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ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.Tech II Semester Supplementary Examinations, July- 2018

GEOTECHNICAL ENGINEERING-II
(Civil Engineering)

Time: 3 Hours   Max Marks: 70

PART-A

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

1.
     a)   Differentiate between representative sample and non-representative sample?
     b)   What are various types of open drive samplers?
     c)   Define stability number
     d)   List the factors affecting the factor of safety of an infinite slope in a clay soil.
     e)   The ratio of coefficient of passive earth pressure to that of active earth pressure is 9 for a soil. Find the angle of internal friction.
     f)   Define coefficient of passive earth pressure
     g)   Define allowable bearing pressure
     h)   Write Meyerhof's bearing capacity equation for strip footing
     i)   Mention types of piles based on mode of load transfer
     j)   List out the type of pile based on material used?

PART-B

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

UNIT-I

2.
     a)   Describe various methods of drilling holes for subsurface investigation.   6M
     b)   Discuss standard penetration test. What are the various corrections? What is the importance of the test geotechnical engineering?   6M

(OR)

3.
     a)   Describe the split-spoon sampler. What is its use?   6M
     b)   What are the factors that affect the sample disturbance? How are the effect minimised?   6M

UNIT-II

4.
     a)   With neat sketches explain about different types of slope failures   6M
     b)   An embankment is to be made of a soil which has the following shear strength parameters under the existing conditions $c' = 30$ kN/m^2 and $\Phi' = 15^o$. It is assumed that different margins of safety are available for cohesion and friction are $C_m=22$ kN/m^2 and $\Phi_m= 12^o$, If the average value of normal effective stress on the failure surface is 120 kN/m^2. What is the factor of safety with respect to (a) cohesion and (b) friction?   6M

(OR)

5.
     a)   What do you understand by infinite slope and derive equation for FS of infinite slope in cohesionless soil?   6M
     b)   Determine the factor of safety with respect to cohesion for a submerged embankment 25 m high and having a slope of $i = 40^o$, $c = 40$ kN/m^2, $\Phi = 40^o$ and $\gamma_{sat} = 18$ kN/m^3. Take $S_n=0.097$ 6M

UNIT-III

6.
     a)   Explain the Coulomb wedge theory with neat sketches.   6M
     b)   A wall of 8 m height retains sand having a density of 1.936 Mg/m^3 and angle of internal friction of 34°. If the surface of the backfill slopes upwards at 15° to the horizontal, find the active thrust per unit length of the wall. Use Rankine's conditions   6M

7. a) A retaining wall 10m high is proposed to hold dry sand of void ratio of 0.6 . The value of angle of internal friction $\Phi = 30^0$ and specific gravity of soil grain is 2.7 the back face of the wall is vertical and smooth. The top surface of back fills horizontal. Calculate the magnitude of the total active earth thrust against the wall assuming the wall is free to move. Also show the distribution of earth pressure and point of application of the resultant. Assume unit weight of the water $10kN/m^3$. **6M**

   b) A gravity retaining wall retains 12 m of a back fill, $\gamma = 17.7$ kN/m^3, $\gamma_{sub} = 10$ kN/m^3. $\Phi = 25^0$ with a uniform horizontal surface. Assume the wall interface to be vertical, determine the magnitude and point of application of the total active pressure. **6M**

UNIT-IV

8. a) A 2m wide strip footing is located at a depth of 2m in a stiff clay of saturated unit weight of $20kN/m^2$ and have $\Phi = 0$, and Cu=120kN/m2 Using Terzaghis bearing capacity equation compute the safe load carried by footing per meter length with F.O.S =3 with respect to the shear failure Nc= 5.7 **6M**

   b) What will be the gross and net safe bearing capacity of sand having $\Phi = 35^o$ and density 2.1t/m^3 below a)1.0m wide strip footing B)1.0X1.0 square footing placed at a depth of 1.2m below the ground. Take factor of safety as 2.5 , Nc = 30.14, Nq = 18.4 and N γ = 22.4. **6M**

(OR)

9. a) A rectangular footing (3 m x 2 m) exerts a pressure of 100 kN/m^2 on a cohesive soil (E value of 5 x 10^4 kN/m^2 and **µ**=0.5). Determine the immediate settlement at the Centre, Assuming the footing is a) flexible, b) rigid. **6M**

   b) A strip footing 2 m wide carries a load intensity of 400 kN/m^2 at a depth of 1.2 m in sand. The saturated unit weight of sand is 19.5 kN/m^3 and unit weight above water table is16.8KN/m3 . The shear strength parameters are c = 0 and $\Phi = 35^o$. Determine the factor of safety with respect to shear failure for the following cases of location of water table. (a) At a depth of 0.5 m below the ground surface, (b) At a depth of 0.5m below the base of the footing Take factor of safety as 2.5 , Nc = 30.14, Nq = 18.4 and N γ = 22.4.. **6M**

UNIT-V

10. a) A group of 16 piles of 50 cm diameter is arranged with a centre to centre spacing of 1.0 m. The piles are 9 m long and are embedded in soft clay with cohesion 30 kN/m^2.Bearing resistance may be neglected for the piles. Adhesion factor is 0.6. Determine the ultimate load capacity of the pile group. **6M**

   b) A 500 mm diameter and 22 m long RCC pile is to be installed at a site, which is characterized by two clay layers. The top layer is 12 m thick, has a $\gamma_t = 20$ kN/m^3 and a Cu = 70 kN/m^2. The bottom layer is 20 m thick, has a $\gamma_t = 22$ kN/m^3 and a Cu = 90 kN/m^2. The ground water table is at the ground surface. Determine the ultimate axial load capacity of the pile. Assume α = 0.9 for both the clay layers (c = Cu = Su = Undrained shear strength). **6M**

(OR)

11. a) A 12m long, 300mm diameter pile is driven in a uniform deposit of sand $\Phi' = 40^0$. The water table is at a great depth and is not likely to rise. The average dry unit weight of sand is 18 kN/m^3, using $N_q = 137$, calculate the safe load capacity of the pile with a factor of safety of 2.5. **6M**

   b) A square group of 9 piles was driven into soft clay extending to a large depth. The diameter and length of the piles were 30cm and 9m respectively. If the unconfined compression strength of the clay is 90 kN/m^2, and the pile spacing is 90 cm centre to centre. What is the capacity of the group? Assume a factor of safety of 2.5 and adhesion factor of 0.75. **6M**

AR13

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.Tech II Semester Supplementary Examinations, July- 2018

POWER ELECTRONICS
(Electrical and Electronics Engineering)

Time: 3 Hours   Max Marks: 70

PART-A

ANSWER ALL QUESTIONS   [1 x 10 = 10 M]

1. a) Among IGBT and MOSFET which device is used for high voltage application and why
    b) Is SCR a fully controlled switch? Support your answer.
    c) What is the role of snubber circuit placed across the switch in a converter circuit
    d) If α_p , α_n are firing angles of P-converter and N-converter respectively ,Then their range to operate dual converter in first quadrant?
    e) What is the effect of source inductance on the performance of a phase controlled converter
    f) The commutation technique employed for Step-down and Step-Up Cyclo-converters
    g) Why chopper is called dc equivalent of an ac transformer?
    h) What are the limitations of pulse width modulation in choppers
    i) Among VSI and CSI in which case converter grade SCRs can be employed
    j) At any given instant of time how many switches conduct in a 3ph inverter controlled by 120° mode

PART-B

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

UNIT-I

2. a)   Evaluate SCR compared to Ideal Switch.   **4 M**
    b) A Thyristor having a latching current of 50mA is used to feed a load of 200 ohms   **8M**
        resistance in series   with 0.6H inductance, from a dc source of 150V. A gate pulse
        of 50ms is applied at the gate. What is the possibility of turn on of the thyristor. If
        there is a failure to turn on suggest a method to turn on the thyristor.

(OR)

3. a)   What are the causes for turn on delay of SCR and how can it be reduced?   **4M**
    b) Draw the general block diagram of a firing circuit for SCR and substantiate the role   **8M**
        of each component

UNIT-II

4. a) The dc voltage in Fig. represents the voltage generated by an array of solar cells   **12M**
        and has a value of 110 V, connected such that Vdc=110 V. The solar cells are
        capable of producing 1000 W. The ac source is 120 V rms, R =0.5 Ω, and L is large
        enough to cause the load current to be essentially dc. Determine the delay angle
        such that 1000W is supplied by the solar cell array. Determine the power
        transferred to the ac system and the losses in the resistance. Assume ideal SCRs.
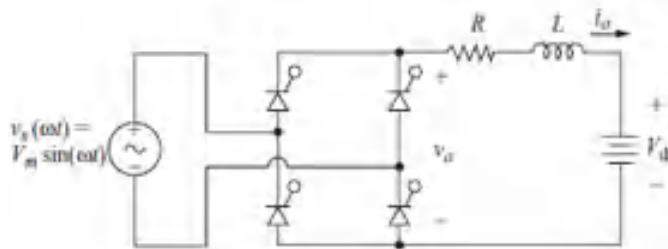
(OR)

5. a) What is the pulse number of a converter? Is it advantageous have higher pulse number? **4M**

    b) Support that semi-controlled converter operates only in one-Quadrant for both R, R-L loads? **8M**

UNIT-III

6. a) How do we make a dual converter operate in 2nd, 4th quadrants **4M**

    b) Explain the operation of three pulse converter with R-Load **8M**

(OR)

7. A battery with a nominal voltage of 200V and internal resistance of 10mΩ has to be charged at a constant current of 20 amps from a 3 phase 220V 50 Hz power supply. Which of the following converters will give better performance with respect to input current displacement factor, distortion factor and power factor? (i) 3 phase fully controlled converter; (ii) 3 phase half controlled converter. **12M**

UNIT-IV

8. a) Describe the basic principle of working of single phase to single phase step down cyclo converter with the help of bridge type configuration. **6M**

    b) In a standard A single-phase bridge-type cycloconverter has input voltage of 230V, 50Hz and load of R=10Ω. Output frequency is one-third of input frequency. For a firing angle delay of 30^0, Calculate **6M**
    (i) rms value of output voltage
    (ii) rms current of each converter
    (iii) rms current of each thyristor
    (iv) input power factor

(OR)

9. a) For a single phase AC voltage regulator feeding a resistive load, show that power factor is given by expression **6M**

$$\left[\frac{1}{\pi} \left(\pi - \alpha + \frac{\sin 2\alpha}{2} \right) \right]^{-1/2}$$

    b) A single phase full-wave ac voltage controller feeds a load of R=20Ω with an input voltage of 230V, 50Hz. Firing angle for both the thyristors is 45^0. Calculate **6M**
    (i) rms value of output voltage
    (ii) Load power and input pf
    (iii) Average and rms current of thyristors.

UNIT-V

10. For type-A chopper, express the following variable in terms of V_s, R, I_o and duty cycle α in case load current I_o to remain constant at a value $I_o = V_o /R$. **12M**
    (a) Average output voltage and current
    (b) Output current at the instant of commutation
    (c) RMS value of the output voltage
    (d) Average and RMS values of chopper current
    (e) Average and rms values of freewheeling diode current

(OR)

11. a) Explain the working of 3phase inverter in 120 degrees mode of operation **8M**

    b) Determine the magnitude of the Lowest order harmonic in the output phase voltage and line voltage of a 3ph inverter supplied by 48V supply and controlled in 120^0 mode of conduction. **4M**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.Tech II Semester Supplementary Examinations, July- 2018
INDUSTRIAL ENGINEERING AND MANAGEMENT
(Mechanical Engineering)

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

PART - A

Answer All Questions   **[1 x 10 = 10 M]**

1. a)   Outline the significance of informal organization.
    b)   Examine various steps to follow for effective delegation.
    c)   Mention the reasons for plant location study.
    d)   Describe the symptoms of bad plant layout.
    e)   List out the different types of allowances that can be given in time study.
    f)   Explain the terms qualified worker and normal worker.
    g)   Mention the different aspects of purchase management.
    h)   What are the different tasks under stores management?
    i)   What are the differences between quality control and inspection?
    j)   Explain the importance of reliability.

PART - B

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

UNIT – I

2. a)   Categorize various Principles of Organization.   6 M
    b)   Summarize the steps for effective decentralization.   6 M

(OR)

3. a)   Compare the advantages of Formal and informal organizations.   6 M
    b)   Distinguish between Delegation and decentralization.   6 M

UNIT – II

4. a)   Discuss the general location for facility location planning.   6 M
    b)   Although facility location is a planning decision, it has implications for   6 M
         decisions in the organizing and controlling sub functions. Explain.

(OR)

5. a)   Discuss various principles of plant layout.   8 M
    b)   Discuss the advantages and disadvantages of process type of layout.   4 M

UNIT – III

6   a)   Explain the Significance, Construction and Applications of Multiple Activity   6 M
         Chart.
    b)   Discuss the steps involved in work sampling.   6 M

(OR)

7 a) Classify different charts and diagrams that are used in method study. 4 M

b) In making a time study of a laboratory technician performing an analysis of processed food in a canning factory, the following times were noted for a particular operation. If the technician's performance has been rated at 120 percent and the company policy for allowance (personal, fatigue, etc.) stipulates 13 percent. Determine the normal time and standard time. Watch readings falling 50% above and 25% below the average may be considered as abnormal. 8 M

Run	1	2	3	4	5	6	7	8	9	10	11	12
Operation Time (Sec)	21	21	16	19	20	16	20	19	19	20	40	19
Run	13	14	15	16	17	18	19	20	21	22	23	24
Operation Time (Sec)	21	18	23	19	15	18	18	19	21	20	20	19

UNIT - IV

8. a) Describe any four types of inventory. 6 M

b) List and explain various purchase systems. 6 M

(OR)

9. a) Briefly explain the VED analysis with a suitable example. 6 M

b) Distinguish between P and Q systems of inventory. 6 M

UNIT - V

10. a) Describe the various functions of the inspection department. 6 M

b) In a process capability study of a lathe used in turning a shaft to a diameter of 23.75 ± 0.1 mm, a sample of 6 consecutive pieces was taken each day for 8 days. The diameters of these shafts are given below. Construct the X_{Bar} and R Charts and find if the process is under control or not. (for sample size n = 6, $A_2 = 0.48$, $D_3 = 0$, $D_4 = 2.00$) 6 M

1st Day	2nd Day	3rd Day	4th Day	5th Day	6th Day	7th Day	8th Day
23.77	23.80	23.77	23.79	23.75	23.78	23.76	23.76
23.80	23.78	23.78	23.76	23.78	23.76	23.78	23.79
23.78	23.76	23.77	23.79	23.78	23.73	23.75	23.77
23.73	23.70	23.77	23.74	23.77	23.76	23.76	23.72
23.76	23.81	23.80	23.82	23.76	23.74	23.81	23.78
23.75	23.77	23.74	23.76	23.79	23.78	23.80	23.78

(OR)

11. a) Discuss the advantages and limitations of sampling inspection. 4 M

b) Suppose that a single sampling plan with n = 150 and c = 2 is being used for receiving inspection where the supplier ships the product in lots of size N = 3000. Prepare an OC and AOQ curves for this plan and find the AQL. 8 M

AR13

PART-A

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

1. a) Define a causal system.
    b) Give hamming window function.
    c) State Parseval's relation in z transform
    d) Why the butterworth response is called a maximally flat response?
    e) Find the Fourier transform of $x(n) = u(n)$
    f) What is anti imaging filter
    g) Why FFT is needed?
    h) Mention the properties of twiddle factor?
    i) Why direct form-II structure is preferred most and why?
    j) Find $H(z)$ for the IIR filter whose $H(s) = \dfrac{1}{(s+6)}$ with T=0.1 sec

PART-B

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

2 a) State any four properties of DFS   **6M**
   b) Define the terms : linearity, time invariance and causality for a discrete time   **6M**
       system.

(OR)

3 Find the solution to the following linear constant coefficient difference equation   **12M**

$$y(n) - \frac{3}{2} y(n-1) + \frac{1}{2} y(n-2) = (\frac{1}{2})^n \ for \ n \geq 0$$

With initial conditions y(-1) = 4 and y(-2) = 10.

UNIT-II

4. a) Write computation efficiency of FFT over DFT   **4M**
    b) Compute the DFTs of the sequence $x(n) = 2^n$, where N = 8 using DIT   **8M**
        algorithm

(OR)

5. a) State any four properties of DFT.   **4M**
    b) Perform the linear convolution of the given sequences $x(n) = \{1,-1, 1,-1\}$,   **8M**
        $h(n) = \{1,2,3,4\}$ using DFT Method.

AR13

UNIT-III

6. a) Define an IIR filter and bring out the constraints to be maintained in conversion of an analog filter into digital filter. **4M**

    b) Obtain an analog Chebyshev filter transfer function that satisfies the constrains **8M**

    $$\frac{1}{\sqrt{2}} \le |H(j\Omega \le 1|; \ 0 \le \Omega \le 2 \ \text{ and } |H(j\Omega| < 0.1; \Omega \ge 4$$

(OR)

7   Design a digital |Butterworth filter that satisfies the following constraints using bilinear transformation.Assume T=1 Sec **12M**

$$0.9 \le |H(e^{jw})| \le 1 \quad o \le w \le \frac{\pi}{2}$$

$$|H(e^{jw})| \le 2 \quad \frac{3\pi}{4} \le w \le \pi$$

UNIT-IV

8.   The desired frequency response of a low pass filter is **12M**

$$H_d(e^{jw}) = \begin{cases} e^{-3jw} & \dfrac{-3\pi}{4} \le w \le \dfrac{3\pi}{4} \\ 0 elsewhere \end{cases}$$

Determine H(e^{jw}) for M=7 using a rectangular window.

(OR)

9. a) What are the applications of multirate sytem ? **4M**

    b) How can sampling rate be converted by rational factor by M/L **8M**

UNIT-V

10. a) Give the Basic block diagram of DSP processor and mention its applications and also provide the advantages and limitations over microprocessors **6M**

    b) What is MAC? Explain its operation in detail. **6M**

(OR)

11. a) Explain about registers in T M S 320 C 5X **6M**

    b) What are the major advantages of having on-chip memory? **6M**

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AR13

CODE : 13CS3017   **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.Tech II Semester Supplementary Examinations, July- 2018

NETWORK SECURITY AND CRYPTOGRAPHY
(Computer Science and Engineering)

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

PART-A

Answer all the questions   **[10 x 1=10]**

1. a) What is the difference between diffusion and confusion?
   b) What is cryptanalysis and cryptography?
   c) What is the purpose of the State array in AES?
   d) What is the size used to represent length in SHA for 1024 byte block?
   e) What are the functions used to produce an authenticator?
   f) What are the different digital signature schemes ?
   g) Draw the header format for an ISAKMP message.
   h) What is the role of bastion host?
   i) Name any two security standards?
   j) List types of firewalls.

PART-B

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

UNIT-I

2. a) Explain the various security attacks?   5M

   b) Convert plain text "MEET ME" into cipher text and vice-versa using following ciphers
                                                        7M
      i)   Hill cipher with the key matrix
      ii) Play fair cipher with key "ASSIGNMENT"

(OR)

3. a) Discuss in detail about Session Hijacking and spoofing?   5M
   b) Explain the model for network security with neat diagram?   7M

UNIT-II

4. a) Draw the general structure of DES and explain the encryption- decryption process. 6M
   b) Perform the RSA algorithm on given data and explain how encryption & decryption
      are performed on the message p=3, q=11, e=7 and M=5.   6M

(OR)

5. a) Illustrate about SHA-512 algorithm   6M
   b) Users A and B use the Diffie Hellman key exchange technique, a common prime q=11
      and a primitive root alpha=7.   6M
    (i) If user A has private key XA=3.What is A's public key YA?
    (ii) If user B has private key XB=6 What is B's public key YB?
    (iii) What is the shared secret key? Also write the algorithm.

AR13

UNIT-III

6.a) How does PGP provide confidentiality and authentication service for e-mail and file storage applications?   5M

 b) Show how the authentication dialogues should be exchanged between the client and server using Kerberos authentication version4 protocol with neat sketch.   7M

(OR)

7. a) Explain about revocation of X.509 Certificate.   6M

   b) List and explain various content types in MIME and S/MIME.   6M

UNIT-IV

8. a) Explain the various steps involved in SSL record protocol and handshake protocol.   6M

   b) List the services provided by IPSec? Explain Authentication header architecture?   6M

(OR)

9. a) What is role of dual signature in SET? Explain the steps involved in payment processing in SET?   6M

   b) Give the IPSec applications and advantages along with Web security considerations? 6M

UNIT-V

10. a) What is virus? Explain about nature ,types and life cycle phases of viruses.   6M

    b) Define intrusion detection and discuss the different types of detection mechanisms, in detail.   6M

(OR)

11. a) Explain characteristics of firewalls and it's configurations with neat sketch.   7M

    b) Write short notes on trusted systems.   5M

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AR13

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III B.Tech II Semester Supplementary Examinations, July- 2018

COMPUTER NETWORKS
(Information Technology)

Time: 3 Hours   Max Marks: 70
PART-A
ANSWER ALL QUESTIONS   [1 x 10 = 10 M]

1. a) Define protocol
   b) List out the basic components of data communication
   c) What is data representation?
   d) List out the design issues of DLL
   e) Define bridge
   f) Define congestion
   g) Define throughput
   h) What is port address
   i) Expand HTTP , DNS
   j) Define check sum

PART-B

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

UNIT-I

2. a) Write a short note about network categories
   b) Explain the process of data transfer through the layered network architecture

(OR)

3. a) Explain TCP / IP Protocol suite in detail
   b) Write a short note about addressing in networks

UNIT-II

4. a) Write about ALOHA in deatil
   b) Describe the frame format of HDLC
   (OR)
5. a) Explain about CRC in detail with an example
   b) Explain the function of DLL

UNIT-III

6. a) Discus in detail about IPV4
   b) Explain about link state routing with an example
   (OR)
7. a) How QOS improved with the help of token bucket method
   b) Describe the different congestion prevention policies.

UNIT-IV

8. a) What are the services primitives of transport layer
   b) Explain about three way hand shake protocol
   (OR)
9. a) Explain about TCP with header format
   b) Explain the flow control in transport layer

UNIT-V

10. a) Explain about DNS
    b) Explain about HTTP
    (OR)
11. a) Explain about SMTP
    b) Describe the architecture of WWW

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