

# AR13

CODE: NO: 13CE3017

SET - 1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)

III B.Tech II Semester Supplementary Examinations, July-2017

GEOTECHNICAL ENGINEERING – II

Civil Engineering

Time: 3 Hours

Maximum Marks: 70

## PART –A

ANSWER ALL QUESTIONS

[ 1 x 10 = 10 Marks]

1. a) List out design features of sampling tool  
b) What are geophysical methods of soil investigation?  
c) What is Taylor's Stability Number?  
d) Mention different types of slope failures.  
e) Compare active and passive earth pressure  
f) Distinguish between Safe bearing capacity and allowable bearing capacity  
g) What are the different types of settlement which can occur in foundation?  
h) Mention various types of shear failure in soils below the foundation  
i) What do mean by Negative Skin Friction in pile foundation  
j) What are the uses of Pile Load Test

## PART –B

Answer one question from each unit

5x12m = 60 Marks

### UNIT-I

2. a) How would you decide the depth of exploration and lateral extent of soil Investigation? [5 m]  
b) What are the methods of exploration? Describe any one in details? [7 m]
- (OR)
3. a) Name the various types of soil samplers used for obtaining undisturbed soil samples. [5 m]  
b) Describe the design features of sampler that affect the sample disturbance and what are the corrections applied to field N value [7 m]

### UNIT – II

4. a) Discuss various types of slopes failures [4 m]  
b) Derive an expression for factor of safety of infinite slopes in cohesionless soil and cohesion – friction soils [5 m]  
c) What is stability Number and its uses [3 m]
- (OR)
5. a) Mention various methods of analyzing finite slopes and Discuss any one method in detail [8 m]  
b) Discuss the stability of slopes of earth dams under different conditions ? [4 m]

### UNIT – III

- 6 a) Derive expression for at rest, active and passive earth pressure [5 m]  
b) Compare Rankine's and Coulomb earth pressure theory [4 m]  
c) Determine the depth of tension crack and critical depth in cohesive soil having a cohesion,  $c = 2 \text{ t/m}^2$  and unit weight of  $2 \text{ t/m}^3$  [3 m]

(OR)

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- 7 a) Discuss in detail Culmann's graphical method of determination of earth pressure [6 m]  
b) A retaining wall 12 m high with a smooth vertical back retains horizontal backfill. The properties of the backfill are cohesion,  $C = 12 \text{ kN/m}^2$ , angle of internal friction,  $\Phi = 30^\circ$ , unit weight,  $\gamma = 16 \text{ kN/m}^3$  and saturated unit weight,  $\gamma_{\text{sat}} = 20 \text{ kN/m}^3$ . The backfill carries a surcharge of  $25 \text{ kN/m}^2$ . The water table is at a depth of 3 m below the surface of the backfill. Sketch the active earth pressure distribution on the back of the wall and determine the magnitude and line of action of resultant active earth pressure. [6 m]

## UNIT – IV

8. a) Discuss different types of shear failure in the case of shallow foundation and what is the effect of water table, depth and width of foundation on Bearing Capacity? [6 m]  
b) A normally consolidated clay has a liquid limit of 50%. Due to construction of footing the average stress at the centre of the clay layer has increased from  $2.0 \text{ kg/cm}^2$  to  $3.0 \text{ kg/cm}^2$ . Find the settlement of the footing if the thickness of the compressible layer is 4.0 metres. Assume  $G = 2.7$  and natural moisture content of clay = 40 %. [6 m]

(OR)

9. a) What are Different types of settlements in Soil? And write a brief note on allowable bearing pressure on sandy soil based on Standard Penetration Test Value [8 m]  
b) Compute the safe bearing capacity of a circular footing 1.50 m wide at a depth of 1.50 metres in a soil with unit weight  $18 \text{ kN/m}^3$ , Cohesion =  $18 \text{ kN/m}^2$  and angle of internal friction =  $25^\circ$ . Bearing capacity factors for  $25^\circ$ ,  $N_c = 25$ ,  $N_q = 12.5$  and  $N_r = 10$ . The water table may rise upto 1.0 metres below the ground level. [4 m]

## UNIT – V

- 10 a) Discuss in detail different methods of estimating the load carrying capacity of piles [7m]  
b) A Concrete pile 400 mm diameter, 9 metre long, is driven through a 6 m thick layer of silty sand [ $\phi = 20^\circ$  and  $\gamma = 1.7 \text{ t/m}^3$ ] overlying a dense layer of sand [ $\phi = 35^\circ$  and  $\gamma = 1.95 \text{ t/m}^3$ ]. If the water table is at the ground surface, estimate the safe load. [5 m]

(OR)

- 11) a) Discuss various types of pile foundation [5 m]  
b) Write short notes on Group Capacity, spacing of piles and efficiency of pile group [4 m]  
c) A precast concrete pile is driven with a 5 tonne hammer having a free fall of 1.0 metres. If the penetration in the last blow is 0.50 cm determine the load carrying capacity of pile using ENR formula. [3 m]

# AR13

**CODE: 13EE3018**

**SET-2**

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

**III B.Tech II Semester Supplementary Examinations, July-2017**

**POWER ELECTRONICS**

**(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 advantages of using a pulse transformer in the control circuit of a power electronics system?
- b) What is meant by Thermal triggering of an SCR?
- c) Differentiate between a semi converter and a fully controlled converter?
- d) What is meant by finger voltage of an SCR?
- e) What is the function of a reactor in a dual converter?
- f) What is the effect of source inductance on the performance of converters?
- g) Write the expression for the power factor in an AC voltage controller?
- h) What is a chopper circuit?
- i) Give two applications of Buck Converters?
- j) What is a Series Inverter?

## **PART-B**

**Answer one question from each unit**

**[5x12=60M]**

### **UNIT-I**

2. a) Explain the dynamic characteristics of an SCR? [6M]
  - b) It is required to operate 250A SCR in parallel with 350A SCR with their respective on-state voltage drops of 1.6V and 1.2 V. Calculate the value of resistance to be inserted in series with each SCR so that they share the total load of 600 A in proportion to their current ratings? [6M]
- (OR)**
3. a) Explain the two transistor model of a Thyristor? [6M]
  - b) Explain dv/dt protection scheme for an SCR? [6M]

### **UNIT-II**

4. a) Explain the principle of phase control with the help of a single phase half-wave thyristor circuit? [6M]
  - b) Derive the expression for the average load voltage and current for a single phase half controlled converter feeding an RL Load? [6M]
- (OR)**
5. a) Describe the working of a single phase fully controlled bridge converter in the following two modes (i) Rectifying mode and (ii) Inverting Mode. [6M]
  - b) A single phase full converter is supplied from 230 V, 50 Hz source. The load consists of  $R = 10 \Omega$  and a large inductance so as to render the load current constant. For a firing angle delay of  $30^\circ$ , determine (i) average output voltage, (ii) average output current, (iii) power factor [6M]

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## UNIT-III

6. (a) Explain the operation of a three phase half controlled bridge converter with inductive load with associated waveforms? [6M]  
(b) Explain the operation of a single phase dual Converter with neat circuit diagram and waveforms? [6M]

(OR)

7. a) A 3- $\phi$ , three pulse converter is operated from a three phase star connected 208V, 60Hz supply and the load resistance is equal to 10 ohms. If it is required to obtain an average output of 50% of maximum possible output voltage. Calculate (i) delay angle, (ii) the average output current and (iii) input power factor. [6M]  
b) Explain the operation of a three phase half-wave controlled rectifier with resistive load with neat waveforms? Derive the expression for the output voltage? [6M]

## UNIT-IV

8. a) Explain the operation of a single phase bidirectional AC voltage controller feeding an  $R$ - $L$  Load with neat waveforms? [6M]  
b) Explain the operation of a single phase midpoint cyclo converter with a resistive load? [6M]

(OR)

9. a) A single phase AC voltage regulator with  $R$ - $L$  Load has the following details. Supply voltage=230 V, 50 Hz;  $R=4\Omega$  and  $\omega L=3\Omega$ , Calculate (i) control range of firing angle, (ii) maximum value of RMS load current, (iii) maximum power and power factor [6M]  
b) Explain the operation of a single phase midpoint cyclo convertor with  $R$ - $L$  load for discontinuous load current for output frequency  $f_o = \frac{1}{2} f_s$  [6M]

## UNIT-V

10. a) For the ideal type-A chopper circuit, with  $R$ - $L$ - $E$  load, following operating conditions are given [6M]  
Source voltage = 220V, Chopping period = 1mS, On period = 400 $\mu$ S,  $R=1.5\Omega$ ,  $L=6$ mH,  $E=44$ V. Calculate the following  
(i) check whether the load current is continuous  
(ii) Average output current  
(iii) maximum and minimum values of steady state output current  
b) Explain the principle of operation of a single phase parallel inverter circuit? [6M]

(OR)

11. a) A d.c. chopper circuit connected to a 100 V d.c. supplies an inductive load having 100 mH with a resistance of 5  $\Omega$ . A freewheeling diode is placed across the load. The load current varies between the limits of 10 A and 12 A. Determine the time ratio of the chopper. [6M]  
b) Explain the different PWM control strategies for an Inverter? [6M]

# AR13

CODE: 13ME3019

SET-2

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)

III B.Tech II Semester Supplementary Examinations, July-2017

INDUSTRIAL ENGINEERING AND MANAGEMENT  
(Mechanical Engineering)

Time: 3 Hours

Max Marks: 70

## PART-A

ANSWER ALL QUESTIONS

[1 x 10 = 10 M]

1. a) What is Virtual Organization?  
b) What is Boundary less Organisation?  
c) What is Plant Layout?  
d) What is plant location?  
e) What are the objectives of Method Study?  
f) What are the objectives of work measurement?  
g) What is Continuous Review System?  
h) Define ABC analysis?  
i) What are variable control charts?  
j) What is ISO 9000?

## PART-B

Answer one question from each unit

[5x12=60M]

### UNIT-I

2. Explain in detail, the basic concepts related to an organisation. 12 M  
(OR)
3. Explain in detail, the various types of Mechanistic and Organic Structures of Organisation. 12 M

### UNIT-II

4. Define Production and Explain in detail, the objectives and types of Production (OR) 12 M
5. Define Plant Layout and explain the objectives and different types of Plant Layouts. 12 M

### UNIT-III

6. Explain in detail, the concept of method study. 12 M  
(OR)
7. Explain in detail, the concept of work measurement. 12 M

# AR13

**CODE: 13ME3019**

**SET-2**

## UNIT-IV

- |    |   |     |
|----|---|-----|
| 8. | Write a detailed note on stores management and stores records.            | 12M |
|    | (OR)  |     |
| 9. | Examine in detail, the objectives and techniques of inventory management. | 12M |

## UNIT-V

- |     |   |     |
|-----|---|-----|
| 10. | Write a detailed note on the various types of charts used in statistical quality control. | 12M |
|     | (OR)  |     |
| 11. | Write a detailed note on Acceptance Sampling?   | 12M |

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# AR13

CODE: 13EC3020

SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)

III B.Tech II Semester Supplementary Examinations, July-2017

DIGITAL SIGNAL PROCESSING  
(Electronics and Communication Engineering)

Time: 3 Hours

Max Marks: 70

## PART-A

ANSWER ALL QUESTIONS

[1 x 10 = 10 M]

1. a) What are the major classifications of the signal?  
b) What is the condition for avoid the aliasing effect?  
c) What is meant by interpolation?  
d) Define linear time invariant system  
e) What is the need for DFT?  
f) What is frequency warping  
g) Why direct form-II structure is preferred most and why?  
h) What is meant by impulse invariant method?  
i) Differentiate Butterworth and Chebyshev filter  
j) Give hamming window function.

## PART-B

Answer one question from each unit

[5x12=60M]

### UNIT-I

2. a) Explain causality and stability of a linear time invariant system. **6M**  
b) State and explain the transfer function of an LTI system **6M**
- (OR)
3. a) Determine the Fourier series representation for the following discrete time signals **12M**  
a)  $x(n) = 3 \sin\left(\frac{\pi n}{4}\right) \sin\left(\frac{2\pi n}{4}\right)$   
b)  $x(n)$  is periodic of period 8, and  $x(n) = n$  for  $0 \leq n \leq 3$ , and  $x(n) = n$  for  $4 \leq n \leq 7$

### UNIT-II

4. a) How FFT is more efficient to determine DFT of sequence? **4M**  
b) Find the N-point DFT for  $x(n) = a^n$  for  $0 < a < 1$ ? **8M**
- (OR)
5. a) What is decimation in frequency algorithm? Write the similarities and differences between DIF and DIT algorithms. **4M**  
b) Find the DFT of the following sequence using DIT-FFT **8M**  
 $X(n) = \{1, 2, 3, 5, 5, 3, 2, 1\}$

**UNIT-III**

6. a) What is Bilinear transformation and sketch the mapping of S-plane to Z-plane. **4M**  
b) prove that  $\Omega_c = \frac{\Omega_p}{(10^{0.1\alpha_p} - 1)^{1/2N}} = \frac{\Omega_s}{(10^{0.1\alpha_s} - 1)^{1/2N}}$  **8M**

**(OR)**

- 7 Develop the cascade and parallel form of the following casual functions **12M**

$$H(z) = \frac{(3 + 5Z^{-1})(0.6 + 3Z^{-1})}{(1 - 2Z^{-1} + 2Z^{-2})(1 - Z^{-1})}$$

**UNIT-IV**

8. a) What are the effects of Windowing ? **6M**  
b) Explain in detail the two basic operations in multi rate signal processing **6M**

**(OR)**

9. a) Explain with neat sketches the implementaion of FIR filters in the direct form and cascade forms. **4M**  
b) Design a digital FIR band pass filter with lower cut-off frequency 2000 Hz and upper cut off frequency 3200 Hz using Hamming window of lengh N=7. Sampling rate is 10000 Hz. **8M**

**UNIT-V**

10. a) Why circular buffers are required in DSP processor? How they are implemented? **6M**  
b) What is the function of an address generation unit explain with the help of block diagram. **6M**

**(OR)**

11. a) Describe programmable Digital Signal processor with RISC and CISC. **6M**  
b) Explain about special addressing modes **6M**



# AR13

**CODE: 13CS3017**

**SET-1**

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

**III B.Tech II Semester Supplementary Examinations, July-2017**

**NETWORK SECURITY AND CRYPTOGRAPHY  
(Computer Science Engineering)**

**Time: 3 Hours**

**Max Marks: 70**

## **PART-A**

**ANSWER ALL QUESTIONS**

**[1 x 10 = 10 M]**

1. a) Differentiate between Format String attacks and SQL Injection.  
b) Give the Plaintext & Key Sizes of Triple DES & AES.  
c) Define Authentication Server & Ticket Granting Server.  
d) Write any two applications of IP Security.  
e) Define Dual Signature.  
f) Define Intruder.  
g) Give an Example for Ceaser Cipher model.  
h) If p & q are 3 & 7 then Compute e , d using RSA Algorithm.  
i) Define CIA triad.  
j) What is the Purpose of TLS?

## **PART-B**

**Answer one question from each unit**

**[5x12=60M]**

### **UNIT-I**

2. a) Explain Various Security Attacks in detail. 6M  
b) Explain the Operation of Play fair Cipher with an Example. 6M  
(OR)
3. a) What are the various Security Services? Discuss them in detail. 6M  
b) What is meant by Denial of Services ( DOS ), Spoofing & Phishing? Explain. 6M

### **UNIT-II**

4. Discuss in detail about DES Architecture. 12M  
(OR)
5. Explain about Secure Hash Algorithm. 12M

### **UNIT-III**

6. a) Draw and Explain fields of X 509 Certificate format. 6M  
b) Explain about the PGP Services. 6M  
(OR)
7. a) Explain how Authentications Performed in Kerberos. 6M  
b) Explain the limitations of SMTP in detail. 6M

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**SET-1**

## UNIT-IV

8. a) Draw AH header and Explain. 6M  
b) Explain the participants of SET and their relationship. 6M  
(OR)  
9. a) Explain IP Security Architecture. 6M  
b) Explain the SSL Record protocol. 6M

## UNIT-V

10. What is firewall? What is the need for firewalls and Discuss about different types of Firewalls. 12M  
(OR)  
11. a) Explain the Need for Trusted System. 6M  
b) Give the taxonomy of malicious programs. Define each one. 6M

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# AR13

CODE: 13IT3002

SET-2

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)

III B.Tech II Semester Supplementary Examinations, July-2017

## COMPUTER NETWORKS (Information Technology)

Time: 3 Hours

Max Marks: 70

### PART-A

ANSWER ALL QUESTIONS

[1 x 10 = 10 M]

1.
  - a) What is Internet?
  - b) What is a data graph?
  - c) What is flooding?
  - d) What are the functions of bridge?
  - e) Define collision.
  - f) What is difference between hub & switch?
  - g) What is a remote bridge?
  - h) What is routing?
  - i) What is port address?
  - j) Write down the three types of WWW documents.

### PART-B

Answer one question from each unit

[5x12=60M]

#### UNIT-I

2.
  - a) Write a short notes on protocols, standards and standards organizations. 6
  - b) Write s short notes on internet. 6

(OR)
3.
  - a) Explain about various network topologies. 6
  - b) Discusses about OSI reference model in detail. 6

#### UNIT-II

4.
  - a) Explain about token ring protocol. 6
  - b) What is pure ALOHA and slotted ALOHA? Consider the delay of both at low load. Which one is less? Explain. 6

(OR)
5.
  - a) Explain CRC with example. 6
  - b) Explain CSMA/CD protocol in detail. 6

#### UNIT-III

6.
  - a) Explain shortest routing protocol with an example. 6
  - b) What are various congestion control principles, prevention policies explain in detail. 6

(OR)
7.
  - a) Briefly explain 3 types of IPv6 addresses. 6
  - b) Explain IPv4 header format in detail. 6

## UNIT-IV

8. a) Explain about various transport services in detail. 6  
b) Explain TCP connection establishment and termination. 6  
(OR)  
9. a) What are the responsibilities of transport layer? 6  
b) Explain TCP and UDP header formats with neat diagrams. 6

## UNIT-V

10. a) What is the purpose of Domain Name System? Discuss the three main division of the domain name space. 6  
b) What is the difference between a user agent (UA) and a mail transfer agent? How does MIME enhance SMTP? 6  
(OR)  
11. a) Give the format of HTTP request message and HTTP response message. 6  
b) Explain the WWW in detail. 6