AR16

CODE: 16CE2004 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Regular & Supplementary Examinations, Nov/ Dec, 2018

SURVEYING

(Civil Engineering)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1. a Define surveying? What are the primary divisions of surveying? 6M

b A 30m steel tape measured 30.015m when standardized fully supported under a 70 Newton pull at a temperature of 20^0C. The tape weighed 0.90kg (9N) and had a cross sectional area of 0.028 cm^2. What is the true length of the recorded distance AB if the recorded distance 114.095m at an average temperature of 12^0 with suspended means of support with a tension of 100N and elevation difference per 100m is 2.5m 8M

(OR)

2. The following are the observed bearings of the lines of a traverse ABCDEA with a compass in a place where local attraction was suspected 14M

Line	FB	BB
AB	191^0 45’	13^0 00’
BC	39^0 30’	222^0 30’
CD	22^0 15’	200^0 30’
DE	242^0 45’	62^0 45’
EA	330^0 15’	147^0 45’

Find the Correct bearings of the lines.

UNIT-II

3. Briefly explain the types of levelling with the help of neat sketch where ever necessary. 14M

(OR)

4. The following consecutive readings were taken with a levelling instrument at intervals of 20m 14M

2.375, 1.730, 0.615, 3.450, 2.835, 2.070, 1.835, 0.985, 0.435, 1.630, 2255 and 3.630m

The instrument was shifted after the fourth and eighth readings. The last reading was taken on a BM of RL 110.200m find the RL’s of all points using HI Method and also Rise & Fall Method.

UNIT-III

5. Explain the procedure of determining the horizontal angle using Repetition method with a neat sketch and represent the tabular form for noting the readings. 14M

(OR)

6. a Explain the methods of Tacheometry. 6M

   b Tacheometric Readings were taken from an instrument station A the reduced level of which was 15.05m to a staff station B, multiplying constant 100 and additive constant 0.36 with staff held vertical. Determine the RL of station B when height of instrument is 1.38m with 30^0 of vertical angle. 8M

UNIT-IV

7. A closed loop traverse was run among stations A, B, C and D having following observation 14M

Line	Length, m	Angle
AB	372.22	0^0 45’
BC	164.98	94^0 45’
CD	242.44	183^0 05’
DE	197.15	232^0 50’

Find the Consecutive Coordinates of the station, closing error if any and represent the traverse with neat sketch.

(OR)

8. Explain the different methods in plotting the traverse in surveying. 14M

UNIT-V

9. a Derive an expression to find the height of the object when the base of the object is accessible. 7M

   b Find the elevation of the top of a chimney with the data 7M

Inst. at	Reading on BM	Angle of elevation	Remarks
A	0.862	$18^0 36^1$	R.L of BM=421.380m
B	1.222	$10^0 12^1$	Distance AB=50m

(OR)

10. a Sketch the diagram showing all the elements of a simple circular curve and give their relationships 6M

    b Two straight lines intersect at a chainage 1150.50 and the angle of intersection is 60^0, if the radius of the curve is 500m. determine 8M

    a) tangent distance
    b) length of the curve
    c) length of long chord
    d) degree of curve

AR16

CODE: 16EE2008 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Regular & Supplementary Examinations, Nov/ Dec, 2018

ELECTRICAL CIRCUIT ANALYSIS

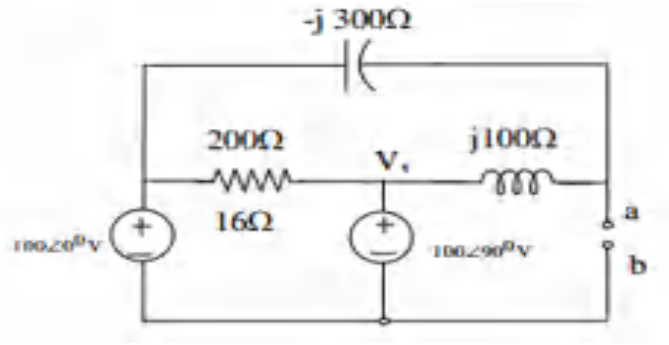
(Electrical and Electronics Engineering)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1. a) State and prove reciprocity theorem choosing a suitable circuit. 5M
   b) For the circuit given below, determine the Norton's equivalent circuit. 9M



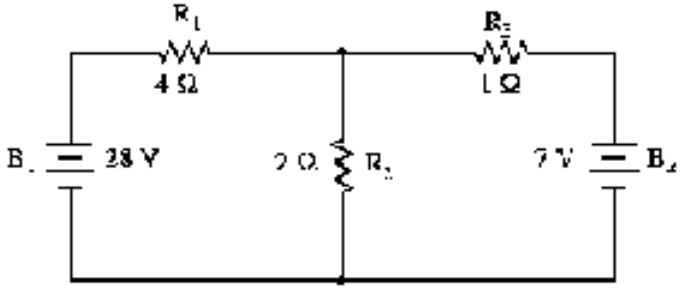
(OR)

2. a) State and prove Norton's theorem choosing a suitable circuit. 5M
   b) Calculate current through 5Ω resistor using super position theorem. 9M

UNIT-II

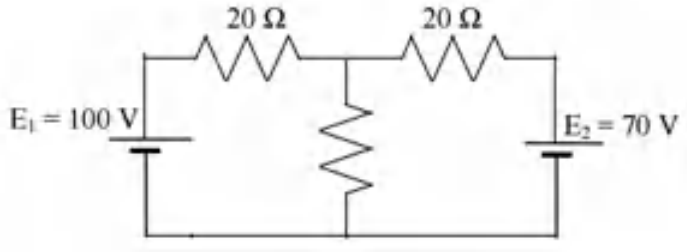
3. a) Derive the condition for maximum power to be transferred to the load for the following cases: 7M
   i) Load having constant resistance and variable reactance.
   ii) Load having variable resistance and constant reactance.
   iii) Load having variable resistance and variable reactance.
   Assume that the source has internal impedance of resistance and inductive reactance.

   b) Verify Tellegen's theorem for the circuit given below. 7M



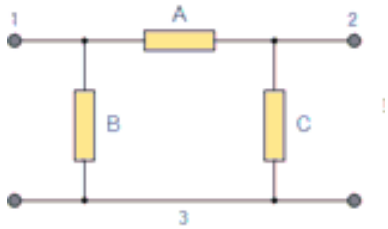
(OR)

4. a) State and prove Milliman's theorem with a suitable circuit. 7M
   b) What should be the value of the centre resistor for it to receive maximum power. Also find the maximum power. 7M



UNIT-III

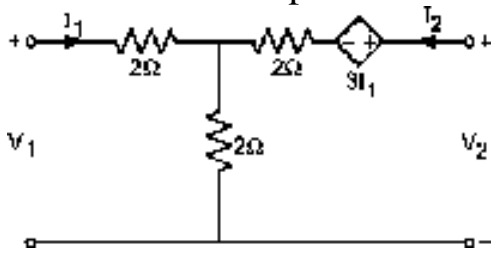
5. a) For the two port network shown below, obtain the Z-parameters. Take A= j10 ohms; B= 20 ohms and C= (5+j12) ohms. 7M



   b) Obtain the h parameters for the two port network having voltages; $V_1 = 2 I_2$ and $V_2 = -2 I_1 + 4 I_2$. Also draw the equivalent circuit. 7M

(OR)

6. a) Find the Z- parameters for the two port network given below. 7M

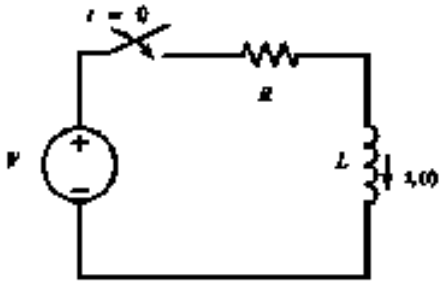


b) Determine the relationship between Y and h parameters. 7M

UNIT-IV

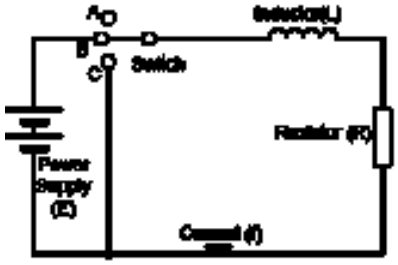
7. a) Derive an expression for the voltage response in a RC series circuit excited by a constant voltage source V. 7M

b) Find I (t) at t=16 sec for the circuit shown below. V=100 volts, R=10 ohms and L= 4 H. 7M



(OR)

8. Switch is in position B for a long time. At t=0 it is moved to position C. Calculate the voltage across R at t= 5 milli sec. 14M



UNIT-V

9. a) Synthesize the following admittance function in Foster 2nd form. 7M

$$Y(s)=\frac{(s+1)(s+3)}{(s+2)(s+5)}.$$

b) Synthesize the following impedance function in Cauer 1st and 2nd forms. 7M

$$Z(s)=\frac{(s+1)(s+3)}{s(s+2)(s+4)}$$

(OR)

10. a) What do mean by network synthesis? Explain with an example. 6M

b) Synthesize the following impedance function in Cauer 1st form. 8M

$$Z(s)=\frac{(s^2+7s+10)}{(s^2+4s+3)}.$$ Draw the network.

AR16

CODE: 16ME2007 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Regular & Supplementary Examinations, Nov/ Dec, 2018

THERMODYNAMICS

(Mechanical Engineering)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1. a) Define a system and explain how systems are classified. 7 M
   b) A mass of gas is compressed in a quasi-static process from 80 kPa, 0.1 m^3 to 0.4 MPa, 0.03 m^3. Assuming that the pressure and volume are related by pV^n=Constant, find net work done by the gas system assume n=1.4. 7 M

(OR)

2. a) Prove that in a constant pressure non-flow process the heat transfer during a process is equal to change in enthalpy. 5 M
   b) A system containing 0.2 m^3 of air at a pressure of 4 bar and 160 ^{0}C expands isentropically to a pressure of 1.06 bar and after this the gas is heated at constant pressure till the enthalpy increases by 65 kJ. Calculate the work done. How imagine that these processes are replaced by a single reversible polytropic process producing the same amount of work between the initial and final state. Find the index of expansion in this case. Take c_p of air as 1.005 kJ/kg K. 9 M

UNIT-II

3. a) Derive the Steady Flow Energy Equation of a turbine with a neat sketch by clearly stating the assumptions. 8 M
   b) Define (i) Kelvin Plank's Second Law of Thermodynamics and (ii) PMM-II 6 M

(OR)

4. a) A household refrigerator is maintained at a temperature of 2°C. Every time the door is opened, warm material is placed inside, introducing an average of 420 kJ, but making only a small change in the temperature of the refrigerator. The door is opened 20 times a day, and the refrigerator operates at 15% of the ideal COP. The cost of work is Rs. 2.50 per kWh. What is the monthly bill for this refrigerator in the month of January? The atmosphere is at 30°C. 8 M
   b) Derive the expression for change of entropy for the following processes. 6 M
   a) Isochoric process b) Isobaric process c) Isothermal process

UNIT-III

5. a) Using Maxwell's relations deduce the two TdS equations. 7 M
   b) 80 kg of water at 100°C are mixed with 50 kg of water at 60°C, while the temperature of the surroundings is 15°C. Determine the decrease, increase and loss in availability due to mixing. 7 M

(OR)

6. a) Define (i) pure substance (ii) Degree of undercooling (iii) Degree of superheat (iv) critical point (v) Triple point 5 M
   b) Find the specific volume, internal energy and entropy of wet steam at 15 bar pressure and dryness fraction 0.8. 9 M

UNIT-IV

7. a) Show that pV^{γ} = Constant for a reversible adiabatic process executed by an ideal gas. 8 M
   b) Set up an expression for the partial pressure of a gas in the gaseous mixture in terms of mass and volume fraction. 6 M

(OR)

8. a) Obtain a relation between degree of saturation and relative humidity. 6 M
   b) Define the following terms 8 M
      i) Mass fraction ii) Molar fraction iii) Volume fraction
      iv) Dalton's Law off partial pressures

UNIT-V

9. a) Compare Otto, Diesel and Dual cycles for (a) same compression ratio and heat rejection (b) the same maximum pressure and temperature (also heat rejection same) with p-V and T-S diagrams. 8 M
   b) Derive an expression for the mean effective pressure of the ooto cycle. 6 M

(OR)

10. An air standard dual cycle has a compression ratio of 15 and compression begins at 0.1 MPa, 40°C. The maximum pressure is limited to 6 MPa and the heat added is 1.675 MJ/kg. Compute (a) the heat supplied at constant volume per kg of air, (b) the heat supplied at constant pressure per kg of air, (c) the work done per kg of air, (d) the cycle efficiency, (e) the temperature at the end of the constant volume heating process, (f) the cut-off ratio, and (g) the m.e.p. of the cycle. 14M

AR16

CODE: 16EC2006 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Regular & Supplementary Examinations, Nov/ Dec, 2018

ELECTRONIC CIRCUITS – I

(Electronics and Communication Engineering)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1.	**a**	With neat circuit diagram explain the operation of bridge rectifier.	**8M**
	b	A voltage of 200 cos ωt is applied to half-wave rectifier with load resistance of 5kΩ.Find the maximum dc current component, rms current, ripple factor, and efficiency	**6M**

(OR)

2.	**a**	Explain multiple LC filters and π – section filter with neat diagram and give the ripple factor?	**7M**
	b	Derive the expression for ripple factor in capacitor filter.	**7M**

UNIT-II

3.	a	Distinguish between d.c and a.c load lines with suitable diagrams.	**7M**
	b	In a CE silicon transistor amplifier using self-bias circuit with parameters V_{CC}=12V, R_1 =8k Ω, R_2=4k Ω, R_C =1k Ω, R_E =1k Ω , R_L =1.5k Ω.Assume V_{BE}=0.7V.Draw the d.c and a.c load line.	**7M**

(OR)

4.	**a**	Define stability factor(s)?	**6M**
	b	In a CE silicon transistor amplifier using self-bias circuit with parameters V_{CC}=10V, R_1=56k Ω, R_2 =12.2k Ω, R_C =2k Ω, R_E =400 Ω , V_{BE}=0.7V and β=150, determine Q-point and the stability factor.	**8M**

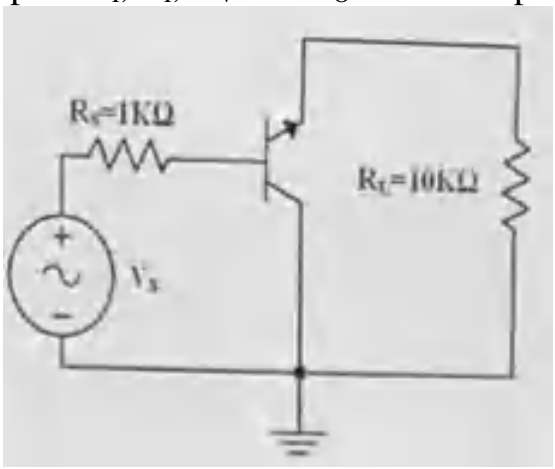
UNIT-III

5.	**a**	Derive the equations for A_I, R_I, A_V and R_O for a BJT using low frequency h-parameter model.	**10M**
	b	The h-parameters of a transistor used in a CE circuit are h_{ie} = 1k Ω, h_{re} = 10×10^{-4}, h_{fe} = 50 and h_{oe} = 100μA/V. The load resistance for the transistor is 1kΩ. Determine A_I, R_I, A_V and Z_O. Assume R_S = 1k Ω.	**4M**

(OR)

6. **a** Compare different transistor amplifier configurations. **6M**

b Compute A_I, R_I, A_V and R_O for the amplifier shown in figure **8M**



h_{ic} = 1.1k Ω, h_{rc} = 1, h_{fc} = -51 and h_{oc} = 24μA/V.

UNIT-IV

7. Derive the equations for A_I, R_I, A_V and R_O for a Common-emitter configuration with emitter resistance. **14M**

(OR)

8. **a** Derive the equations for A_I, R_I, A_V and R_O for a Common-base configuration. **10M**

b Draw the small signal equivalent of common-source amplifier. **4M**

UNIT-V

9. **a** Enumerate the effects of negative feedback on the various characteristics of the amplifier with suitable derivations. **10M**

b The open loop gain of the amplifier is 50 and its bandwidth is 20kHz.When a negative feedback is applied, the bandwidth is increased to 25kHz.What will be the required feedback ratio? **4M**

(OR)

10. **a** Derive the expression for gain, input resistance and output resistance in voltage – shunt feedback amplifier with neat circuit diagram. **8M**

b An amplifier has voltage gain with feedback of 100.If the gain without feedback changes by 20% and the gain without feedback should not vary more than 2%, determine the values of open loop gain A and feedback ratio β. **6M**

AR16

CODE: 16EC2011 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Regular & Supplementary Examinations, Nov/ Dec, 2018

DIGITAL LOGIC DESIGN

(Common to CSE & IT)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1.	a	Solve for b. i) $(16)_{10} = (100)_b$ ii) $(292)_{10} = (1204)_b$	7M
	b	Implement all the basic gates using NAND gates only.	7M
		(OR)	
2.	a	With examples explain about weighted and non weighted codes.	7M
	b	Explain the procedure to find the dual of a given function with an example.	7M

UNIT-II

3.	a	Minimize the following expression using K-map. $F(A,B,C,D) = \Sigma\, m(1,4,7,10,13) + \Sigma\, d(5,14,15)$	7M
	b	Realize full adder using two half adders and logic gates.	7M
		(OR)	
4.	a	With truth table explain the logic diagram of full subtractor.	7M
	b	Explain about 4-bit ripple adder.	7M

UNIT-III

5.	a	Implement the logic function $F(A,B,C) = \Sigma\, m(1,2,4,7)$ using i) only 2X1 Multiplexers and ii) 8X1 Multiplexer	7M
	b	Explain the difference between encoder and a priority encoder.	7M
		(OR)	
6.	a	Design 3-bit binary to gray code converter.	7M
	b	Explain the operation of a 3X8 decoder with truth table.	7M

UNIT-IV

7.	a	Implement $f(A,B,C,D) = \sum(0,1,4,5,6,7,9,10,12,13,15)$ using PLA.	7M
	b	Design a half subtractor using PROM.	7M
		(OR)	
8.	a	Compare PROM,PLA and PAL	7M
	b	Design a full adder using PLA.	7M

UNIT-V

9.	a	Explain the operation of JK flip flop with truth table	7M
	b	Draw and explain the logic diagram of 4 bit ring counter	7M
		(OR)	
10.		Draw and explain the logic diagram of universal shift register	14M

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AR13

CODE: 13CE2002 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, Nov/Dec-2018

SURVEYING

(Civil Engineering)

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

PART-A

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

1. a) Define Azimuth and Bearing.
   b) What is contour interval?
   c) What is the necessity of keep in level midway between back and for sight readings?
   d) Define the ranging in surveying.
   e) For what purpose planimeter is used?
   f) Why the substance bar is used?
   g) What are the principles of trigonometry?
   h) When do you go for horizontal curves?
   i) What is meant by degree of a curve?
   j) What is EDM?

PART-B

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

UNIT-I

2. a) What are the objectives and principles of plane surveying? 6 M
   b) Explain the classification of surveying based on instruments used and nature of survey field? 6 M

(OR)

3. a) The following fore bearings and back bearings were observed in traversing with a compass 6 M

Line	FB	BB
PQ	S 37°30′ E	N 37°30′ W
QR	S 43°15′ W	N 44°15′ E
RS	N 73°00′ W	S 72°15′ E
ST	N 12°45′ E	S 13°15′ W
TP	N 60°00′ E	S 59°00′ W

   Calculate the interior angles and correct them for observational errors.
   b) What are different tape corrections and how are they applied? 6 M

UNIT-II

4. a) Describe the methods of reducing the levels, and their relative advantages and disadvantages. 6 M
   b) Explain briefly the following i) Fly levelling ii) Check levelling iii) Reciprocal levelling 6 M

(OR)

5. a) Discuss various characteristics of contours. 6 M
   b) What is contour gradient and what are the applications of contouring? 6 M

UNIT-III

6. a) Discuss repetition method for horizontal angle measurement. 6 M
   b) What are the temporary adjustments of a theodolite? Explain clearly. 6 M

(OR)

7. a) What is tangential method of tachometry? What are its advantage and disadvantages over the stadia method? 6 M
   b) How do you determining the additive and multiplying constant of a Tachometer? 6 M

UNIT-IV

8. a) The areas enclosed by contours in a lake an as follows: 6 M

Contour (m)	270	275	280	285	290
Offsets (m)	2,050	8,400	16,300	24,600	31,500

Calculate the volume of water between the contours 270 m and 290 m by (i) Trapezoidal rule (ii) Prismoidal rule

   b) Write about any three methods for calculating areas. 6 M

(OR)

9. a) How do you determine i) the capacity of reservoir ii) the earthwork for a borrow pit 6 M
   b) The following perpendicular offsets were taken at 20 m intervals from a base line to an irregular boundary line: 6 M
5.90, 12.4, 16.5, 15.3, 18.4, 20.9, 24.2, 21.8 and 19.2 m
Calculate the area enclosed between the base line, the irregular boundary line and the first and last offsets by
i) Trapezoidal rule ii) Simpson's rule

UNIT-V

10. a) Write about the elements of a circular curve with a sketch. 6 M
    b) A simple circular curve is of 330 m radius. Calculate the offsets from the tangent to locate point on the curve at 15 m intervals for a distance of 60 m from tangent points. Give the radial as well as perpendicular offsets. 6 M

(OR)

11. a) The chainage of intersection of two straight line having deflection angle 55° is 1000 m. If the radius of the curve is 400 m. Calculate the following 6 M
i) Tangent distance ii) length of curve iii) chainage at point T_1 and T_2
iv) Length of long chord v) Degree of curve vi) Apex distance
vii) Mid-ordinate distance
    b) Explain Rankine's method of setting out circular curve? 6 M

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AR13

CODE: 13EE2004 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Supplementary Examinations, Nov/Dec-2018
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 "KCL"?
   b) Three equal resistances of 5Ω are connected in delta. What is the resistance in one of the arms in an equivalent star circuit?
   c) Write the properties of RLC parallel circuit under resonance.
   d) Define Oriented Graph?
   e) State the Millman's Theorem.
   f) Explain how the Thevenin's equivalent can be obtained from Norton's equivalent circuit.
   g) If Z_{11}=2Ω; Z_{12}=1Ω; Z_{21}=1Ω and Z_{22}=3Ω then find Y-parameters.
   h) What is the concept of duality of the network?
   i) The reciprocity theorem is applicable to which type of network.
   j) Define H-parameters.

PART-B

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

UNIT-I

2. a) Determine the nodal voltages in the circuit Fig 2a. 6M

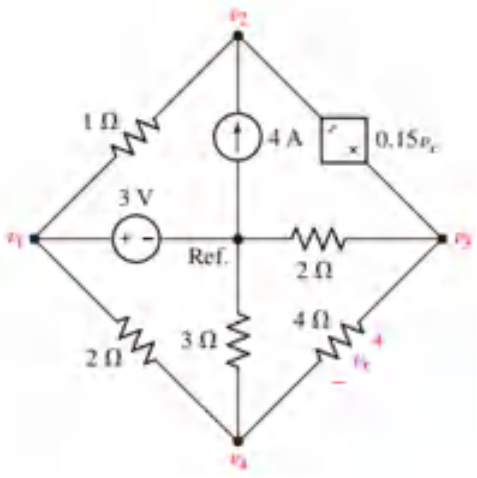


Fig 2a.

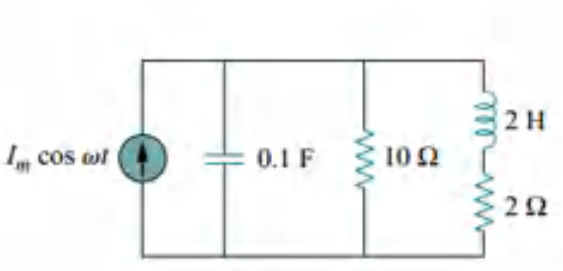


Fig 2b,

b) Determine the resonant frequency of the circuit Fig 2b, 6M

(OR)

3. a) Use mesh analysis to determine the three mesh currents in the circuit Fig 3a. 6M

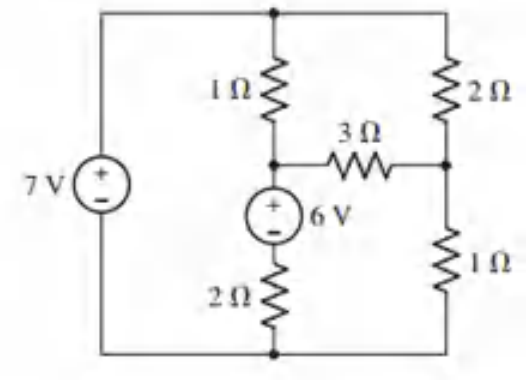


Fig 3a.

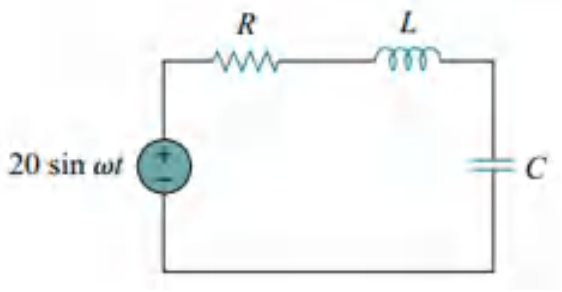
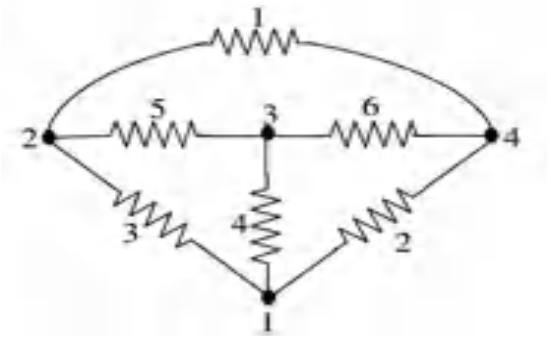


Fig 3b.

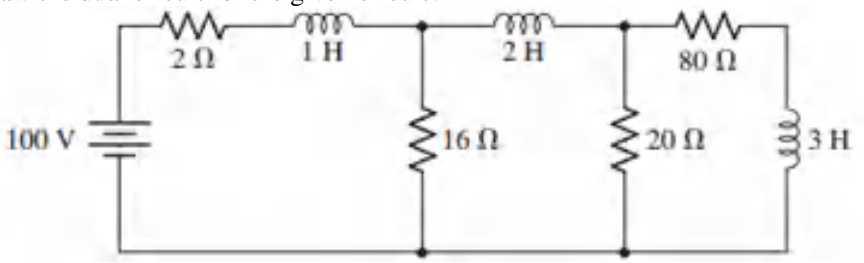
b) In the circuit in Fig., $R = 2\Omega$, $L = 1$ mH, and $C = 0.4\ \mu$F. (a) Find the resonant frequency and the half-power frequencies. (b) Calculate the quality factor and bandwidth. (c) Determine the amplitude of the current at ω_0, ω_1 and ω_2. Fig 3b. 6M

UNIT-II

4. a) For the given network shown in Fig., draw the graph and chose a possible tree. Construct the basic tie set schedule. Write the equation for the branch currents and interns of the link current & write separately the independent equations. 6M



b) Draw the dual circuit for the given circuit? 6M



(OR)

5. a) Determine the basic cutest matrix for the oriented graph given in Fig. where the elements 1, 2, 3 are free branches. Fig 5a. 6M

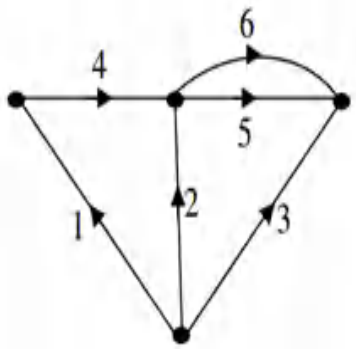


Fig 5a.

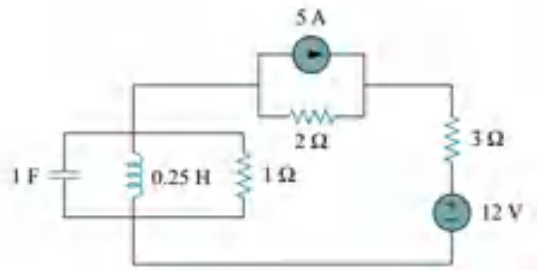


Fig 5b.

b) Draw the dual circuit for the given circuit? Fig 5b. 6M

UNIT-III

6. Calculate current through 1Ω resistor using super position theorem. 12M

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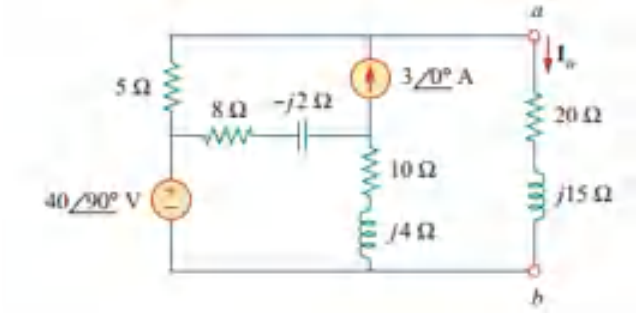
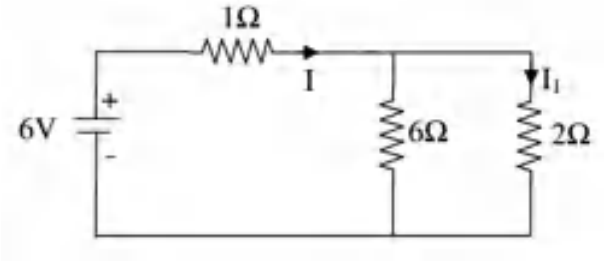
(OR)

7. a) Obtain current I_0 in the circuit using Norton's theorem. 6M

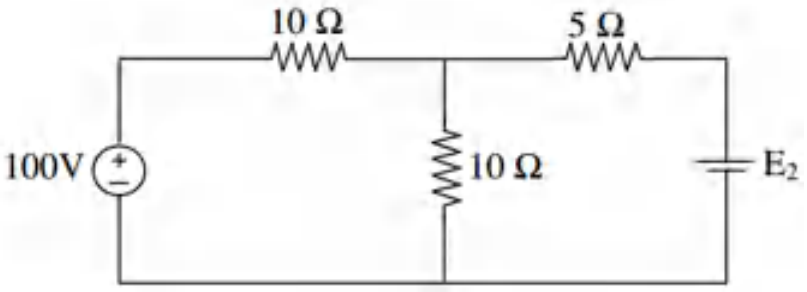


b) Find the current through 2Ω resistor in the circuit by using the reciprocity theorem. 6M



UNIT-IV

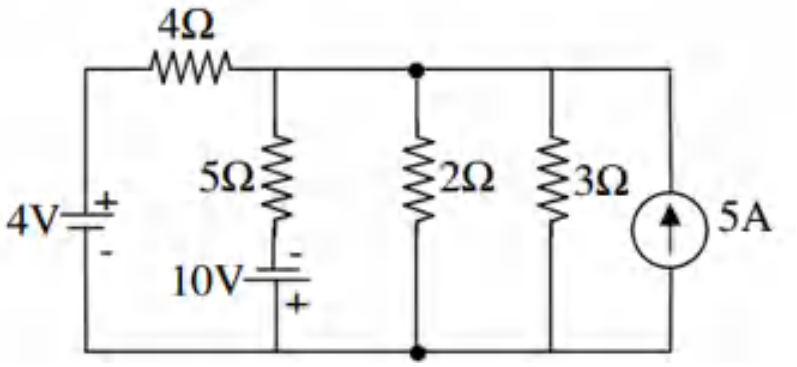
8. a) Find the value of source E_2 in the circuit using Tellegen's theorem if the power absorbed by E_2 is 20W. 6M



b) State and explain the maximum power theorem. 6M

(OR)

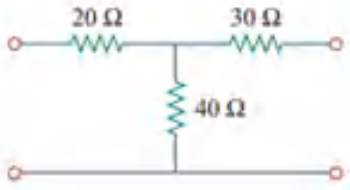
9. a) Find the current through 2Ω resistor for a given circuit using Millman's theorem 6M



b) Write down the statement of compensation theorem with example. 6M

UNIT-V

10. a) Determine the z parameters for the circuit 6M



b) Establish the relation between z – parameters and h-parameters. 6M

(OR)

11. a) Find the transmission parameters for the two-port network Fig 11a. 6M

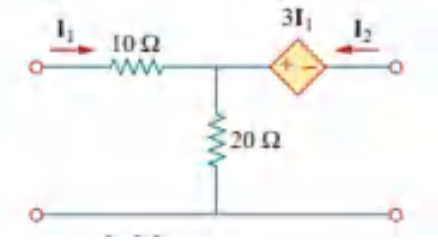


Fig 11a.

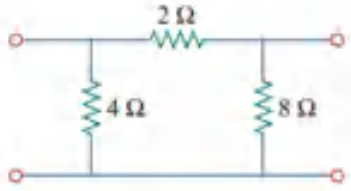


Fig 11b.

b) Obtain the y parameters for the network Fig 11b. 6M

AR13

CODE: 13ME2007 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, Nov/Dec-2018

THERMODYNAMICS
(Mechanical Engineering)
Use of Steam, Ref &A/C Tables is permitted.
For Air Use C_P=1.005 kJ/kg K and C_V=0.718 kJ/kg K

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

PART-A

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

1. a) Distinguish between open system and closed system.
   b) Define Thermodynamic equilibrium.
   c) State the significance of Zeroth Law of thermodynamics
   d) State any one corollary of Carnot Theorem.
   e) State first law of thermodynamics applied to a closed system undergoing any process
   f) What do you understand by a throttling process?
   g) Distinguish between ideal gas and real gas.
   h) A container has a mixture of 4 kgs oxygen gas and 12 kgs of Nitrogen. If the total pressure of the mixture is 1 bar what is the partial pressure of oxygen.
   i) Define relative humidity of moist air.
   j) Name the process in Lenoir cycle

PART-B

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

UNIT-I

2. a) All point functions are known as system properties. Explain. 5M
   b) 10 kgs of air is isothermally compressed in a closed system form 1 bar 30 ^{O} C until its pressure increases 5 folds. Determine the Work of compression and Heat transfer. Sketch the process on P-V diagram. 7M

(OR)

3. a) State and explain Zeroth law of thermodynamics. 5 M
   b) 3 kg of Air is compressed in a closed system reversibly from 2 bar 27 ^{O} C to 10 bar 300 ^{O} C polytropically. Determine the work of compression. 7M

UNIT-II

4. a) Derive steady flow energy equation of a turbine. 5M
   b) Steam enters a horizontal, adiabatic nozzle with a velocity of 20 m/s and with an enthalpy of 2400 kJ/kg. If it leaves the nozzle at an enthalpy of 2200 kJ/kg determine its exit velocity. 7M

(OR)

5. a) State and prove Claussius inequality 5M
   b) Determine the entropy change of Universe when 5 kg of air cooled at constant volume in a closed container from 227 ^{O} C to 27 ^{O} C. Take Atmosphere temperature as 27 ^{O} C. 7M

UNIT-III

6. a) Define Helmotz function and Gibbs Function. 5M
   b) Determine the availability of heat energy stored in a cast iron metal block of mass 500 kg at 600 ^{O} C. Assume the specific heat of the block as 0.6 kJ/kg K and environment temperature as 27 ^{O} C. 7M

(OR)

7. a) Draw the T-S diagram for a pure substance and explain different salient features of it. 5M
   b) 10 kg of steam at 20 bar and 0.3 dryness fraction is throttled to 5 bar. Determine the final dryness fraction and increase in entropy. 7M

UNIT-IV

8. a) Explain the step by step procedure of converting gravimetric analysis of given composition of gases into volumetric analysis. 5M
   b) A gas mixture consists of 1 kg of O_2 and 2 kg of N_2 at 1.5 bar and 20^{o}C. Calculate the C_V and C_P of the mixture. Also find the change in internal energy and enthalpy of the mixture when it is heated under constant volume to a temperature of 100^{o}C. Take C_v for O_2 0.653 and N_2 = 0.741 kJ/kg K, C_p for O_2 0.917 and N_2 = 1.038 kJ/kgK. 7M

(OR)

9. a) Derive the expression for specific humidity in terms of Partial pressure of water vapour. 5M
   b) Determine the specific humidity and DPT of air at a pressure of 760 mm Hg and is at DBT 48 ^{O} C and 80 % RH. 7M

UNIT-V

10. a) Derive the expression for Air standard efficiency of Diesel cycle in terms of compression ratio and cut off ratio. 5M
    b) Find the efficiency of an air standard Diesel cycle having compression ratio 16 in which cut off occurs at 1/12 th of stroke. 7M

(OR)

11. a) Compare Otto and Diesel cycles for the same compression ratio and same heat rejection. 5M
    b) In an air standard Diesel cycle 3 kg of air initially at 1 bar 27 ^{O} C is compressed with a compression ratio of 16 .The cut-off ratio maintained in the cycle is 2.15. Find the net work done by the cycle and its mean effective pressure. 7M

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AR13

CODE: 13EC2002 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, Nov/Dec-2018

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 is the use of filters in rectifier circuits? **1M**
   b) What is a voltage regulator? **1M**
   c) What is the need of biasing? **1M**
   d) Define the term thermal runaway. **1M**
   e) Define forward current gain and reverse voltage gain in hybrid model **1M**
   f) What is the relationship between r_d, g_m and μ **1M**
   g) Draw the simplified hybrid model circuit **1M**
   h) Why CC amplifier is called as an emitter follower **1M**
   i) What is base spreading resistance in hybrid-π model. **1M**
   j) Define α-cutoff frequency. **1M**

PART-B

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

UNIT-I

2. a) Derive the expression for ripple factor of a half wave rectifier with capacitor filter. 6M
   b) Draw and explain about π-section filter 6M

(OR)

3. a) Draw the circuits for π-section filter, L-section filter and multiple π-section filters. 6M
   b) Explain how zener diode can be used as a voltage regulator 6M

UNIT-II

4. a) Define stability factor and derive an expression for the stability factor of a collector to base biasing circuit. 6M
   b) Draw a circuit which uses a diode to compensate for changes in $I_{co.}$ Explain how stabilisation is achieved in the circuit. 6M

(OR)

5. a) If the various parameters of a CE amplifier which uses the self bias method are V_{cc}=12v,R_1=10kΩ,R_2=5kΩ,R_c=1kΩ,R_E=2kΩ and β=100. Find the Q-point and stability factor 6M

   b) Explain how FET can be used as a voltage variable resistor. 6M

UNIT-III

6. Derive the equation for voltage gain, current gain, input impedance and output impedance for a BJT using low frequency h-parameter model for CE configuration 12M

(OR)

7. a) Compare the performance of a BJT as an amplifier in CE, CB and CC configurations. 6M

   b) Draw and explain the small signal model of a FET in CS configuration 6M

UNIT-IV

8. a) Determine the voltage gain and current gain of CE amplifier with emitter resistance using simplified hybrid model. 6M

   b) State and prove Millers's theorem. 6M

(OR)

9. a) Why CC amplifier is called as an emitter follower and determine the voltage gain and input resistance of emitter follower using approximate hybrid model 6M

   b) Draw the circuit diagram of CS amplifier and find its voltage gain and input resistance. 6M

UNIT-V

10. a) Draw the equivalent diagram of a single stage CE amplifier at high frequencies. Derive the expression for gain under short circuited load conditions. 6M

    b) Define transconductance g_m and derive the expression for it. 6M

(OR)

11. a) What is diffusion capacitance and derive the expression for $C_{b'e}$ 6M

    b) Draw and explain the high frequency model of JFET in CS configuration. 6M

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AR13

CODE: 13EC2006 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, Nov/Dec-2018

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 do you mean by Byte?
   b) Which gate is equivalent to bubbled OR gate?
   c) Convert $48056_{(10)}$ to Binary?
   d) Draw the truth table for Half Adder?
   e) What is don't care?
   f) Prove that x+x = x.
   g) A memory has 16 bit address bus. How many locations are there in this?
   h) What is latch?
   i) What are the applications of Shift registers?
   j) What is the Modulus of a counter?

PART-B

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

UNIT-I

2. Using (r -1)'s complement perform the subtraction for the following: 12M
   a) 1010-0111
   b) 0111-1010

(OR)

3. a Simplify the following logic expressions 6M
   i) Y=A'B'C'D' + A'B'C'D + A'BC'D
   ii) X=A'B'C'D'+A'BC'D'+ABC'D'+AB'C'D'
   iii) Z=(A+B'+C') + (A+B'+C)

   b Simplify the following logic expression using De-Morgan's theorem 6M
   i) X=[(A+B+C)(A' +B' +C)] '
   ii) Y=(A+BCD) '
   iii) Z=[(A+B+C'D') AB] '

UNIT-II

4. Simplify the following logic function using K-map in SOP and POS forms: 12M
   $F(A,B,C,D) = \sum m(0,1,2,5,6,8) + d(3,4,7,14)$

(OR)

5. Explain about look ahead carry adder with neat figures and required expressions. 12M

UNIT-III

6. a Implement the Boolean function $F(x,y,z) = \sum m(1,2,6,7)$ using 4:1 MUX. 6M

   b Design a 32:1 MUX using two 16:1 MUX 6M

(OR)

7. Design a Binary to BCD code converter. 12M

UNIT-IV

8. a Realize the following function using PROM. 6M
   $F_1 = \sum m(0,4,7)$
   $F_2 = \sum m(1,3,6)$
   $F_3 = \sum m(1,2,4,6)$

   b List and explain the types of ROM. 6M

(OR)

9. Realize the following functions using a PAL with 4 inputs and 3 wide AND – OR structure. Also write the PAL programming table. 12M
   $F_1 (A,B,C,D) = \sum m(6,8,9,12\text{-}15)$
   $F_2 (A,B,C,D) = \sum m(1,4,5,6,7,10\text{-}13)$
   $F_3 (A,B,C,D) = \sum m(4,5,6,7,10,11)$
   $F_4 (A,B,C,D) = \sum m(4,5,6,7,9\text{-}15)$

UNIT-V

10. With the help of neat timing diagram, Explain how a 4-bit asynchronous counter Counts 0000 to 1100. 12M

(OR)

11. a Draw and explain Ring counter with a neat timing diagram. 6M

    b Explain the importance of a Buffer register. 6M

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