stress of soil. 6

(OR)

5. a Water is flowing at the rate of 0.2 cc/sec in an upward direction through a sand 6
sample with $k = 8 \times 10^{-3}$ cm/sec. Thickness of sand sample is 10 cm and sectional
area is 50 cm^2 . What is the effective stress at middle of sample if saturated density
is 2 t/m^3 .
b Find the discharge per unit length of earth dam using flow net, if $k = 4.5 \times 10^{-4}$ 6
cm/sec, $N_f = 4$, $N_d = 19$, and $h = 7 \text{ m}$.

UNIT-III

6. a Write a short note on Newmark's influence Chart 6
b A 10 m thick sand deposit overlies a bed of soft clay. The water table is 5 m from 6
the ground surface. If the sand above the water table has a 45% degree of
saturation, calculate the effective stress at the middle and bottom of the sand layer.
Take $e=0.68$ and $G_s=2.65$.

(OR)

7. a Explain in detail three different types of roller used in field compaction 6
b A soil sample is having a specific gravity of 2.6 and a void ratio of 0.78. What will 6
be the water content in percentage required to fully saturate the soil at that void
ratio?

UNIT-IV

8. a Explain the consolidation process with spring analogy mechanism 6
b Write a short note on primary and secondary consolidation 6

(OR)

9. a A normally consolidated clay layer settled by 25 mm when the effective stress was 6
increased from 30 to 60 kN/m^2 . What will be its settlement when the effective
stress is increased from 60 to 100 kN/m^2 .
b A vertical concentrated force of 40 kN is acting at a point on the ground surface. 6
Determine the vertical stress intensities due to this load at a depth of 2.5 m below
GL on the line of action of load and at a depth of 1.5 m below GL and a radial
distance of 3m.

UNIT-V

10. a Provide the soil type and saturated/unsaturated state for the appropriate usage of 6
Direct shear test, unconfined compression test, unconsolidated undrained triaxial
test, consolidated undrained triaxial test, consolidated drained triaxial test.
b The principal stresses at a point in a material are 100 kN/m^2 and 50 kN/m^2 . 6
Determine the Normal, Shear and Resultant Stress on a plane inclined at 35° to
the major principal plane. Also find, for this plane, the maximum value of
Obliquity.

(OR)

11. a Discuss the advantages of triaxial tests over direct shear test. 6
b A drained triaxial test on a normally consolidated clay showed that the failure 6
plane makes an angle of 58° with the horizontal. If the sample was tested with a
chamber pressure of 103.5 kN/m^2 , what will be the major principal stress at
failure?

AR13

CODE: 13EC3016

SET-2

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

III B.Tech I Semester Regular & Supplementary Examinations, October-2017

LINEAR DIGITAL INTEGRATED CIRCUITS

(Electrical and Electronics Engineering)

Time: 3 Hours

Max Marks: 70

PART-A

ANSWER ALL QUESTIONS

[1 x 10 = 10 M]

1. a) List out various ideal specifications of an op-amp.
- b) Define slew rate of an op-amp.
- c) Give various example circuits for linear applications of an op-amp.
- d) Draw the circuit diagram for V to I converters using op-amp.
- e) Define VCO?
- f) What is the bandwidth of filter.
- g) Give the various specifications of IC1408 DAC.
- h) Draw the logic diagram of SR flipflop?
- i) Write the logic equation for 4x1 multiplexer
- j) Define low pass filter.

PART-B

Answer one question from each unit

[5x12=60M]

UNIT-I

2. a) Explain the block diagram of an operational amplifier. 6M
- b) Define the terms i) CMRR ii) Input Offset Voltage iii) Thermal Drift 6M

(OR)

3. a) Explain about AC characteristics of an op-amp. 8M
- b) Draw an equivalent symbol of an op-amp and explain it. 4M

UNIT-II

4. a) Explain the circuit operation of triangular waveform generator using op-amp. 6M
- b) Derive output expression for integrator using op-amp. 6M

(OR)

5. a) Derive output expression for differentiator using op-amp. 6M
b) Explain the circuit operation of Schmitt trigger using op-amp. 6M

UNIT-III

6. a) With neat diagram, explain high Pass Filter using op-amp 8M
b) With neat diagram, explain Band Pass Filter using op-amp. 4M

(OR)

7. a) Derive frequency of oscillations for astable multivibrator using IC 555. 8M
b) Explain about various blocks of PLL. 4M

UNIT-IV

8. a) What is the advantage of R-2R ladder DAC and explain its operation. 8M
b) Give comparison between various logic families. 4M

(OR)

9. a) With neat diagram, explain the circuit operation of successive approximation ADC. 8M
b) Explain about CMOS with TTL interfacing with diagrams. 4M

UNIT-V

10. a) Design parallel binary adder/subtractor and explain its operation. 8M
b) Draw the diagram for SDRAM 4M

(OR)

11. a) Explain the operation of JK flipflop. 8M
b) Convert JK flip-flop to T flip-flop 4M

UNIT – III

6. (a) Explain various components of NC with neat diagrams.
(b) Discuss the applications of NC and economics of NC.
(OR)
7. (a) Define CNC. What are the salient features of CNC?
(b) What is machining centre. Explain the important features of machining centres.

UNIT – IV

8. (a) What are the classification and coding systems in G T? Explain OPITZ system briefly.
(b) Define Group Technology. List out the benefits of Group Technology.
(OR)
9. (a) Define Cellular manufacturing? Explain Composite Part Concepts in G T with an example
(b) Explain various factors taken in account in the selection of a part in Parts classification and coding systems.

UNIT – V

10. (a) Define CAPP. List out the types of CAPP. Explain any one type of CAPP with flow chart.
(b) Describe the hardware components of CIM with a neat diagram.
(OR)
11. (a) What is FMS? List out the benefits and applications of FMS.
(b) Explain the functions of material handling and storage systems?

AR13

CODE: 13EC3015

SET-2

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

III B.Tech I Semester Regular & Supplementary Examinations, October-2017

ANTENNAS AND WAVE PROPAGATION
(Electronics and Communication Engineering)

Time: 3 Hours

Max Marks: 70

PART-A

ANSWER ALL QUESTIONS

[1 x 10 = 10 M]

1.
 - a) Draw the equivalent circuit of an antenna
 - b) Define radiation intensity
 - c) Define radiation resistance
 - d) Define Effective area of an antenna
 - e) Write the significance of $1/r^2$ term
 - f) What is the role of directors in yagi uda antenna?
 - g) Obtain the gain of an antenna whose area is 12m^2 and operating at a frequency of 6GHz
 - h) Find the radiated power of an antenna if a current of 10amp exists and its radiation resistance is 32.0Ω
 - i) Define Snell's law
 - j) Define critical frequency of the ionosphere layer

PART-B

Answer one question from each unit

[5x12=60M]

UNIT-I

2.
 - a) Discuss the significance of $1/r$, $1/r^2$ and $1/r^3$ terms of the above field components. 6
 - b) Derive the value of r at which the near field and far fields are equal 6
- (OR)
3. Evaluate the current distribution on a short dipole and obtain the expressions for the field components 12
 - a) E_θ and
 - b) H_ϕ

UNIT-II

4. a Given a linear, broadside, uniform array of 10 isotropic elements with separation of $d = \frac{\lambda}{4}$ between the elements, find the directivity of the array. 6
- b What is broad side array? Evaluate the expression for the radiation pattern for an end fire array of N identical elements 6
- (OR)
5. Three isotropic sources, with spacing d between them, are placed along the z-axis. The excitation coefficients of each outside element are unity while that of the centre element is 2. For a spacing of $d = \frac{\lambda}{4}$ between the elements find the a) array factor 2
b) angles where the nulls of the pattern occur +5
c) angles where the maxima of the pattern occur +5

UNIT-III

6. a Design a Rhombic antenna using a V-antenna and inverted V-antenna. Evaluate design equations 6
- b Design a rhombic antenna to operate at a frequency of 30 MHz with an angle of elevation of 30 degrees with respect to the ground 6
- (OR)
7. a Design a helical shape antenna using a long wire with neat illustrations. 6
- b Calculate in db the directivity of 10 turn helix, having $\alpha = 12^\circ$, circumference equal to one wavelength 6

UNIT-IV

8. a What are the general characteristics of an Yagi-Uda antenna and show that the increase in the number of directors causes a decrease in the input impedance of the antenna and also suggest a remedy. 6
- b Comment on the radiation characteristics of a long wire antenna as its length increases. Also write the field expressions for long wire antenna. 6

(OR)

9. a Discuss the principle of lens antennas with a neat sketch. 6
- b Discuss the analysis of non-metallic dielectric lens. 6

UNIT-V

10. a Describe the phenomenon of ground wave propagation, give its applications. 6
- b Analyse wave tilt in surface waves, calculate field strength at a distance due to surface waves. 6

(OR)

11. a Determine the effective earth's radius in space wave propagation. 6
- b A high frequency radio link has to be established between two points at a distance of 2500km on earth's surface. Consider the ionosphere height to be 200 km and its critical frequency 5MHz, calculate the MUF for the given path 6

AR13

CODE: 13CS3013

SET-2

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

III B.Tech I Semester Regular & Supplementary Examinations, October-2017

DESIGN AND ANALYSIS OF ALGORITHMS (Computer Science and Engineering)

Time: 3 Hours

Max Marks: 70

PART-A

ANSWER ALL QUESTIONS

[1 x 10 = 10 M]

1.
 - a) Define Profiling.
 - b) What is Primality Testing
 - c) Define Purging rule and merging rule.
 - d) Define principle of optimality.
 - e) Differentiate Greedy and Dynamic Programming.
 - f) What is meant by feasible solution?
 - g) What is clique decision problem.
 - h) Define chromatic number of the graph.
 - i) Define convex hull .
 - j) Define NP-hard problem

PART-B

Answer one question from each unit

[5x12=60M]

UNIT-I

2.
 - (a) What is an asymptotic notation?. What is its purpose? Explain various asymptotic notations [6M]
 - (b) Explain in detail about Amortized and Probabilistic analysis. [6M]

(OR)

3.
 - (a) Explain the usefulness of the following functional operations on sets. [6 M]
(i) DELETE (ii) FIND (iii) UNION (iv) INSERT
 - (b) Explain in detail about depth first search and its applications. [6 M]

UNIT-II

4.
 - (a) Write and explain the control abstraction for Divide and Conquer. [6 M]
 - (b) Briefly explain Binary Search Algorithm with suitable example and Derive its Time Complexity [6 M]

(OR)

5.
 - (a) Define Greedy method with control abstraction. Explain single source shortest path problem [6 M]
 - (b) State and explain prim's algorithm for solving minimum cost spanning tree problem. [6 M]

AR13

CODE: 13CS3013

SET-2

UNIT-III

- 6 (a) Define Dynamic Programming. Apply Dynamic Programming to solve Travelling Sales Person problem. [6 M]
(b) What is an articulation point. Explain with the help of an algorithm, the mechanism of identifying articulation points and Bi-Connected components in a graph. [6 M]
- (OR)**
- 7 (a) Construct an optimal binary search tree for the following data: $n=4$, $(a_1, a_2, a_3, a_4) = (\text{do}, \text{if}, \text{int}, \text{while})$, $p(1:4) = (3, 3, 1, 1)$ and $q(0:4) = (2, 3, 1, 1, 1)$. [6 M]
(b) Explain Matrix chain Multiplication with an example. [6 M]

UNIT-IV

- 8 (a) Describe Backtracking technique to m-coloring graph. Explain with example [6M]
(b) Write an algorithm for N-Queens problem and solve the 4-Queens problem by using state space tree. [6M]
- (OR)**
- 9 (a) Briefly explain Hamiltonian cycles using backtracking. [6M]
(b) Write a recursive backtracking algorithm for Sum of Subsets problem [6M]

UNIT-V

- 10 (a) Explain the principles of Control Abstractions for LC-search. [6M]
(b) Draw the portion of the state space tree generated by LC Branch and Bound by the following knapsack. Problem: $n=5$ profits(10,15,6,8,4) and corresponding weights(4,6,3,4,2) and $m=12$. [6M]
- (OR)**
- 11 (a) Explain in detail about NP-Hard & NP-Complete classes. [6M]
(b) Briefly explain Cooks-theorem. [6M]

MICROPROCESSOR AND MICROCONTROLLERS**(Information Technology)****Time: 3 Hours****Max Marks: 70****PART-A****ANSWER ALL QUESTIONS****[1 x 10 = 10 M]**

1. a) What is the use of REP instruction?
b) Define machine cycle.
c) What is physical address?
d) How can you disable an interrupt in 8086?
e) What is use of flag register?
f) What are the features of PIC microcontrollers?
g) What is the relation between address bus and memory?
h) What is the use of timer register of 8051?
i) What is maximum mode?
j) What is PSW?

PART-B**Answer one question from each unit****[5x12=60M]****UNIT-I**

2. a) Explain internal architecture of 8086 microprocessor 8M
b) Write the advantages memory segmentation 4M
(OR)
3. a) Explain different instruction set of 8086 micro processor 6M
b) Explain Assembler directives of 8086 6M

UNIT-II

4. Explain instruction set of 8086 12M
(OR)
5. Explain interrupt vector table of 8086 12M

UNIT-III

6. Explain pin diagram of 8051 microcontroller 12 M
(OR)
7. Explain Interrupts of 8051 12M

UNIT-IV

8. Explain Programmable Interrupt Controller 8259A 12M
(OR)
9. Explain Programmable Parallel Interface 8255 12M

UNIT-V

10. Explain addressing modes of 8051 12M
(OR)
11. Explain assembler directives of 8051 12M