AR13

CODE: 13CE3013 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.Tech I Semester Regular / Supplementary Examinations, November, 2016

GEOTECHNICAL ENGINEERING-I
(Civil Engineering)

Time: 3 Hours **Max Marks: 70**

PART-A

ANSWER ALL QUESTIONS **[1 x 10 = 10 M]**

1. a) Define relative density
   b) Express the equation of permeability by falling head method.
   c) Express the Boussines equation for point load.
   d) Define zero air voids line.
   e) Define critical void ratio
   f) Coefficient of curvature
   g) Darcy's law
   h) Express the Wester gaard's equation for point load.
   i) Define coefficient of compressibility
   j) Express the coulomb's equation for shear strength.

PART-B

Answer one question from each unit **[5x12=60M]**

UNIT-I

2. a A sample of saturated soil has a water content of 25% and unit weight of 20 kN/m^3. Determine dry density, void ratio and specific gravity of solid particles. What would be the bulk unit weight of the soil at the same void ratio but at a degree of saturation of 80%. Take γ_w=10 kN/m^3. **6M**
   b Discuss the characteristics and the construction of Kaolinite, Illite and Montmarillonite minerals. **6M**

(OR)

3. There are two borrow areas A and B which have soils with void ratios of 0.80 and 0.70, respectively. The inplace water content is 20%, and 15%, respectively. The fill at the end of construction will have a total volume of 10,000 m^3, bulk density of 2Mg/m^3 and a placement water content of 22%. Determine the volume of the soil required to be excavated for both areas. G = 2.65. **12M**
   If the cost of excavation of soil and transportation is Rs. 200/- per 100 m^3 for area A and Rs. 220/- per 100m^3 for area B, which of the borrow area is more economical?

UNIT-II

4. a A soil profile consists of a surface layer of clay 4 m thick (γ = 19.5 kN/m^3) and a sand layer 2 m thick (γ = 18.5 kN/m^3) overlying an impermeable rock. The water table is at the ground surface. If the water level in a standpipe driven into the sand layer rises 2 m above the ground surface, draw the plot showing the variation of total, neutral and effective stresses. Take γ_w = 10 kN/m^3. **6M**
   b Derive the expression for critical hydraulic gradient. **6M**

(OR)

5. a The falling-head permeability test was conducted on a soil sample of 4 cm diameter and 18 cm length. The head fell from 1.0 m to 0.40 m in 20 minutes. If the cross- section area of the stand pipe was 1 cm2, determine the coefficient of permeability. 6M

b Explain the uses of flow net 6M

UNIT-III

6. An L – shaped building in plan (Fig.1) exerts a pressure of 75 kN/m^2 on the soil. Determine the vertical stress increases at a depth 5 m below the interior corner P. 12M

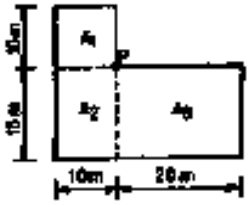

Fig.1

(OR)

7. Calculate the vertical stress at a point P at a depth of 2.5 m directly under the centre of the circular area of radius 2m and subjected to a load 100 kN/m^2. Also calculate the vertical stress at a point Q which is at the same depth of 2.5 m but 2.5m away from the centre of the loaded area. 12 M

UNIT-IV

8. a Describe briefly the procedure to compute the pre-consolidation pressure. 6 M

b Explain the consolidation process with spring analogy mechanism. 6 M

(OR)

9. The following results were obtained from a standard compaction test on a sample of soil. 12 M

Water content (%)	0.12	0.14	0.16	0.18	0.20	0.22
Mass of the wet soil (kg)	1.68	1.85	1.91	1.87	1.87	1.85

The volume of the mould used was 950 ml. make necessary calculation and plot the compaction curve and obtain the maximum dry density and the optimum water content. Also calculate the void ratio, the degree of saturation and the theoretical maximum dry density (G = 2.70).

UNIT-V

10. A series of consolidated-undrained triaxial tests was conducted on an over-consolidated clay and the following results were obtained. 12 M

Sample No.	Cell pressure (kN/m^2)	Deviator stress (kN/m^2)	Pore-water pressure (kN/m^2)
1	125	510	-70
2	250	620	-10
3	500	850	+120

Plot the strength envelopes in term of total stresses and effective stresses, and hence determine the strength parameters.

(OR)

11. Describe the triaxial shear test. What are the advantages of triaxial shear test 12 M

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CODE: 13EC3016 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.Tech I Semester Regular / Supplementary Examinations, November-2016

LINEAR AND DIGITAL IC APPLICATIONS
(Electrical and Electronics Engineering)

Time: 3 Hours **Max Marks: 70**

PART-A

ANSWER ALL QUESTIONS **[1 x 10 = 10 M]**

1. a) What are the assumptions made from ideal opamp characteristics?
   b) What is OPAMP?
   c) Mention some of the non linear applications of op – amps?
   d) Draw the logic diagram of half subtractor.
   e) Draw the frequency response for a low-pass filter.
   f) Draw the truth table of T-flip flop
   g) Draw the truth table of D-flip flop.
   h) What is the need for frequency compensation in practical op-amps?
   i) Draw the transistor logic diagram for NAND logic.
   j) Write the applications of high pass filter?

PART-B

Answer one question from each unit **[5x12=60M]**

UNIT-I

2. (a) Explain the DC-characteristics of an operational amplifier. [7 M]
   (b) Why is it necessary to use an external offset voltage compensating network with practical Op-amp circuits? [5 M]

(OR)

3. (a) Define common mode rejection ratio (CMRR)? Explain why for an CMRR → ∞ emitter coupled differential amplifier where RE → ∞. [6M]

   (b) Explain any one of the frequency compensation technique in connection with Op-amp. [6M]

UNIT-II

4. (a) Explain the working of transducer based instrumentation amplifier with a circuit. Give its characteristics and applications? [6 M]
   (b) Draw and explain the working of astable multivibrator using Op-Amp. [6 M]

(OR)

5 (a) Draw and explain basic Integrator using Op-Amp [6 M]
   (b) Explain the operation of Schmitt trigger using Op-Amp. [6 M]

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CODE: 13EC3016 **SET-2**

UNIT-III

6 Explain the functional block diagram of PLL emphasizing the importance of capture range and Lock range. Explain in detail FSK demodulation using PLL [12M]

(OR)

7 Derive the transfer function; gain and phase angle for first order High pass active filter. [12 M]

UNIT-IV

8 (a) Draw and Explain the working of a Weighted resistor D/A converter. [4 M]
(b) Explain the working of a dual slope A/D converter. [8 M]

(OR)

9 (a) Draw the circuit of 2- input NAND gate using TTL. With the help of truth table explain its operation. [4 M]
(b) With help of a block diagram and timing diagram explain the operation of counter type A/D converter? [8 M]

UNIT-V

10 (a) Explain 4-bit Serial in-serial out shift register with its logic block diagram. [6 M]
(b) Design a conversion circuit to convert a SR flip-flop to J-K flip-flop? [6 M]

(OR)

11 (a) Design a full subtractor with logic gates? [6M]
(b) Write short notes on BCD to binary converter?. [6M]

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AR13

CODE: 13ME3016 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.Tech I Semester Regular / Supplementary Examinations, November-2016

CAD/CAM
(Mechanical Engineering)

Time: 3 Hours **Max Marks: 70**

PART-A

ANSWER ALL QUESTIONS **[1 x 10 = 10 M]**

1. a) Mention different types of graphical coordinate systems.
   b) What is windowing?
   c) Explain the properties of Bezier curves.
   d) State examples of synthetic surfaces .
   e) Define NC, CNC & DNC.
   f) What is the code used for spindle rotation, clockwise and counter-clockwise.
   g) What is Production flow analysis
   h) Define GT.
   i) What are the basic approaches of CAPP?
   j) Define FMS?

PART-B

Answer one question from each unit **[5x12=60M]**

UNIT-I

2. a Bring out clearly the difficulties a design engineer has to face at each of the design stages if they are carried out manually. 6M
   b Explain 2D and 3D transformations briefly. 6M

(OR)

3. a Discuss briefly about design process in a product life cycle. 6M
   b What is meant by concatenation matrix? Demonstrate how translation, scaling and rotation operations can be performed simultaneously on a graphic element using concatenation matrix. 6M

UNIT-II

4. a Compare Wire frame modelling vs Surface Modeling 6M
   b Distinguish between interpolation and approximation approaches used in design of curves. 6M

(OR)

5. a What is Solid Modelling? Explain various methods used in solid modeling. 6M
   b Consider a quadratic B-spline curve with uniform knot spacing. Consider a segment with control points (1, 0) (1, 1) (0, 1) in that order. What are the end-points of the curve segment? What is the midpoint of the curve segment? 6M

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CODE: 13ME3016 **SET-2**

UNIT-III

6. a List the steps involved to produce an NC program. Briefly explain sequence number, preparatory function, and miscellaneous function. 6M

b Explain the following: (a) MCU (b) buffer storage (c) Canned cycle 6M

(OR)

7. a What are the various types of machining centres? Explain briefly. 6M

b Define Computer Aided Manufacturing. What are its advantages? 6M

UNIT-IV

8. For the machine-part number matrix shown below, find the part families groups. 12M

Machine	Part Number															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
P	X	X		X		X	X	X	X	X	X			X	X	X
Q	X		X	X	X	X	X		X		X	X	X			X
R	X	X	X	X		X	X	X	X	X	X	X	X	X	X	
S	X	X	X		X		X	X	X	X	X		X		X	X

(OR)

9. a List the benefits and application of group technology. 6M

b What is a coding system structure? Explain the parts classification and coding systems. 6M

UNIT-V

10. a Explain the variant and generative CAPP systems. 6M

b List and explain the major components of FMS. 6M

(OR)

11. a Define process planning. How this is accomplished? 6M

b Describe the FMS layout configurations. How do you select material handling equipment for them? 6M

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CODE: 13EC3015 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

III B.Tech I Semester Regular / Supplementary Examinations, November-2016

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) Classify the antenna types.
(b) Define retarded vector potential
(c) Estimate the gain of a paraboloid reflector antenna operating at 10GHz, diameter 10m and illumination efficiency 60%.
(d) Define the Reciprocity theorem.
(e) Calculate the HPBW of 10 element array with inter-element spacing of λ/2.
(f) What are the different types of designs of rhombic antenna?
(g) Mention dis-advantages of lens antenna.
(h) What is meant by spill-over.
(i) State the relationship between critical frequency and maximum ionization density of an Ionospheric layer.
(j) Define MUF.

PART-B

Answer one question from each unit **[5x12=60M]**

UNIT-I

2(a) what is the effective length of an antenna? Determine the effective length of a λ/2 antenna. [8M]
(b) Define (i) SLL (ii) Polarization [4M]

(OR)

3. Derive the expression for radiation resistance of an alternating current element [12M]

UNIT- II

4(a) Derive the expression for the array factor of linear broadside array of n elements [6M]
(b) Explain the concept of pattern multiplication related to antenna arrays. [6M]

(OR)

5(a) Differentiate broadside and end-fire arrays and derive the expressions for the width of main lobe in these cases. [6M]
(b) Derive the expressions for maxima, null and beam width for end-fire array. [6M]

UNIT III

6(a) State the advantages and dis-advantages of rhombic antenna. [6M]
(b) Explain the construction of an helical antenna with a neat sketch.[6M]

(OR)

7(a) Differentiate V antenna from rhombic antenna. Explain their construction and principles in detail. [6M]
(b) State the condition for circular polarization in an helical antenna.[6M]

UNIT IV

8(a) with a neat sketch, explain the principle of an lens antenna. [6M]
(b) Derive the expression for radiation resistance of a folded dipole.[6M]

(OR)

9(a) what is a parasitic element? Describe the Yagi-Uda antenna with the help of diagrams. [6M]
(b) Explain in detail about the feeding structure of parabolic reflector antenna. [6M]

UNIT V

10(a) Describe the space-wave propagation. [6M]
(b) What is meant by duct? Explain the different M – curves in detail. [6M]

(OR)

11. Define the following terms: [12M]
(i) Skip Zone
(ii) MUF
(iii) Multihop Propagation
(iv) Whistlers.

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AR13

CODE: 13CS3013 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.Tech I Semester Regular / Supplementary Examinations, November-2016
DESIGN AND ANALYSIS OF ALGORITHMS
(Computer Science Engineering)

Time: 3 Hours **Max Marks: 70**

PART-A

ANSWER ALL QUESTIONS **[1 x 10 = 10 M]**

1. a) Define little Oh notation.
   b) Write one application of UNION and FIND algorithms
   c) Write the name of minimum cost spanning tree algorithm with lowest time complexity.
   d) What is a bi-connected component of a graph?
   e) How dynamic programming is different from Greedy method?
   f) Write the difference between Floyd's algorithm and Warshall's algorithm.
   g) What are the applications of Hamiltonian cycle?
   h) What is Live node and E-node in state space tree?
   i) How does LCBB work?
   j) Distinguish between NP-Hard and NP-Complete Problems.

PART-B

Answer one question from each unit **[5 x 12=60M]**

UNIT-I

2. (a) What is meant by recursion? Explain with example, the direct and indirect recursive algorithms. [7M]
   (b) Show that $f(n)+g(n)=O(n^2)$ where $f(n)=3n^2-n+4$ and $g(n)=n\log n+5$ [5M]

(OR)

3. (a) Explain the set representation using trees. [6 M]
   (b) Develop the algorithm for **Find** using collapsing rule with an example. [6 M]

UNIT-II

4. (a) Draw the tree of calls of Merge sort for the following set. [6 M]
   (35, 25, 15, 10, 45, 75, 85, 65, 55, 5, 20, 18)
   (b) Derive the Time Complexity of Quick Sort Algorithm $C_A(n)$. [6 M]

(OR)

5 (a) Define Spanning Tree. Explain Prim's algorithm with an example. [7 M]

   (b) What is the solution generated by the function JS when n=7 [5 M]
   (p1, p2, …., p7) = (3, 5, 20, 18, 1, 6, 30), and
   (d1, d2, …., d7)=(1, 3, 4, 3, 2, 1, 2)?

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CODE: 13CS3013 **SET-1**

UNIT-III

6 (a) Define Optimal Binary Search Tree. Briefly explain the functions of OBST. [5 M]

(b) Use function OBST to compute w(i,j),r(i,j) and c(i,j), 0<=i<j<=4, for the identifier set (a1, a2, a3, a4)=(count, float, if, while) with p(1)=1/20, p(2)=1/5, p(3)=1/10, p(4)=1/20, q(0)=1/5, q(1)=1/10, q(2)=1/5, q(3)=1/20, and q(4)=1/20. Using the r(i,j)'s, construct the Optimal Binary Search Tree. [7 M]

(OR)

7 (a) Write an algorithm of matrix chain multiplication. [6 M]

(b) Write an algorithm of all pairs shortest path problem [6 M]

UNIT-IV

8 (a) Explain in detail about sum of subsets problem. [6M]

(b) Write an algorithm for 8 queens problem using backtracking [6M]

(OR)

9 (a) Briefly explain Hamiltonian cycles using backtracking. [6M]

(b) Device a backtracking algorithm for m-coloring graph problem. [6M]

UNIT-V

10 (a) Write FIFOBB algorithm for 0/1 Knapsack problem. [6M]

(b) Explain how the travelling sales person problem is solved by using LC Branch and Bound [6M]

(OR)

11 (a) Write short notes on NP-hard and NP-Complete classes [6M]

(b) State and Prove Cook's theorem. [6M]

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