

CODE: NO: 13CE3013

SET - 1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

III B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, MARCH-2017

GEOTECHNICAL ENGINEERING – I

Civil Engineering

Time: 3 (Three) Hours

Maximum Marks: 70

PART –A

ANSWER ALL QUESTIONS

[1 x 10 = 10 M]

1. a) Differentiate Residual and Transported soil
b) Define Relative Density
c) Consistency Limits
d) Clay Forming Minerals
e) Differentiate between Seepage Velocity and Discharge velocity
f) What do you mean by Isochrones?
g) Define Pressure Bulb
h) Compaction of soils
i) Mohr- Coulomb strength envelope
j) Flow Net

PART –B

Answer one question from each unit

[5 x 12M = 60 M]

UNIT-I

- 2) a) Define the weight relationship, volume relationships and weight-volume relationships [6M]
b) Explain in detail and determination of consistency Limits [6M]
(OR)
- 3) a) Briefly explain Indian Soil Classification System [5M]
b) During a sedimentation test for grain size analysis, the corrected hydrometer reading in a 1000 ml uniform soil suspension at the commencement of sedimentation is 1.028. After 30 minutes, the corrected hydrometer reading is 1.012 and the corresponding effective depth is 10.5 cm. Determine the 1) the total weight of the solids dispersed in 1000 ml suspension, 2) the particle size corresponding to 30 minute reading and 3) the percentage finer than this size.

UNIT-II

- 4) a) Explain Darcy's Law? Also explain the various factors affecting permeability of soil by writing the general expression of permeability [6M]
b) In a certain permeability determination test on a silty soil sample, the following data was obtained. Length of the sample is 250 mm and cross section area 4000 mm^2 . Under a constant head of 400 mm, a discharge of 250 mm^3 in 90 sec. Determine the coefficient of permeability of the soil. If a variable head were conducted on the soil sample with the same length and cross section, with a stand pipe of 10mm diameter, how much time will be required for the head to fall from 1.0 m to 0.50 m. [6M]
OR
- 5) a) Define Total, neutral and effective stresses [3M]
b) What do you mean by Quick Sand [3M]
c) The soil profile at a site consists of 4 m of sand followed by 4 m clay. Water table is at a depth of 2m below the ground level and sand is saturated upto 1 metre below ground level due to capillary rise. Sand has a $G = 2.70$ and porosity $n = 0.5$. Clay has a saturated density of 2000 kg/m^3 . Plot the total, neutral and effective stresses [6M]

UNIT-III

- 6) a) Write the expression for vertical stress due to point load at any depth by Boussinesq and Westergaard's theory [5M]
 b) What do you understand on Influence diagram and Pressure Bulb? [3M]
 c) A water tower has a circular foundation of 10 metres. If the total weight of the tower including the foundation is 2×10^4 kN. Calculate the vertical stress at a depth of 2.50 metres below the foundation level by theory and approximate method. [4M]
- (OR)
- 7) a) Compare Boussinesq and Westergaard's theory [4M]
 b) Explain Newmark's Influence Chart & Its uses [4M]
 c) Two columns A and B are situated 6 metres apart. Column A transfer a load of 50 t and column B, a load of 25 t. Determine the resultant vertical stress on a horizontal plane 2.0 metres below the ground surface directly below the column B. [4M]

UNIT-IV

- 8) a) Explain Consolidation Test on Clayey soil in the laboratory. What are the graphs to be plotted at the end of the experiment? [7M]
 b) A clayey soil tested in a consolidometer showed a decrease in void ratio from 1.20 to 1.10 when the pressure was increased from 0.25 to 0.50 kg/cm². If the sample tested at the site was taken from a clay layer 3.0 metre in thickness determine the consolidation settlement resulting from the given stress increment. [5M]

(OR)

- 9) a) Discuss the factors affecting compaction of soils [6M]

- b) The data obtained from a standard proctor compaction test are as given below

Water content(w)	7.80 %	10.10 %	12.00 %	14.40 %	16.80 %
Mass of the soil in the mould(gm)	1824 gm	1958 gm	2176 gm	1995 gm	1860 gm

- Draw moisture-density curve and find OMC and MDD, volume of the soil sample is 1500 cm³. Find degree of saturation at OMC [6M]

UNIT-V

- 10) a) Discuss the difference between Triaxial shear test & Direct Shear Test. [6M]
 b) An unconfined compression test was conducted on an undisturbed sample of saturated clay, The sample had a diameter of 37.5 mm and 80 mm long. The load at failure measured by the proving ring was 28 N and the axial deformation of the sample at failure was 13 mm. Determine the unconfined compressive strength & shear strength and shear parameters [6M]
- OR
- 11) a) Discuss the shear characteristics of cohesionless soil and cohesive soils [6M]
 b) A sample of dry cohesionless soil was tested in a Triaxial machine. The angle of shearing resistance was found to be 36 degrees for confining pressure of 1.0 kg/cm². Determine the deviator stress at which the sample failed. [6M]

AR13

CODE: 13EC3016

SET-1

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

III B.Tech I Semester Supplementary Examinations, March-2017

**LINEAR AND DIGITAL IC APPLICATIONS
(Electrical and Electronics Engineering)**

Time: 3 Hours

Max. Marks: 70

PART - A

ANSWER ALL QUESTIONS

[1 X 10 = 10M]

1. a) What are the different IC packages?
b) Define CMRR.
c) Draw the circuit diagram of non inverting amplifier.
d) Which feedback is used in Schmitt Trigger?
e) Astable Multi Vibrator is also known as free running multi vibrator, why?
f) Expand VCO.
g) Draw the circuit diagram of 2-input TTL NAND gate.
h) Mention different ADC techniques.
i) Define encoder.
j) Draw the circuit symbol of operational amplifier.

PART - B

ANSWER ONE QUESTION FROM EACH UNIT

[5 X 12 = 60M]

UNIT - I

2. a) Define slew rate. What are causes of slew rate? **4M**
b) Explain the properties of ideal operational amplifier. **8M**

(OR)

3. a) Draw and explain the equivalent circuit of op-amp. **7M**
b) Write a short note on features of 741 op –amp. **5M**

UNIT - II

4. a) Explain the operation of inverting amplifier. **8M**
b) Draw the circuit diagram of square wave generator. **4M**

(OR)

5. a) Explain the operation of differentiator using op-amp. **6M**
b) Draw and explain the operation of current to voltage converter. **6M**

UNIT - III

6. a) Explain the operation of Astable multi vibrator using 555 timer. **10M**
b) Write the applications of Mono stable multi vibrator. **2M**

(OR)

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SET-1

7. a) Draw and explain the circuit diagram of VCO using 555 timer. **8M**
b) Draw the circuit diagram of first order high pass filter. **4M**

UNIT – IV

8. a) Explain the operation of Successive Approximation ADC with neat sketches. **10M**
b) Draw the CMOS inverter Circuit. **2M**

(OR)

9. a) Explain the operation of parallel comparator type ADC. **9M**
b) Compare TTL and CMOS Logics. **3M**

UNIT – V

10. a) Design a 4- bit parallel binary adder/ sub tractor using 2's complement. **9M**
b) Draw the excitation table of J-K flip flop. **3M**

(OR)

11. a) Design a 2- bit digital comparator. **6M**
b) Explain the operation of 4- bit ring counter. **6M**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

III B.Tech I Semester Supplementary Examinations, March-2017

CAD/CAM
(Mechanical Engineering)

Time: 3 Hours

Max Marks: 70

PART-A

ANSWER ALL QUESTIONS

[1 X 10 = 10 M]

1.
 - a) Write any four benefits of CAD.
 - b) Write 2-D transformation matrix for rotation about z-axis.
 - c) Differentiate between analytic curve and synthetic curve.
 - d) Write any four 2-D entities and four 3-D entities.
 - e) What is preparatory code G00, G01 and G02?
 - f) What are the axes in CNC lathe?
 - g) Define part family.
 - h) What is form code and supplementary code in Opitz classification system?
 - i) What are the basic components of FMS?
 - j) Define computer aided process planning.

PART-B

Answer one question from each unit

[5x12=60M]

UNIT-I

2.
 - (a) Explain product life cycle overlaid with CAD/CAM [7M]
 - (b) Explain the concept of obtaining a reflection about an arbitrary line starting from the plain reflection about an axis [5M]

(OR)

3.
 - (a) Differentiate between working coordinate system and screen coordinate system. [4M]
 - (b) The vertices of a triangle are situated at points (15,30), (25,35) and (5,45). Find the coordinates of the vertices if the triangle is rotated by 30° in counter clockwise direction about its centroid. [8M]

UNIT-II

4.
 - (a) Derive the parametric equation of Hermite cubic spline curve. [8M]
 - (b) Draw a 4X4 Bezier surface. [4M]

(OR)

5.
 - (a) A cubic Bezier curve is defined by the control points as (30,30), (50,80), (100,100) and (150,30). Find the equation of the curve and its mid point. [7M]
 - (b) Compare CSG and B-Rep scheme. [5M]

UNIT-III

6.
 - (a) Explain the basic components of NC system. [6M]
 - (b) Explain the coordinate system in CNC milling and CNC lathe with the help of diagram. [6M]

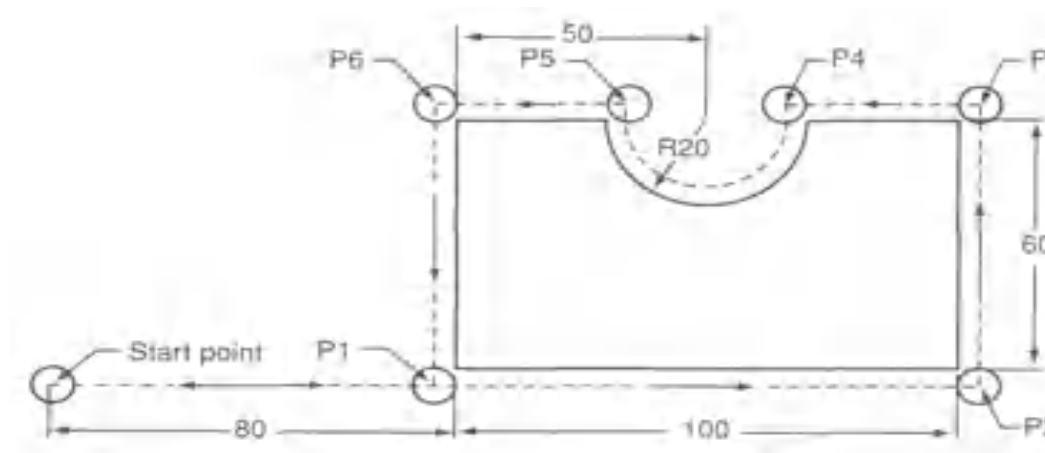
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SET-I

(OR)

- 7 (a) What is canned cycle? [2M]
(b) Write the manual part program for milling operation of the outside edges of the work part as shown in figure. [10M]



UNIT-IV

- 8 (a) Why is group technology more important in the present manufacturing scenario? [4M]
(b) Explain Opitz parts classification and coding system used in group technology. [8M]
- (OR)
- 9 (a) Explain the role of group technology in CAD/CAM integration. [4M]
(b) Explain MICLASS coding system used in group technology. [8M]

UNIT-V

- 10 (a) Explain the methodology to be followed for developing a retrieval type of computer aided process planning system. [8M]
(b) What is AGVS? Explain its importance in industry. [4M]
- (OR)
- 11 (a) What are the various types of layouts used in FMS design? Explain briefly about their applications. [8M]
(b) Explain production flexibility and routing flexibility in FMS. [4M]

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SET-2

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

III B.Tech I Semester Supplementary Examinations, March-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) Define Antenna and its Radiation Pattern.
 - b) Write the relation between the maximum aperture area and Directivity of an antenna?
 - c) Define Aperture and Effective Height of Antenna.
 - d) Write the relation between the HPBW and BWFN?
 - e) Write any two applications of Rhombic Antenna?
 - f) Write short notes on different modes in Helical Antenna?
 - g) Compare Parabolic and Corner Reflector Antennas?
 - h) Define Virtual Height and Skip distance?
 - i) Determine the maximum electron density of E- layer when the critical frequency is 3MHz
 - j) Obtain the relation between MUF and Skip distance

PART-B

Answer one question from each unit

[5x12=60M]

UNIT-I

2.
 - (a) List Antenna Theorems, State and prove the Theorem related to Effective Length. [6 M]
 - (b) Obtain the Formulas for Radiation Resistance of Small Dipoles and Monopoles. [6 M]
- (OR)
3.
 - (a) Briefly explain the current distribution on a thin wire antenna? [6 M]
 - (b) Evaluate the field components of Half wave dipole? [6 M]

UNIT-II

4.
 - (a) Obtain the expressions for the directions of pattern maxima and minima for minor lobes when the array of 'n' isotropic sources of equal amplitude and spacing for the case of broadside [6 M]
 - (b) Given a linear Broadside, uniform array of 10 Isotropic elements (N=10) with a separation of $\lambda/4$ between the elements, find the directivity of the array in dB? [6 M]
- (OR)
5.
 - (a) Find the Directivity of 2-element linear array for the case of broadside? [6 M]
 - (b) For a 10-element binomial array with spacing of $\lambda/2$ between the elements. Determine the half power beam width (in degrees) and maximum directivity (dB) ? [6 M]

UNIT-III

- 6 Discuss the design relations of Rhombic antenna? Mention the advantages and disadvantages of Rhombic antenna. [12 M]
- (OR)**
- 7 (a) Design an End-fire right hand circularly polarized helix having a half-power beam width of 45° , pitch angle of 13° , and a circumference of 60 cm at a frequency of 500MHz. Determine the (i) turns needed (ii) directivity in dB (iii) axial ratio [6 M]
- (b) Explain the operation of the Helical antenna in normal mode? [6 M]

UNIT-IV

- 8 (a) Explain folded dipoles and their characteristics?. [6 M]
- (b) Explain the following terms with respect to parabolic reflector antennas. [6 M]
(i) aperture blocking (ii) spill over (iii) cassegrains feeds
- (OR)**
- 9 (a) Explain different types of Horn antenna in detail?. [6 M]
- (b) Explain the principle of operation of Lens antenna with neat sketches. [6 M]

UNIT-V

- 10 (a) Explain duct propagation in detail?. [6 M]
- (b) The transmitting and receiving antennas with respective heights of 49m and 25m are installed to establish communication at 100MHz with a transmitted power of 100watts. Determine the LOS distance and the received signal strength there at? [6 M]
- (OR)**
- 11 Derive an expression for line of sight distance for the case of effective earth's radius. [12 M]

AR13

CODE: 13CS3013

SET-1

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

III B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, MARCH-2017

DESIGN AND ANALYSIS OF ALGORITHMS

(CSE Branch)

Time: 3 Hours

Max Marks: 70

PART-A

ANSWER ALL QUESTIONS

[1 x 10 = 10 M]

1. a) Define Space complexity and Time complexity
- b) 'Quick sort is better than Merge sort', will you state or interpret it in your own words.
- c) List any two applications of BFS.
- d) Define All Pairs shortest path problem.
- e) Write a brief outline about job sequencing with deadlines
- f) Write the cost function for optimal binary search tree.
- g) Differentiate between greedy method and dynamic programming.
- h) Describe general backtracking method.
- i) Draw a state space tree for sum of subsets problem, when we consider fixed size tuple formulation and number of objects is 3.
- j) List the conditions that are used to kill a node in branch and bound.

PART-B

Answer one question from each unit

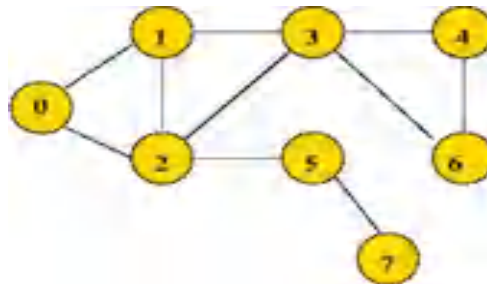
[5x12=60M]

UNIT-I

2. (a) Define Big Oh ,Omega and Theta notations. [6 M]
- (b) Distinguish between Recursive algorithm and Non Recursive algorithm with an example. [6 M]

(OR)

3. (a) Apply Depth First Search algorithm to find out whether 6 is present in the given graph or not. Justify your answer. [6 M]



- (b) Explain Prim's algorithm for finding minimum cost spanning tree with an example. [6 M]

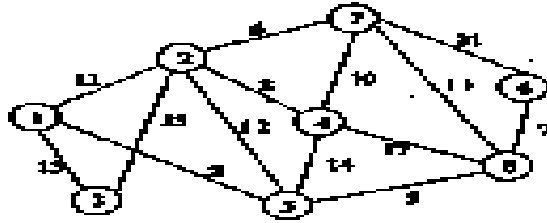
UNIT-II

4. (a) Construct an optimal binary search tree with the identifier set {a1 , a2 , a3,a4, a5} = {k1,k2,k3,k4,k5 } with (p1,p2,p3,p4,p5)=(0.15, 0.10, 0.05, 0.10, 0.20) and (q0,q1,q2,q3,q4,q5)=(0.05, 0.10, 0.05, 0.05, 0.05, 0.1).

- (b) Apply Greedy method to find an optimal solution to the knapsack [6 M]
instance $n=7$, $m=15$, $(p_1, p_2, p_3, p_4, p_5, p_6, p_7) = (10, 5, 15, 7, 6, 18, 3)$ &
 $(w_1, w_2, w_3, w_4, w_5, w_6, w_7) = (2, 3, 5, 7, 1, 4, 1)$ and also write the
algorithm .

(OR)

5. Construct a minimal spanning tree for the tree with the following [12 M]
graph using a) Prim's algorithm b) Kruskal's algorithm

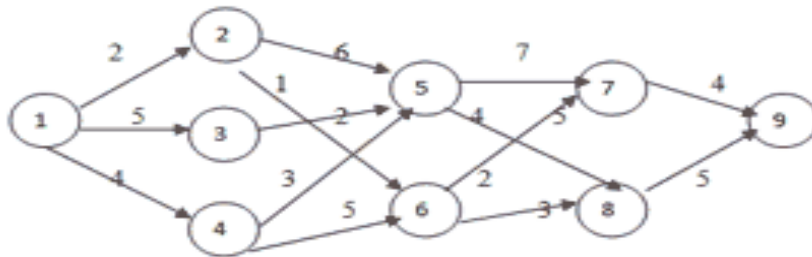


UNIT-III

6. Apply Dynamic Programming to solve 0/1 knapsack problem with [12 M]
suitable example.

(OR)

7. Apply Dynamic Programming to find minimum cost path for the [12 M]
following multistage graph using both forward and backward
approach and also write its algorithm.



UNIT-IV

8. Write recursive backtracking algorithm. Solve the 8-queens problem [12 M]
using backtracking.

(OR)

9. (a) Design a state space tree for m coloring when $n=3$ and $m=3$. [7 M]
(b) Draw and explain the portion of the tree for 4-queens problem that is
generated during backtracking. [5 M]

UNIT-V

10. Illustrate the method of reduction to solve TSP problem using Branch [12 M]
and Bound. Apply the principles of LC Branch and Bound by using
suitable example.

(OR)

11. (a) Describe NP-Hard and NP-Complete class of problems. [6 M]
(b) State and explain Cook's theorem. [6 M]

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SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, MARCH-2017
MICROPROCESSORS & MICRO CONTROLLERS
(Information Technology)

Time: 3 Hours

Max Marks: 70

PART-A

ANSWER ALL QUESTIONS

[1 x 10 = 10 M]

1. a) Explain microprocessor? Write difference between microprocessor and CPU.
- b) Explain the significance of flag register in microprocessor.
- c) Find out Machine code for following instruction
MUL [SI+5]
- d) What are DOS function codes?
- e) Define virtual mode flag and resume flag in 80386?
- f) What are different data types of 80486?
- g) Explain program counter (PC) in 8051 microcontroller.
- h) What makes 8051 an 8-bit microcontroller.
- i) How many ports are there in 8255 and what are they?
- j) How many possible combinations of 8255 would be there when it is operated in mode 2?

PART-B

Answer one question from each unit

[5x12=60M]

UNIT-I

2. (a) How does 8086 convert a logical address to physical address. Explain with an example. [2M]
- (b) What are addressing modes in 8086. [5M]
- (c) Explain pin diagram of 8086. [5M]

(OR)

3. (a) What are two modes of 8086? List out various signals generated by the CPU in these two modes respectively. [6 M]
- (b) Explain with suitable diagram how 8086 access a byte or word from EVEN and ODD memory banks and list out segmentation registers of 8086. [6 M]

UNIT-II

4. (a) Write an assembly language program starting at A0400H location to unpack eight number of 1-byte packed BCD numbers stored at A0500H location. Store the result at different memory location. Write an 8086 assembly language program to find smaller of 8-bit numbers. [6M]
- (b) Explain stack and stack structure in microprocessor 8086. [6 M]

(OR)

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SET-1

- 5 (a) Define interrupt and explain maskable and non-maskable interrupt. [6 M]
(b) Draw the interrupt vector table and define predefined interrupts of 8086 Micro processor. [6 M]

UNIT-III

- 6 (a) In 80386 processor working in protected mode, how a segment is accessed through an LDT. [6 M]
(b) Explain the internal architecture of 80387. [6 M]
(OR)
7 (a) Explain the meaning of following in 80386. [6 M]
a)G-bit b)CPL c)WC bits d)A bits e)Type-bits f)X-bits
(b) Explain CPU with a numeric coprocessor 80486. [6 M]

UNIT-IV

- 8 (a) Explain features of PIC 16C6X/7X and FSR(File Selection Register). [6M]
(b) Explain parallel I/O ports and memory organization in 8051 microcontroller. [6M]
(OR)
9 (a) Explain the 8051 pin diagram. [6M]
(b) Explain any three special function registers of 8051 Micro controller [6M]

UNIT-V

- 10 (a) Write an command word for an 8255A to work as follows: [5M]
Port A-Input, mod2
PortB-Output, mod1
(b) Explain block diagram of DMA controller and interfacing of DMA with 8051. [7M]
(OR)
11 (a) Explain the block diagram of programmable communication interface (USART). [8M]
(b) Explain block diagram of key board/display controller(8279). [4M]