AR13

CODE: 13CE2002 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, January-2019

SURVEYING
(Civil Engineering)

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

PART-A

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

1. a) Differentiate between Base line and Check line
   b) What are the Methods of Levelling?
   c) What do you understand by local attraction?
   d) List out any two uses of Contours.
   e) Write about Electronic Distance Measurements.
   f) Why is it necessary to take observations on both faces in Theodolite surveying?
   g) Enumerate different methods of determination of volume of earthwork.
   h) Explain the methods of estimating capacity of a reservoir.
   i) What are the principles of Tachometer?
   j) How would you compute the length of a vertical curve?

PART-B

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

UNIT-I

2. a) What is the basic principle of Surveying? Classify and explain different types of Surveys — 7 M
   b) Describe with sketches the indirect method of chaining on a sloping ground. — 5 M

(OR)

3. The following fore bearings and back bearings were observed in a closed traverse with a compass. Compute the interior angles and correct them for observational errors. Assuming the observed bearing of the line CD to be correct adjust the bearing of the remaining sides: — 12 M

Line	Fore Bearing	Back Bearing
AB	$80^0 10'$	259^0
BC	$120^0 20'$	$301^0 50'$
CD	$170^0 50'$	$350^0 50'$
DE	$230^0 10'$	$49^0 30'$
EA	$310^0 20'$	$130^0 15'$

UNIT-II

4. The following readings were observed successively with a leveling instrument. The instrument was shifted after 5th and 11th readings. 0.485, 1.020, 1.785, 3.395, 3.875, 0.360, 1.305, 1.785, 2.675, 3.385, 3.885, 1.835, 0.4.35, 1.705. Draw up a page of level book and determine the RL of various points by rise and fall method if the R.L. of the point on which the first reading was taken is 264.350m — 12 M

(OR)

5. Explain the characteristics and uses of Contours. — 12 M

UNIT-III

6. a) Explain how you would measure with a theodolite the horizontal angle by repetition method? 8 M

   b) Define the terms: 4 M
   (i) Face right and face left observations
   (ii) Swinging the telescope.

(OR)

7. a) To determine the multiplying constant of a tacheometer the following observations were taken on a staff held vertically at a distance, measured from the instrument: 8 M

Observation	Horizontal distance in m	Vertical angle	Staff intercept
1	50	+3°48'	0.500 m
2	100	+1°06'	1.000 m
3	150	+0°45'	1.500 m

The focal length of the object glass is 20 cm and the distance from the object glass to trunnion axis is 10 cm. The staff is held vertically at all these points? Find the multiplying constant?

   b) Explain the procedure for determining tacheometric constants in the field. 4 M

UNIT-IV

8. a) Derive the Prismoidal formula and state its validity. 5 M

   b) The following data refers to a site of reservoir. The areas are the ones which will be contained by a proposed dam and contour lines as given below: 7 M

Contour (m)	610	615	620	625	630
Area enclosed in hectares	22	110	410	890	1158

Calculate the capacity of the reservoir.

(OR)

9. The following perpendicular offsets were taken at 10 m intervals from a survey line to an irregular boundary line: 2.95m, 5.70m, 4.00m, 6.35m, 8.25m, 6.00m, 3.30m, 4.85m, 5.70m. Calculate the area included between the survey line, the irregular boundary line, and the first and last offsets by Trapezoidal rule and Simpson's rule. 12 M

UNIT-V

10. a) Draw a neat sketch of a simple circular curve and show its various elements thereon. 4 M

    b) Calculate the ordinates at 10 m intervals for setting out a simple circular curve of 200 m radius for a deflection angle of 60° by using offsets from Long Chord method. 8 M

(OR)

11. What are the methods of setting out simple curves? Explain Rankine's method of tangential angles for setting out curves. 12 M

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AR13

CODE: 13EE2004 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Supplementary Examinations, January-2019

ELECTRICAL CIRCUIT ANALYSIS-I
(Electrical & Electronics Engineering)

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

PART-A

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

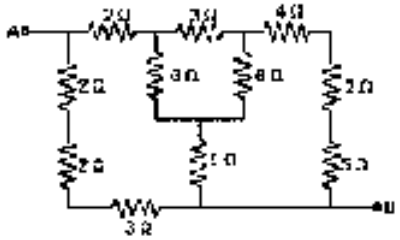
1. a) Define Super node.
   b) Define resonant frequency.
   c) Define super mesh.
   d) Mention different types of dependent sources.
   e) State Thevenin's theorem.
   f) State Norton's theorem.
   g) Write the applications of Maximum power transfer theorem.
   h) State Tellegen's theorem.
   i) What are the applications of Hybrid parameters?
   j) Write the condition for symmetry in ABCD-parameters.

PART-B

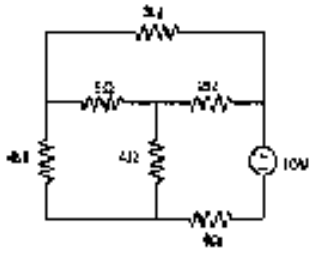
Answer one question from each unit **[5x12=60M]**

UNIT-I

2. a) Calculate effective resistance between A & B for the network shown below. 6M



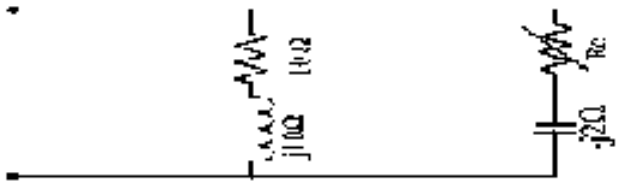
b) Determine current passing through 3Ω resistor using nodal analysis. 6M



(OR)

3. a) Derive an expression for resonant frequency in series RLC circuit and define band width. 6M

b) Calculate the value of R_c in the circuit of shown below to yield resonance. 6M

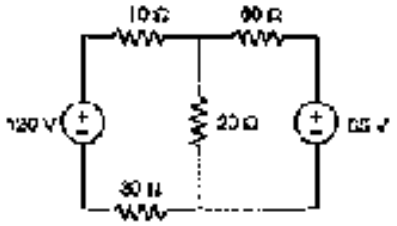


UNIT-II

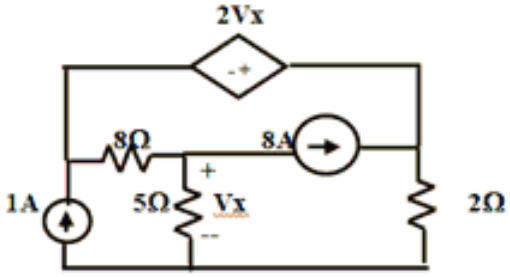
4. Explain the following with example.(i) Graph ((ii) Branch (iii) Cutset matrix (iv) Tree (v) Co-tree (vi) Incidence matrix 12M

(OR)

5. a) Determine current passing through 20Ω resistor using loop analysis for the given circuit. 6M



b) Determine voltage Vx for the circuit shown below using nodal analysis 6M

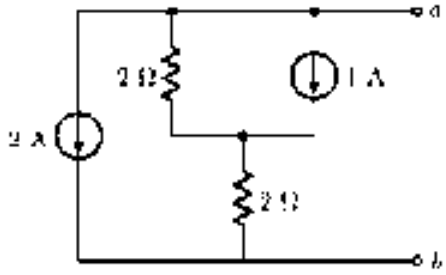


UNIT-III

6. Find the current through 5omhs resistor using super position theorem. 12M

(OR)

7. a) Obtain Norton's equivalent between terminals a-b. 6M

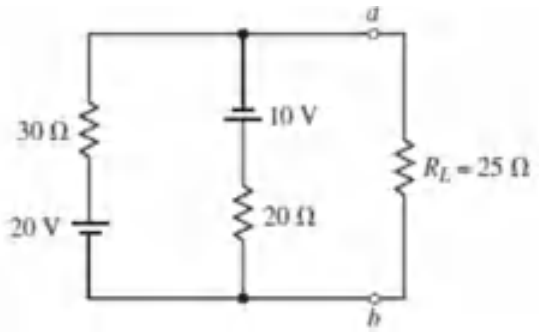


b) State and explain reciprocity theorem with an example. 6M

UNIT-IV

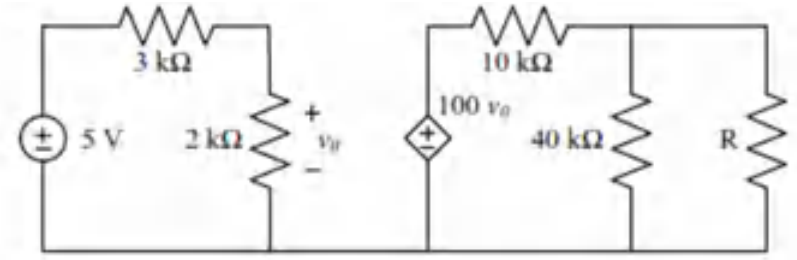
8. a) State and explain maximum power transfer theorem. 6M

b) Find the current through and power dissipated by R_L using Millman's theorem. 6M



(OR)

9. a) Find the maximum power delivered to the load R for the circuit shown below. 6M



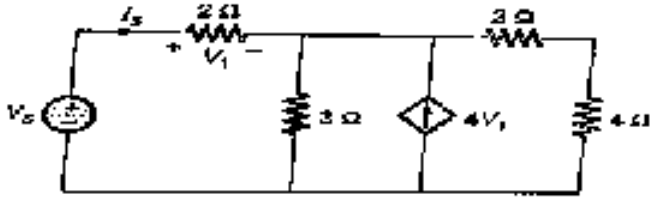
b) State and explain Compensation theorem with an example. 6M

UNIT-V

10. Write short notes on Z and Y parameters 12M

(OR)

11. a) Find the driving point impedance at the input port for the network shown below. 6M



b) Derive the expression for equivalent ABCD parameters when two port networks are connected in cascade. 6M

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AR13

CODE: 13ME2007 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Supplementary Examinations, January-2019

THERMODYNAMICS
(Mechanical Engineering)

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

PART-A

Note: Steam Tables are allowed
ANSWER ALL QUESTIONS **[1 x 10 = 10 M]**

1. a) Define open and closed systems with examples?
   b) Explain Quasi-static processes?
   c) What is continuum?
   d) Define PMM-I?
   e) State first law of thermodynamics?
   f) State third law of thermodynamics?
   g) Define relative humidity?
   h) Explain exergy and anergy?
   i) Draw P-v and T-s diagrams of Atkinson cycle?
   j) Write the air standard thermal efficiency of a otto cycle?

PART-B

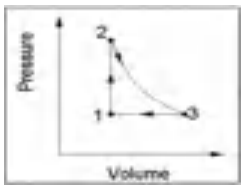
Answer one question from each unit **[5x12=60M]**

UNIT-I

2. a) Explain the concepts of point function and path function with examples?
   b) A mass of 1.5 kg of air is compressed in a quasi-static processes from 0.1 MPa to 0.7 MPa for which pv=const. the initial density of air is 1.16 kg/m^3. Find the work done by the piston to compress the air.

(OR)

3. a) State first law for a closed system undergoing a cycle
   b) A stationary fluid system goes through a cycle as shown in the figure comprising the following processes.
      i) 1-2 isochoric heat addition of 235 kJ/kg
      ii) 2-3 adiabatic expansion to its original pressure with loss of 70 kJ/kg internal energy
      iii) 3-1 isobaric compression to its original volume with heat rejection of 200 kJ/kg prepare a balance sheet of energy quantities and find the overall changes during the cycle.



UNIT-II

4. In a steady flow apparatus, 135 kJ of work is done by each kg of fluid. The specific volume of the fluid, pressure and velocity at the inlet are 0.37 m^3/kg, 600 kPa, and 16 m/s. The inlet is 32m above the floor and the discharge pipe is at the floor level. The discharge conditions are 0.62 m^3/kg, 100 kPa and 270 m/s. The total head loss between the inlet and discharge is 9 kJ/kg of fluid. In flowing through this apparatus, does the specific internal energy increases or decreases and by how much.

(OR)

5. State Kelwin plank and Clausis statement and also explain about their equivalence.

UNIT-III

6. Derive Maxwell's equations?

(OR)

7. a) Explain Mollier diagram for a pure substance with a neat sketch and also state why isobars diverge from one another?

b) Steam initially at 1.5 MPa, 300^0C expands reversibly and adiabatically in a steam turbine to 40^0C. Determine the ideal work output of the turbine per kg of steam.

UNIT-IV

8. a) Derive an expression for entropy change of an ideal gas.

b) A mass of 0.25 kg of an ideal gas has a pressure of 300 kPa, a temperature of 80^0C, and a volume of 0.07 m^3. The gas undergoes an irreversible adiabatic processes to a final pressure of 300 kPa and final volume of 0.10m^3, during which the work done on the gas is 25 kJ. Evaluate the *Cp* and *Cv* of the gas and the increase in entropy of the gas.

(OR)

9. An air –water mixture enters a heater humidifier unit at 5^0C, 100 kPa, 50% RH. The low rate of dry air is 0.1 kg/s. Liquid water at 10^0C is sprayed into the mixture at the rate of 0.002 kg/s. The mixture leaves the unit at 30^0C, 100 kPa. Calculate a) the relative humidity at the outlet and b) the rate of heat transfer to the unit.

UNIT-V

10. Explain diesel cycle with p-v and T-s diagrams and derive an expression for air standard efficiency of diesel cycle.

11. An engine working on Otto cycle has an air standard efficiency of 56% and rejects 544 kJ/kg of air. The pressure and temperature of air at the beginning of compression are 0.1 MPa and 60^0C respectively. Compute a) the compression ratio of the engine b) the work done per kg of air c) the pressure and temperature at the end of compression and d) the maximum pressure in the cycle.

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AR13

CODE: 13EC2002 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Supplementary Examinations, January-2019

ELECTRONIC CIRCUITS-I
(Electronics and Communication Engineering)

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

PART-A

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

1. a) What happens to the ripple factor of a rectifier if the value of the capacitor is increased in a rectifier circuit?
   b) What is avalanche breakdown?
   c) What is thermal runaway?
   d) What is base width modulation?
   e) The h_{fe} of a transistor is 50. find what is h_{fc}.
   f) Draw the small signal model of n - channel JFET.
   g) What is the difference between cascading and cascoding?
   h) Why CC amplifier circuit is called a voltage follower? justify the reason.
   i) Why the high frequency model is called as Transconductance model? justify.
   j) Why Hybrid - pi model is preferred in the analysis of amplifiers if the h - parameters are available and are easy for analysis? justify.

PART-B

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

UNIT-I

2. a) Under what conditions does a Zener diode act as a voltage regulator. Explain in detail. 6M
   b) Derive the expression for ripple factor of a half wave rectifier with capacitive filter. 6M

(OR)

3. a) What are the advantages of Full wave rectifier over half wave? 4M
   b) For the Zener diode network shown in the Fig. determine V_L, V_R, I_Z, and P_Z. 8M

UNIT-II

4. a) On what factors does the stability factor depend upon? Derive the expression for stability factor in case of fixed bias. 6M
   b) In linear region, FET shows resistive behaviour. explain in detail with neat diagrams. 6M

(OR)

5. a) What is Early effect? explain. 4M
   b) What is the significance of operating point? Why operating point is to be maintained in the middle of the active region for a faithful amplification? justify. 8M

UNIT-III

6. a) Obtain the h - parameter values of CE configuration from its characteristics. 6M
   b) Given , h_{fe} = 50, h_{ie} = 1.1KΩ, h_{oe} = 25μA/V and h_{re} = 2.5X10^{-4}, calculate the values of h_{fc}, h_{ic}, h_{oc} and h_{rc} 6M

(OR)

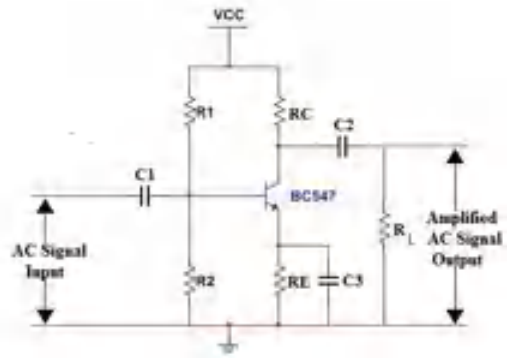
7. Derive the expressions for Voltage gain, current gain, input impedance and output impedance of an Emitter follower. 12M

UNIT-IV

8. a) Derive the expression for Voltage Gain, input and output impedances of a Common Emitter amplifier. 6M
   b) Define Miller's theorem and explain it with an example. 6M

(OR)

9. Consider a single stage amplifier with R_S = 1KΩ, R_1 = 100KΩ, R_2 = 10KΩ, R_C = 3KΩ, R_L = 5KΩ, h_{fe} = 50, h_{ie} = 1.1KΩ, h_{oe} = 25μA/V and h_{re} = 2.5X10^{-4} as shown. Find A_V, A_I, Z_i, A_{IS}, A_{VS} and Z_o 12M



UNIT-V

10. a) Write the conversion formulae of h - parameter model in terms of High frequency model 6M
    b) Draw the hybrid - π model and explain each and every parameter in the model. 6M

(OR)

11. a) Explain the significance of the factors f_α, f_β and f_T 6M
    b) Prove that (i) $h_{fe} = g_m r_{b'e}$ (ii) $h_{ie} = r_{bb'} + r_{b'e}$ 6M

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AR13

CODE: 13EC2006 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Supplementary Examinations, January-2019

DIGITAL LOGIC DESIGN
(Common to CSE and IT)

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

PART-A

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

1. a) What is the significance of "radix" in number system?
   b) Which gates can be used as inverters other than NOT gate?
   c) Multiply $1100_{(2)}$ by $1001_{(2)}$ using Binary Multiplication?
   d) Using Basic gates realize function y= (A+B)(A+C)?
   e) What is K-map?
   f) Define De-Morgans Theorems?
   g) What is the advantage of PLD?
   h) What are the various methods used for triggering flip-flops?
   i) What are buffer registers?
   j) What do you mean by resetting a counter?

PART-B

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

UNIT-I

2. Convert the following numbers to the required base 12M
   a) $231.3_{(4)}$ to base 7
   b) $110101_{(2)}$ to base 8,16
   c) $41.6875_{(10)}$ to base 2

(OR)

3. Draw the logic diagram for the function F= [AB(C+D)] '+A and convert the following AOI logic circuit to 12M
   a) NAND Logic
   b) NOR Logic

UNIT-II

4. a Explain the working of Binary parallel adder. 6M
   b Design a Full adder using Half adders. 6M

(OR)

5.		Reduce the following expression and implement the minimal expression in NAND logic $F(A,B,C,D)=\sum m(0,1,2,3,5,7,8,9,10,12,13)$	12M

UNIT-III

6.	a	Design an Octal to Binary encoder	6M
	b	Design a 3 line to 8 line decoder	6M
		(OR)	
7.		Realize the logic function using an 8:1 MUX $F(A,B,C,D) =(2,4,6,7,9,10,11,12,15)$	12M

UNIT-IV

8.		Implement the following two functions with PLA. $F_1 (A,B,C)= \sum m (0,1,2,4)$ $F_2 (A,B,C) =\sum m(0,5,6,7)$	12M
		(OR)	
9.		Design a combinational circuit using a PROM. The circuit accepts a 3 bit binary number and generates its equivalent XS-3 Code.	12M

UNIT-V

10.	a	Design an S-R latch using two 2- input NAND gates and explain the operation.	6M
	b	Explain the operation of UP/DOWN counter.	6M
		(OR)	
11.	a	Differentiate between synchronous sequential circuits and Asynchronous sequential circuits.	6M
	b	What are shift registers? Explain different modes of data movement in shift registers.	6M

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