

AR13

CODE: 13CE2002

SET 1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, January - 2016

SURVEYING
(CIVIL ENGINEERING)

Time: 3Hours

Max Marks:70

PART -A

ANSWER ALL QUESTIONS

[1x10=10M]

1. a) List out the instruments used for chaining specifying the purpose of each.
- b) Distinguish between cumulative error and compensating error.
- c) What is the difference between the whole circle bearing system and the quadrantal bearing system?
- d) List out the three distinctive functions of the leveling head.
- e) Distinguish between a direct angle and deflection angle.
- f) What is differential leveling?
- g) Define contour gradient.
- h) What is the function of plumbing fork in plane table surveying?
- i) What is the advantage of using analectic lens in telescopes?
- j) What are the 3 classes that circular curves are divided into? Explain them.

PART - B

Answer one question from each Unit

[5 x 12=60M]

UNIT - 1

2. a) What are the instruments used in chain surveying? How is a chain survey executed in the field? [6M]
- b) What are the sources of errors in compass survey and what precautions will you take to eliminate them? [6M]

(OR)

3. For the following traverse, find the length of DE so that A, E and F may be in the same straight line: [12M]

Line	Length in Metres	R.B.
AB	200	S 84°30' E
BC	100	N 75°18' E
CD	80	N 18°45' E
DE	—	N 29°45' E
EF	150	N 64°10' E

AR13

Code: 13CS2003

SET-2

UNIT – II

4. The following staff readings were observed successively with level, the instrument having been moved forward after the second, fourth and eighth readings:
0.875, 1.235, 2.310, 1.385, 2.930, 3.125, 4.125, 0.120, 1.875, 2.030, 3.765.
The first reading was taken with the staff held upon a benchmark of elevation 132.135. Enter the readings in level book-form and reduce the levels. Apply the usual checks. Find also the difference in level between the first and the last points. [12M]

(OR)

5. Describe various methods of contouring. Discuss the merits and demerits of Each? [12M]

UNIT – III

6. Draw a neat sketch of a vernier theodolite and explain the functions of the various parts. [12M]

(OR)

7. a) What are the different methods employed in tachometric survey? Describe the method most commonly used. [5M]
b) The vertical angles to vanes fixed at 0.5 m and 3.5 m above the foot of the staff held vertically at a point were $-0^{\circ}30'$ and $+1^{\circ}12'$ respectively. Find the horizontal distance and the reduced level of the point, if the level of the instrument axis is 125.380 metres above datum. [7M]

UNIT –IV

8. The following offsets were taken from a chain line to a hedge [12M]

Chain (m) : 0 15 30 45 60 70 80 100 120 140

Offset (m) : 7.60 8.5 10.7 12.8 10.6 9.5 8.3 7.9 6.4 4.4

Compute the area by

(i) Trapezoidal rule (ii) Simpson's rule (iii) Average ordinate rule

(OR)

9. Find out the volume of earth work in a road cutting 120 m long from the following data. The formation width 10 meters, side slopes 1 to 1; average depth of cutting along the centre of line 5 m; slopes of ground in cross – section 10 to 1. [12M]

UNIT - V

10. a) How curves are classified? [3M]
b) Explain the terminology of simple curve with neat sketch. [9M]

(OR)

11. a) Explain the procedure of Rankine's method for setting out circular curves. [6M]
b) Explain the tangential method of determination of horizontal and vertical distances when both the angles are angles of elevation. [6M]

Code: 13EC2007**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)****II B.Tech I Semester Supplementary Examinations, January, 2016****ELECTRONIC DEVICES AND CIRCUITS
(ELECTRICAL & ELECTRONICS ENGINEERING)****Time: 3 Hours****Max Marks: 70****Answer all questions****[1 x 10 = 10 M]****PART - A**

1.
 - (a) Define Extrinsic semiconductor.
 - (b) What is the nature of reverse saturation current when temperature increases?
 - (c) What are the applications of Zener diode?
 - (d) What is thermal runaway effect?
 - (e) Give relationship between α and β in a transistor?
 - (f) What is the order of input impedance in an FET device?
 - (g) What happened for improper biasing in a transistor?
 - (h) Define Diffusion Capacitance of a diode?
 - (i) What are the advantages of full wave rectifier over half wave rectifier?
 - (j) Define pinch-off region in the case of JFET?

PART-B**Answer one question from each Unit****[5 x 12 = 60M]****UNIT-I**

- 2)
 - a) Explain conductors, insulators and semiconductors using energy band diagram? [6M]
 - b) Explain P-N junction diode in forward biasing and reverse biasing conditions with circuits and also explain its V-I characteristic? [6M]

(OR)

- 3)
 - a) Explain mobility, conductivity and law of junction. [6M]
 - b) Explain Hall Effect and derive an expression for Hall coefficient and also mention its applications. [6M]

UNIT-II

- 4)
 - a) Distinguish between Avalanche and Zener breakdown diodes [6M]
 - b) Explain working principle of tunnel diode with the help of energy band diagrams? [6M]

(OR)

- 5)
 - a) Explain full wave rectifier with circuit diagram and waveforms [6M]
 - b) Explain the operation of half wave rectifier? Draw the load current and load voltage waveforms? [6M]

UNIT-III

- 6) a) Draw the circuit diagram of BJT in CE configuration and explain with the help of input and output characteristics [6M]
b) Draw UJT emitter characteristics and mention various regions? [6M]

(OR)

- 7) a) With the help of neat diagram explain the operation of n- channel enhancement type MOSFET? [6M]
b) Explain about input and output characteristics of a transistor in CB configuration with relevant sketches? [6M]

UNIT- IV

- 8) a) Draw the circuit diagrams of collector to base bias and Self bias and derive the expressions for Stability factor? [6M]
b) Draw the small signal model of conventional common emitter amplifier and determine the expression for voltage gain and input impedance? [6M]

(OR)

- 9) a) Why the h-parameters are preferred over other parameters? How can these be determined from the transistor characteristics? [6M]
b) What is thermal runaway? How to avoid it in amplifier circuit using BJT? [6M]

UNIT- V

- 10) a) Describe with necessary derivations, the effect of negative feedback on the bandwidth and distortion of amplifier? [6M]
b) Explain the working of Hartley oscillator? [6M]

(OR)

- 11) a) Explain the RC phase shift oscillator with transistor and FET? [6M]
b) Explain the working of Colpitts oscillator? [6M]

CODE:13ME2006**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)****II B.Tech I Semester Supplementary Examinations, January - 2016
ENGINEERING METALLURGY AND MATERIAL SCIENCE
(MECHANICAL ENGINEERING)****Time : 3 Hours****Max Marks: 70****PART – A****Answer all questions****[1X10=10]**

1. (a) What is a unit Cell.
(b) Define solid Solution
(c) Write about strain hardening.
(d) What is Brass and Bronze
(e) List out the differences between alloy and composite
(f) Discuss Ionic and Covalent Bonds
(g) Write the Composition of HSS.
(h) What is pearlite transformation.
(i) Discuss the properties , Strength and Hardness.
(j) What is Sintering.

PART – B**Answer one Question from Each Unit****[5 X 12 = 60M]****UNIT-I**

2. Discuss about Crystal Imperfections in detail with neat sketches.
(OR)
3. Write any two strengthening mechanisms of materials

UNIT-II

4. Explain the critical Temperatures and various phases that occur in Iron – Iron Carbide Equilibrium diagram with a neat sketch
(OR)
5. What are the principle mechanisms of solidification

UNIT-III

6. (a) Explain Jominy End Quench Experiment of Hardenability.
(b) Write the Differences between Annealing and Normalizing.
(OR)
7. Differentiate the micro structures and Properties of various types of Cast Iron.

UNIT-IV

8. Explain the properties evaluated by Tensile testing Procedure.
(OR)
9. What is meant by creep and Explain different Creep Mechanisms.

UNIT-V

10. Explain the methods for the production of metal powders.
(OR)
11. What are the various advantages, Disadvantages and applications of Powder Metallurgy Process.

CODE : 13EC2002**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)****II B.Tech I Semester Supplementary Examinations, January, 2016****ELECTRONIC CIRCUITS-I
(ELECTRONICS AND COMMUNICATION ENGINEERING)****Time: 3hours****Max.Marks: 70****PART - A****Answer all questions****[10 X 1 = 10M]**

1. a) List the advantages of π filter?
b) What is the expression for ripple factor of Inductor Filter?
c) What are the requirements of a biasing circuit?
d) Write the condition for thermal stability?
e) List the benefits of transistor h-parameters?
f) For a transistor amplifier circuit $R_s=R_L=1\text{K}\Omega$, $h_{ie}=1.1\text{K}\Omega$, and $h_{oe}=25\mu\text{A/V}$. Calculate Current gain A_I ?
g) Write the expression for h_{ie} in terms of CB h-parameters?
h) Write the h-parameter equations for transistor CC configuration?
i) Define the parameter f_β ?
j) What is the relationship between g_m , I_C and temperature?

PART - B**Answer one question from each unit****[5 X 12 = 60]****UNIT - I**

2. A full wave rectifier circuit is fed from a transformer having a center-tapped secondary winding. The rms voltage from either end of secondary to center tap is 30V. If the diode is forward resistance is 2Ω and that of the half secondary is 8Ω , for a load of $1\text{K}\Omega$. Calculate (i) Power delivered to load, (ii) % Regulation at load, (iii) Efficiency of rectification, (iv) TUF of secondary
[12M]

(OR)

3. a) List the merits and demerits of Full wave rectifier? [4M]
b) Draw the circuit diagram and derive the expression for ripple factor of a Inductor filter? [8M]

UNIT - II

4. Draw the circuit diagram of collector to base bias and derive the expressions for stability factors. [12M]

(OR)

5. a) Assume that a silicon transistor with $\beta=50$, $V_{CC}=20\text{V}$ is used in self bias arrangement. It is desired to establish a Q point at $V_{CE}=11.5\text{V}$, $I_C=1.5\text{mA}$ and stability factor $S \leq 3$. Find R_C , R_E , R_1 and R_2 . [8M]
b) Explain briefly about thermal resistance? [4M]

UNIT -III

6. a) Derive the expressions for A_V , A_I , R_i and R_O of a transistor amplifier in CE configuration using low frequency h-parameter model. [8M]

- b) Compare the transistor amplifiers in CE, CB and CC configurations in terms of A_V , A_I , R_i and R_O [4M]

(OR)

7. a) A junction transistor has the following h-parameters: $h_{ie} = 2000\Omega$, $h_{re} = 1.6 \times 10^{-4}$, $h_{fe} = 49$ and $h_{oe} = 50\mu A/V$. Determine A_V , A_I , R_i and R_O of the CE amplifier if the load resistance $R_L = 30K\Omega$ and the source resistance $R_S = 600\Omega$ [8M]

- b) Derive the CE h-parameter h_{re} in terms of CB h-parameters [4M]

UNIT -IV

8. a) The FET amplifier shown in figure has following parameters. $I_{DSS} = 3mA$, $V_p = -4V$, $r_d \gg R_D$. Determine (i) V_{GS} , (ii) I_D (iii) Quiescent point V_{DS} (iv) small signal voltage gain A_V [8M]

- b) In the CS amplifier if drain resistance $R_D = 5K\Omega$, $\mu = 50$ and $r_d = 35K\Omega$, Evaluate the voltage gain A_V . [4M]

(OR)

9. The common base amplifier shown in figure has the following components: $R_S = 600\Omega$, $R_C = 5.6K\Omega$, $R_E = 5.6K\Omega$, $R_L = 39K\Omega$. The transistor parameters are $h_{ie} = 1K\Omega$, $h_{fe} = 85$ and $h_{oe} = 2\mu A/V$. Calculate R_i , R_o , A_V , $A_{VS} = V_o/V_s$. Use approximate analysis method. [12M]

UNIT -V

10. a) Draw the Emitter Follower Circuit diagram and its high frequency equivalent circuit. [4M]

- b) Draw the circuit diagram of CS amplifier and draw the small signal equivalent circuit at high frequencies and derive the voltage gain, input impedance and input capacitance. [8M]

(OR)

11. a) Draw the FET high frequency model for common drain amplifier configuration and derive the expressions for voltage gain, input impedance and output impedance. [8M]

- b) At $I_C = 1mA$ and $V_{CE} = 10V$, a certain transistor data shows $C_C = C_{b'c} = 3pF$, $h_{fe} = 200$ and $\omega_T = 500M \text{ rad/sec}$. Calculate g_m , $r_{b'e}$ and $C_{b'e}$ [4M]

Code: 13BS2006**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)****II B.Tech I Semester Supplementary Examinations, January - 2016****PROBABILITY AND STATISTICS****(Common to CSE & IT)****Time: 3 hours****Max. Marks: 70****PART-A****Answer all Questions****[10X1=10M]**

1. a) A card is drawn from a well shuffled pack of cards .What is the probability that it is either a spade or an ace ?
- b) If the probability density function of a random variable is given by $f(x) = kx$; $2 < x < 5$ = '0' otherwise . then find the value of k ?
- c) In which probability distribution mean and variance are equal ?
- d) Define the parameter ?
- e) What is meant by level of significance ?
- f) Write the null hypothesis in case of testing the equality of two populations.
- g) What is the result of geometric mean of two regression coefficients ?
- h) If the lower control limit is negative how do you do in constructing the control chart ?
- i) When the customer is said to be reneged ?
- j) In a single server queuing system with infinite queue size if $\lambda = 6$ and $\mu = 8$ then find the percentage of time the server is busy ?

PART-B**Answer one question from each unit.****[5 x12 = 60]****UNIT-1**

2. a) State and prove the addition theorem for three events if A,B and C are not disjoint.
- b) Find mean and variance of the uniform probability distribution given by $f(x) = 1/n$ for $x = 1,2,3,\dots,n$.

[6M + 6M]**(OR)**

3. a) A businessman goes to hotels X ,Y, Z ,20 % , 50%, 30% of the time respectively. It is known that 5%, 4%, 8% of the rooms in X, Y, Z hotels have faulty plumbing. What is the probability that the businessman's room having faulty plumbing is assigned to hotel Z ?
- b) probability density function of random variable X is $f(x)=1/2 \sin x$, for $0 \leq x \leq \pi$ = '0 ' other wise
Find the mean and mode of the distribution ?

[6M+ 6M]**UNIT-II**

4. a) Find the mean and variance of Poisson distribution.
- b) In a sample of 1000 cases, the mean of a certain test is 14 and standard deviation is 2.5.Assuming the distribution is to be normal, find
(i) how many students score between 12 and 15 ?
(ii) how many score below 18 ?

[6M+ 6M]

(OR)

5. a) Fit the Binomial distribution to the following data

X	0	1	2	3	4
F	30	62	46	10	2

b) A population consists of six numbers 4,8,12,16,20,24. Consider all samples of size two which can be drawn without replacement from population.

Find (i) population mean (ii) population standard deviation (iii) mean of the sampling distribution of means [6M+ 6M]

UNIT-III

6. a) Write the procedure of the testing of hypothesis.

b) A random sample of 10 bags of pesticide are taken whose weights are 50,49,52,44,45,48,46,45,49,45 (in kgs.). Test whether the average packing can be taken to be more than 50 kgs. [6M+ 6M]

(OR)

7. a) Define (i) one tailed test (ii) two tailed test (iii) Type I error

b) The following figures relate to production in kgs. Of three varieties A, B, C of wheat shown in 12 plots.

A	14	16	18		
B	14	13	15	22	
C	18	16	16	19	20

Is there any significant difference in the production of the three varieties? [6M+ 6M]

UNIT-IV

8. a) A chemical company, wishing to study the effect of extraction time on the efficiency of an extraction of an extraction operation, obtained the data shown in the following table.

Extraction time mts(x)	27	45	41	19	3	39	19	49	15	31
Efficiency%(y)	57	64	80	46	62	72	52	77	57	68

Fit a straight line to the given data by the method of least squares.

b) Explain the construction of fraction defective chart. [6M+ 6M]

(OR)

9. a) Find the regression lines for the data given below. Also find coefficient of correlation ?

X	1	4	2	3	5
Y	3	1	2	5	4

b) Explain the control chart for mean and range. [6M+ 6M]

UNIT-V

10.a) Write short notes on customer behaviour

b) Customers arrive at one person barber shop according to a Poisson process with a mean inter arrival time of 20 minutes. Customers spend on an average of 15 minutes in the barber's chair.

(i) What is the probability that a new arrival need not wait for the barber to be free ?

(ii) What is the expected number of customers in the barber shop ?

(iii) How much time can a customer expect to spend in the shop ? [6M+ 6M]

(OR)

11.a) Explain queue discipline

b) At a railway station only one train is handled at a time. The yard can accommodate only two trains to wait. Arrival rate of trains is 6 per hour and the railway station can handle them at the rate of 12 per hour. Find the steady state probabilities for the various number of trains in the system. Also find the average waiting time of a newly arriving train. [6M+ 6M]