ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMUS)
II B.Tech I Semester Supplementary Examinations, December- 2017
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 – 1

1. a) Differentiate between
    (i)   Geodetic Surveying and Plane Surveying
    (ii)   Map and plan   (6M)
    b) What are the types of tape corrections? And explain with formulas   (8M)

(OR)

2. a) Discuss various types of random errors in chain and tape.   (8M)
    b) Give a classification of surveys and explain briefly the various types of surveys. (6M)

UNIT – II

3. a) What is a bench mark? Describe different types of bench marks.   (6M)

    b) The following readings were observed successively with a leveling instrument. The
       instrument was shifted after fifth and eleventh readings.
      0.585; 1.010; 1.735; 3.295; 3.775; 0.350; 1.300; 1.795; 2.575; 3.375; 3.895; 1.735;
      0.635; 1.605;
    Draw up a page of level book and determine the R.L. of various points if the R.L. of the
    point on which the first reading was taken is 144.440, use the rise and fall method   (8M)

(OR)

4. a) Explain the working of a dumpy level with a sketch. In what respects, does it differ
       from a tilting level?   (8M)
    b) What are various problems in leveling? How would you circumvent them?   (6M)

UNIT – III

5. a) Explain about fundamental lines in vernier theodolite?   (6M)
    b) Explain how you would measure with a theodolite, how to measure vertical angles?
                                                                                     (8M)

(OR)

6. a) Explain about errors in Theodolite surveying?   (8M)
    b) Can you use a theodolite as a leveling instrument? If so, how?   (6M)

UNIT – IV

7. a) Define the term 'latitude' and 'departure'. How would you determine them for a line? Differentiate between the consecutive coordinates and independent coordinates? (8M)
    b) Write short notes on (6M)
    (i) Selection of traverse stations   (ii) Marking of stations   (iii) Station signals

(OR)

8. a) Explain about Checks in a open traverse (6M)
    b) Explain briefly about permanent adjustments of a vernier theodolite? (8M)

UNIT – V

9. How would you determine the difference in elevations of the instrument station and the top of a chimney, if the base of the chimney is   (a) Accessible and   (b) Inaccessible   (14M)

(OR)

10. a) Explain briefly about Relationship between Radius and Degree of curve? (2M)
    b) Discuss various methods of setting out a horizontal curve with tape? (12M)

2 of 2

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AR16

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(An Autonomous Institution)
II B.Tech I Semester Supplementary Examinations, December- 2017

ELECTRICAL CIRCUIT ANALYSIS
(Electrical and Electronic Engineering)

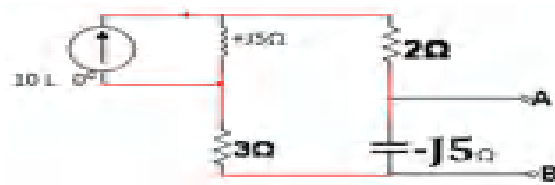**TIME: 3 HOURS**   **MAX. MARKS: 70**

Answer one question from each unit
All questions carry equal marks
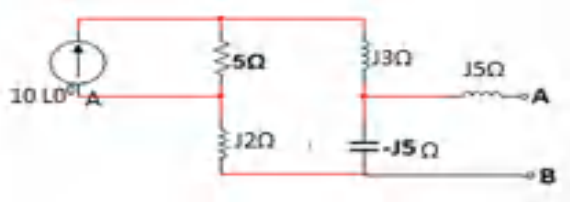All parts of the question must be answered at one place

UNIT-1

1. a) State and explain super position theorem with an Example.   [6M]
   b) Obtain Thevenin's equalent network for the below fig.   [8M]

(OR)

2. a) State and Explain Reciprocity theorem with example.   [5M]
    b) Obtain Norton's equalent network for the below fig.   [9M]

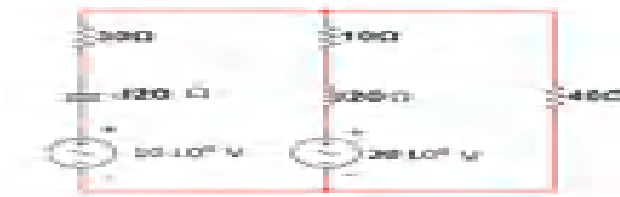## UNIT-II

3. a) State and explain maximum power transfer theorem with an example.   [5M]
    b) Find the impedance Z_L, so that maximum power can be transferred to it in the network of below fig. Find the maximum power.   [9M]
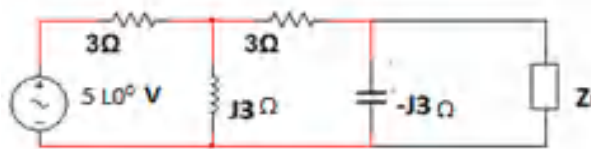
(OR)

4. a) State and explain compensation theorem with example.   [4M]
    b) Find the current through the 40 ohms resistor using millman's theorem. [10M]

UNIT-III

5. a) Determine the open circuit impedance parameters of a two port network.   [8M]
    b) Briefly explain parallel connection of two port network with neat diagram. [6M]

(OR)

6. a) Determine the short circuit admittance parameters of a two port network.   [8M]

b) With necessary expressions, explain inverse transmission parameters of two port network.   [6M]

UNIT-IV

7. a) Explain DC transient response of series R-C circuit with necessary expressions.
                                                            [8M]

b) With neat diagram, obtain the response of R-L circuit for pulse input.   [6M]

(OR)

8. a) Explain sinusoidal transient response of series R-L-C circuit with necessary expressions.   [8M]

b) With neat diagram obtain the response of R-C circuit for pulse input.   [6M]

UNIT-V

9. a) Check whether the following function is Hurwitz or Not. P(S)= $S^4+7s^3+6S^2+21S+8$.   [8M]

b) Test whether $F(S) = \dfrac{S^2 + S + 6}{S^2 + S + 1}$ is a positive real function.   [6M]

(OR)

10. Realise the Foster and cauer forms of the impedance function $Z(S) = \dfrac{(S+1)(S+3)}{S(S+2)}$.

                                                                    [14M]

AR16

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Supplementary Examinations, December- 2017
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   A mass of 1.5 kg of air is compressed in a quasi - static process from 0.1 MPa to 0.7 MPa for which pv= constant. The initial density of air is 1.16 kg/m^3. Find the work done by the piston to compress the air.   7M

   b   Explain the working of Constant Volume gas thermometer with a neat sketch.   7M

(OR)

2. a   What is thermodynamic system? Explain different types of thermodynamic systems   7M

   b   A stationary mass of gas is compressed without friction from an initial state of 0.3m^3 and 0.105 MPa to a final state of 0.15 m^3 and 0.105 MPa, the pressure remaining constant during the process. There is a transfer of 37.6 kJ of heat from the gas during the process. How much does the internal energy of the gas change?   7M

UNIT-II

3. a   What are the limitations of first law of thermodynamics   5M

   b   A heat engine receives reversibly 420 kJ/cycle of heat from a source of 327^{0}C and rejects heat reversibly to sink at 27^{0}C. There are no other heat transfers. For each of three hypothetical amounts of heat rejected, in (i), (ii), and (iii) below, compute the cyclic integral of dQ/T. From these results show which case is irreversible, which reversible, and which is impossible   9M

     (i) 210 kJ/ cycle rejected, (ii) 105 kJ /cycle rejected,
     (iii) 315 kJ/ cycle rejected

(OR)

4. a   Show that entropy is a property of a system.   7M

   b   Establish the equivalence of Kelvin-Planck and Clausius statements.   7M

UNIT-III

5. a What do you understand by high grade energy and low grade energy   5M

   b A rigid vessel of volume 0.86 m^3 contains 1 kg of seam at a pressure of 2 bar. Evaluate the specific volume, temperature, dryness fraction, internal energy, enthalpy and entropy of steam.   9M

(OR)

6. a What is available energy referred to cycle?   5M

   b A vessel of 0.04 m^3 contains a mixture of saturated water and saturated steam at a temperature of 250^{0}C. The mass of liquid present is 9 kg. Find the pressure, the mass, the specific volume, the enthalpy, and the entropy.   9M

UNIT-IV

7. a Show that for an ideal gas, the slope of the constant volume line on T-s diagram is more than that of constant pressure line.   7M

   b A mixture of ideal gases consists of 3 kg of Nitrogen and 5 kg of carbon dioxide at a pressure of 300 kPa and a temperature of 20^{0}C. Find (a) the mole fraction of each constituent (b) equivalent molecular weight of the mixture (c) the partial pressures.   7M

(OR)

8. a State and prove Avogadro's law of additive volumes.   7M

   b What is the mass of air contained in a room 6 m * 9 m *4 m if the pressure is 101.325 kPa and the temperature is 25^{0}C?   7M

UNIT-V

9. a Derive the expression for air standard efficiency of diesel cycle with P-v and T-s diagrams.   9M

   b Mention the assumptions involved in analysis air standard cycle   5M

(OR)

10. a An engine working on the Otto Cycle is supplied with air at 0.1Mpa, 35^{0}C. The compression ratio is 8. Heat supplied is 2100 kJ/kg. Calculate the maximum pressure and temperature of the cycle, the cycle efficiency, and mean effective pressure   9M

   b For the same compression ratio and heat rejection compare Otto, duel and diesel cycle by using P-v and T-s diagrams.   5M

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AR16

Code: 16EC2006   Set-2

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Supplementary Examinations, December- 2017

ELECTRONIC CIRCUITS - I
(Electronics and Communication Engineering)

Time: 3 hours   Max. Marks: 70M

Answer ONE Question from each unit

All Question Carry Equal Marks

All parts of the Question must be answered at one place

UNIT - I

1.a	Explain the Bridge rectifier with neat sketch	6M
b	Compare half-wave, full-wave and bridge rectifiers.	8M

(OR)

2.a	Derive the expression for ripple factor in a FWR using an induction filter.	7M
b	A bridge rectifier uses four identical diodes having forward resistance of 50Ω each. Transformer secondary resistance is 50Ω and the secondary voltage is 30V(rms). Determine the dc output voltage for $R_L=1\Omega$ and value of the output ripple voltage.	7M

UNIT-II

3.a	In transistor self bias arrangement the circuit component values are $V_{CC} = 12V$, $R_C = 4.7K\Omega$, $R_1 = 27K\Omega$, $R_2 = 2.7K\Omega$, $R_E = 270\Omega$ and $\beta = 50$. Find the stability factor.	6M
b	Describe various methods used for transistor biasing. State their advantages and disadvantages.	8M

(OR)

4.a	Explain the following bias compensation techniques. (i) Thermistor compensation (ii) Senister Compensation.	7M
b	Explain voltage divider bias with neat sketch	7M

UNIT-III

5.a	Draw the h-parameter equivalent circuits for the transistor amplifiers in the three configurations.	7M
b	Draw the circuit of an emitter follower and derive the expressions for A_I, A_V, R_I and R_O in terms of CE parameters.	7M

(OR)

6.a Explain about H- parameters   6M

b For a CE amplifier, if a load $R_L = 1K\Omega$ is connected and $h_{ie} = 1K\Omega$, $h_{fe} = 50$, $h_{re} = 2x10^{-4}$, $h_{oe} = 25\mu A/V$, then calculate A_I, A_V, and R_I using exact analysis.   8M

UNIT-IV

7.a Derive the expressions for A_I, A_V, R_I and R_O for common emitter amplifier with unbypassed R_E.   8M

b State and prove Miller's theorem. Explain its significance in transistor circuit analysis.   6M

(OR)

8.a Draw the small signal model of common drain amplifier using JFET and derive the expression for A_V.   7M

b Sketch the common source amplifier using JFET and draw its equivalent circuit. Derive the expression for voltage gain.   7M

UNIT-V

9.a Draw the circuit of voltage shunt feedback amplifier and derive the expression for R_{if}, R_{of}, A_{vf} and A_{if}.   8M

b Calculate the voltage gain, input impedance, output impedance of voltage series feedback amplifier having A= -200, $R_i = 2.7K\Omega$, $R_o = 57K\Omega$ and $\beta = -1/50$.   6M

(OR)

10.a Compare and contrast the four topologies of a feedback amplifier with respect to their characteristics and advantages.   6M

b An amplifier has voltage gain with feedback is 100. If the gain without feedback changes by 30% and the gain with feedback should not vary by more than 5%, determine the values of open loop gain and the feedback ratio β.   8M

AR16

Code: 16EC2011   Set-II

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Supplementary Examinations, December- 2017

DIGITAL LOGIC DESIGN
(Common to CSE & IT)

Time: 3 hours   Max. Marks: 70M

Answer ONE Question from each unit

All Question Carry Equal Marks

All parts of the Question must be answered at one place

UNIT - I

1.a Find the 10's complement of $(9578)_{BCD}$.   6M

  b Convert the following into binary: 8M
     (i) $(7FE9)_{16} = (\ )_2$ (ii) $(63.575)_{10} = (\ )_2$

(OR)

2.a Write the logic symbol, expression and truth tables for OR, AND, NAND, NOR, EX-NOR   10M
     and EX-OR gates

  b Simplify the Boolean algebraic expression $(AB + C + B)(\overline{C} + D)(\overline{C} + D + E))$ 4M

UNIT-II

3.a Simplify the following function $F(A,B,C,D) = (A + B + C)(A + \overline{B} + C)(A + \overline{B} + \overline{C})(\overline{A} + B + C)$ 6M

  b Simply the switching function $F(A,B,C,D) = \sum(0,5,7,8,9,10,11,14,15) + \phi(1,4,13)$ 8M
     using Karnaugh map

(OR)

4.a Design a full adder circuit using AND and OR gates.   7M

  b Implement full subtractor using two half subtractors and justify the answer.   7M

UNIT-III

5.a Design even parity generator circuit for 4 bit input using multiplexer.   7M

  b Implement 1:16 Demultiplexer using 1:4 Demultiplexer.   7M

(OR)

6.a Design and implement a two bit comparator using logic gates.   7M

 b Implement the full subtractor circuit using Demultiplexer.   7M

UNIT-IV

7.a Write the PLA programming table and implement $A(x,y,z) = \sum m(1,2,4,6)$;   8M
     $B(x,y,z) = \sum m(0,1,6,7)$

 b Explain about logic construction of 64 x 4 PROM.   6M

(OR)

8.a Realize the following functions using PAL and draw the logic diagram using PAL.   7M
     $F(A,B,C,D) = \sum m(3,5,6,7,8,11,13,14,15)$ and $G(A,B,C) = \sum m(0,1,5,6,8,9,11,13,14)$

 b Design a 3-bit binary to gray code converter using a suitable PLA.   7M

UNIT-V

9.a Draw the logic diagram and write function table of SR latch using NAND gates. Explain   7M
     the operation.

 b Design a mod-10 counter using JK flip-flops.   7M

(OR)

10.a Draw the logic diagram of JK flip-flop using excitation table and explain its operation.   7M

 b Design a 4-bit serial in and parallel out shift register.   7M

Code: 13CE2002
ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Supplementary Examinations, December- 2017
SURVEYING
(Civil Engineering)

Time: 3 hours $\hspace{8cm}$ **Max. Marks: 70**

PART – A

Answer all Questions $\hspace{7cm}$ **[10X1=10M]**

1. a) What is the purpose of optical square?
   b) Mention two instruments for measurement of angles.
   c) The reduced bearing of a survey line SΘE. what is the W.C.B
   d) What is deflection angle?
   e) What do you understand by fly leveling?
   f) What is bench mark? List different types of bench marks.
   g) Distinguish between a valley line and ridge line in contouring.
   h) Define terms true and magnetic bearing..
   i) Define fore bearing
   j) What is sag correction of a tape?

PART – B

Answer one question from each unit $\hspace{5cm}$ **[5 x 12 = 60 M]**

UNIT-I

2. a) What are objectives of surveying? Explain the principle of surveying? $\hspace{1cm}$ [6M]
   b) Describe the different types of chains used in survey indicating the relative advantages of each $\hspace{8cm}$ [6M]

(OR)

3 .a). Explain Indirect Ranging $\hspace{8cm}$ [6M]
   b) The bearings of the sides of the traverse ABCDEA are given below. Sketch and compute the interior angles of the traverse $\hspace{5cm}$ [6M]

Line	F.B	B.B
AB	$142^0 30'$	$322^0 30'$
BC	$223^0 15'$	$44^0 15'$
CD	$287^0 00'$	$107^0 45'$
DE	$12^0 45'$	$193^0 15'$
EA	$60^0 00'$	$239^0 00'$

UNIT-II

4 a) What is profile levelling? Describe the procedure for conducting profile leveling of a proposed highway. $\hspace{6cm}$ [6M]
   b) The group of figures below refers to staff readings taken with a level from instrument stations A, B, C, D and E. The first and last readings in each group are the backsights and foresights resp. The backsight from station A was taken with the staff held on a B.M at

200.00m.
A 2.5757, 0.865, 0.890, 0.415
B 1.650, 1.430, 0.610
C 1.000, 1.590, 1.115
D 2.430, 3.485, 3.780, 2.785   [6M]
E 2.630, 2.100, 2.290
Book the readings by the rise and fall method, and determine the R.L of each station.

(OR)

5. a) Discuss the uses of contour maps with sketches   [6M]
   b) What are the characteristic features of contours? Explain how you do these adjustments?
                                                        [6M]

UNIT-III

6. a) Describe the procedure of measuring horizontal angles by Reiteration and Repetition
   methods.   [6M]
   b) Explain temporary adjustments in theodolite.   [6M]

(OR)

7. a) Explain principle of EDM   [6M]
   b). Explain direct method of theodolite traversing without transiting   [6M]

UNIT-IV

8. The following were taken from a chain line to a boundary line

Distance (m)	0	8	16	24	32	40	48	56
Offsets (m)	2.8	3.2	3.6	3	2.9	2.4	2.1	1.8

Calculate the area enclosed between the chain and boundary line by using trapezoidal rule and Simpsons rule.   [12M]

(OR)

9. From a contour plan of proposed reservoir area the following data were found

Contour (m)	150	155	160	165	170	175
Area (hectares)	2	7	11	14	22	28

Determine (a) Capacity of reservoir if FRL is 175m and
         (b) The elevation of water surface when the reservoir is at its half capacity. The volume below the counter of 150 may be ignored.   [12M]

UNIT – V

10. List the various methods of setting out a simple curve .Explain briefly any two methods.
                                                     [12M]

(OR)

11. Two tangents intersecting at chainage 1190m. The deflection angle being 36º. Calculate all the data necessary for setting out a curve with a radius of 300m by the deflection angle method. The Peg interval is 30m.   [12M]

AR 13

Code:13EE2004   **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Supplementary Examinations, December- 2017

ELECTRICAL CIRCUIT ANALYSIS – I
(Electrical and Electronics Engineering)

Time:3 Hours   **Max Marks:70**
Answer all Questions   **[1 x 10=10M]**

PART – A

1) (a) Define "KCL"
(b) What is Super Mesh?
(c) Define Q-factor
(d) What is the condition for reciprocity for Z and Y parameters?
(e) What are Hybrid Parameters?
(f) What is the phase angle of a series RLC circuit at resonance?
(g) What will be the impedance of an ideal parallel resonant circuit without resistance in either branch?
(h) Three Equal resistance of 3 ohms are connected in star. What is the resistance in one of the arms in an equivalent delta circuit?
(i) State reciprocity theorem
(j) Six light bulbs are connected in parallel across 110 V. Each bulb is related at 75 W. How much current flows through the bulb?

PART B

Answer one Question from each unit   **[5 x 12=60M]**
UNIT 1

2(a) Determine the current in the 5 ohms resistor in the given circuit Using mesh analysis
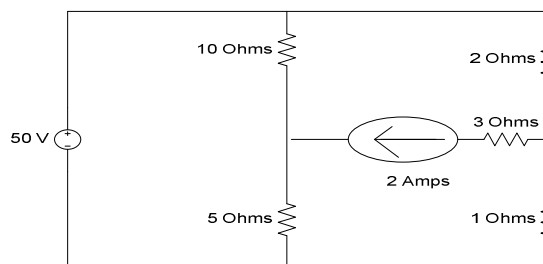
2(b) Determine the voltage at each node for the given circuit
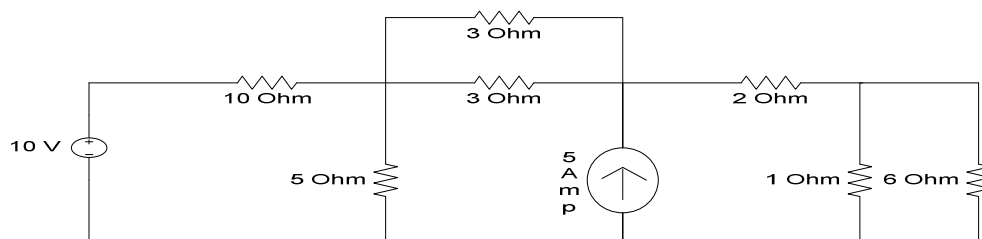
AR 13

(OR)

3 (a) in a circuit RLC Series where R = 10 Ohms, L = 0.1 Henry and C= 50 Micro Faradays' is connected to source of 100 Vrms, determine the frequency at which the circuit resonates. Also find the voltage across the inductor at resonance and Q factor of the circuit

(b) Plot locus of the current. mark the range of I from Minimum to Maximum values of R and the maximum power consumed in a given RL Series Circuit where R = 50 Ohms and Xl = 25 Ohms , the voltage given to the circuit is 200 V , 50 Hz

UNIT II

4(a) Describe the rules and procedure to construct a dual network and show with an example
 (b) For a given circuit find the current passing through the 5 ohms resistor by using nodal method
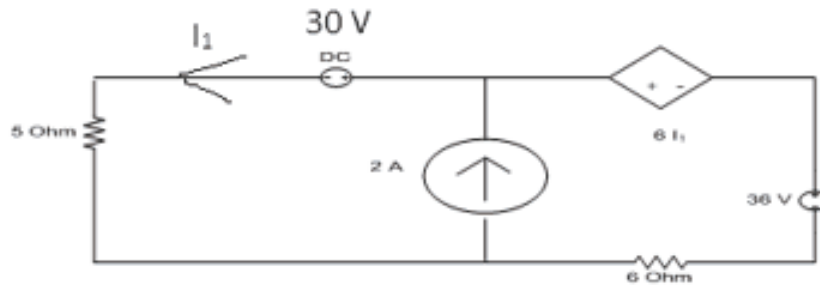
(OR)

5(a) Obtain the fundamental Cut – Set Matrix Q for the graph
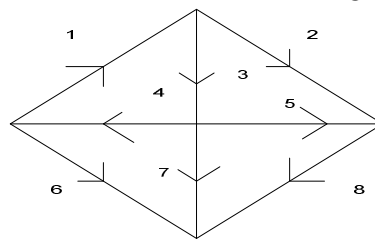
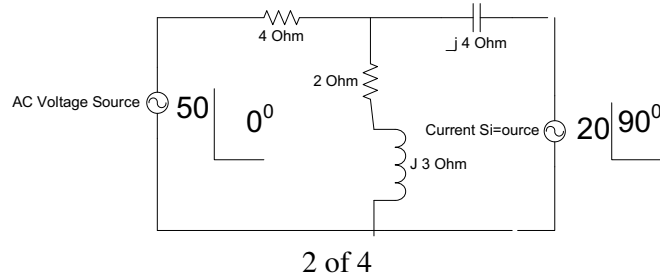(b) Explain the properties of Incidence Matrix A
UNIT III

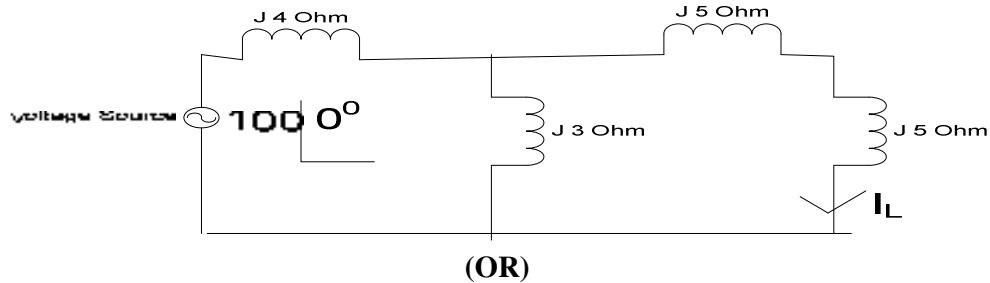6(a) for a given circuit determine the current in (2+j3) ohms by using the super position theorem
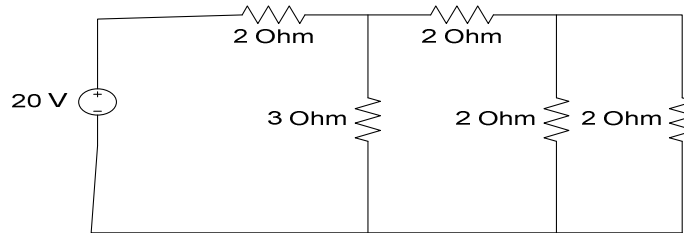
AR 13

SET-2

(b) for the given circuit determine load current by applying thevenins theorem

(OR)

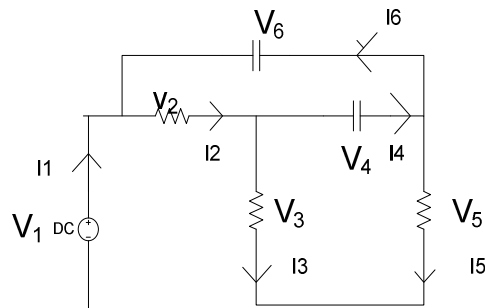7(a) State and Explain Norton's theorem and verify with example

(b) Verify the reciprocity theorem for the given network

UNIT-IV

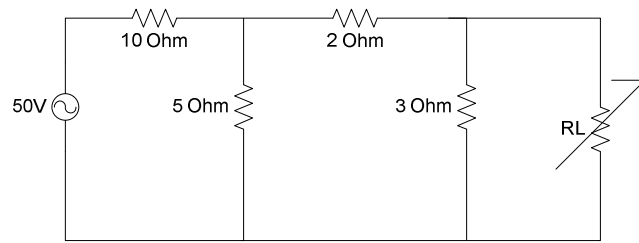8(a) State and Explain the compensation theorem

(b) Verify Tellengens theorem for the given network in the given question $V_1 = 4$, $V_2 = 2$, $V_3 = 2$, $V_4 = 3$, $V_5 = -1$, $V_6 = -5$ volts and Currents $I_1 = 2$, $I_2 = 2$, $I_3 = 4$, $I_4 = -2$, $I_5 = -6$ $I_6 = 4$ Amps

(OR)

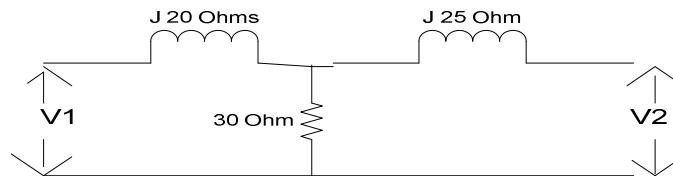9(a) State and Explain Millimans theorem with an example

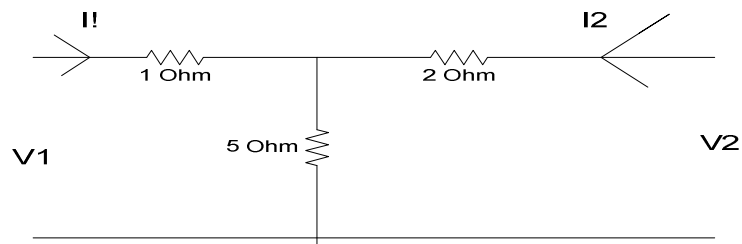(b) Determine the maximum power delivered to the load in the given circuit

AR 13

UNIT- V

10(a) Determine Y parameters of the given circuit

(b) Find transmission line parameters for the given circuit

(OR)

11(a) Express the interrelation between Z and Y parameters and vice versa

(b) Express the interrelation ABCD parameters interms of Z and Y Parameters

CODE: 13ME2007   **SET-2**
ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Supplementary Examinations, December- 2017
THERMODYNAMICS
(Mechanical Engineering)

Time: 3 Hours   Max Marks: 70

PART-A
ANSWER ALL QUESTIONS   **[1 x 10 = 10 M]**

1. (a) What are the points of similarity between heat and work?
    (b) Define thermodynamic process?
    (c) What is flow energy or flow work?
    (d) Define thermal efficiency of a heat engine?
    (e) Define Gibbs function?
    (f) What is meant by sublimation?
    (g) Define mole fraction?
    (h) Define degree of saturation?
    (i) How is the mean effective pressure (MEP) for reciprocating engines defined?
    (j) What are four processes makeup the idle otto cycle?

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

2. (a) Explain the term mechanical equivalent of heat?   [4 M]

    (b) A piston cylinder device initially contains 0.4 m^3 of air at 100kPa and 80^0C. The air is now compressed to 0.1 m^3 in such a way that the temperature inside the cylinder remains constant. Determine the work done during this process?   [8 M]

(OR)

3. (a) What is the concept of continuum?   [4 M]

    (b) A fluid is contained in a cylinder by a spring loaded frictionless piston so that the pressure in the fluid is a linear function of the volume(p=a+bv). The internal energy of the fluid is given by equation, U=34+3.15PV(U is in kJ,P is in kPa & V is in m^3);if the fluid changes from initial state of 170 kPa ,0.03 m^3 to a final state of 400 KPa,0.06 m^3,with no work other than that done on the piston, find the direction and magnitude of work and heat transfer ?   [8 M]

UNIT-II

4. (a) What is the function of the nozzle, explain with neat sketch ?   [4 M]

   (b) A nozzle is a device for increasing the velocity of a steadily flowing stream. At inlet to a certain nozzle, the fluid parameters are enthalpy = 2850 kJ/kg, velocity = 50 m/s, area = 0.1 m^2 and specific volume = 0.18 m^3 / kg. At the discharge end the enthalpy is 2650 kJ/kg and the specific volume is 0.49 m^3/kg. make calculations for the exit velocity and mass flow rate of the nozzle.   [8 M]

(OR)

5. (a) Show that the C.O.P of a heat pump is greater than the C.O.P of a refrigerator by unity?   [4 M]

   (b) A reversible heat engine operates between two reservoirs at temperatures of 600^0C & 40^0C. The engine drives a reversible refrigerator which operates between reservoirs at temperatures 40^0C & -20^0C. The heat transferred to the heat engine 2000kJ and the work output of the combined engine refrigerator plant is 360kJ, then evaluate the net heat transfer to the reservoir at 40^0C?   [8 M]

UNIT-III

6.   2kg of steam, initially at a pressure of 15bar and a temperature of 250^0C expands reversibly and polytropically to 1.5bar. Find the final temperature, work done, heat transferred and change of entropy, if the index of expansion is 1.25?   (use steam tables)   [12M]

(OR)

7.   a) Explain the concept of availability?   [3 M]

     b) Calculate the decrease in available energy when 25 kg of water at 95^0C mix with 35 kg of water at 35^0C. The pressure being taken as constant and the temperature of the surrounding being 15^0C? (CP of water= 4.2 kJ/kgK)   [9 M]

UNIT-IV

8.   a) Explain Vander'waals equation of state?   [4 M]

     b) The readings from a sling psychrometer as follows:

       DBT= 30^0C, WBT=20^0C, barometer reading=740mm of Hg
       Using steam tables determine i) Dew point temperature
       ii) Relative humidity   iii) Degree of saturation?   [8 M]

CODE: 13ME2007   **SET-2**

(OR)

9.   a) Define the terms Mass Fraction?   [2 M]

b) Consider a gas mixture that consists of 3kg of O_2, 5kg of N_2 and 12kg of CH_4 in a closed cylinder. Determine the mass fraction of each component and mole fraction of each component?   [10M]

UNIT-V

10. An engine working on Otto cycle is supplied with air at 0.1 MPa, 35^0C. The compression ratio is 8. Heat supplied is 2100 KJ/Kg. Calculate the maximum pressure and temperature of the cycle, the cycle efficiency & the MEP? (for air C_P=1.005kJ/kg K, C_V=0.718kJ/kgK and R=0.287 kJ/kgK)   [12 M]

(OR)

11. An air standard dual cycle has a compression ratio 16, and compression begins at 1 bar, 50^0C. The maximum pressure is 70 bar. The heat transferred to air at constant pressure is equal to that at constant volume. Estimate

i) The pressure & temperature at the cardinal points of
   the cycle.   ii) The cycle efficiency

iii) MEP (for air C_P=1.005kJ/kg K, C_V=0.718kJ/kgK and R=0.287
   kJ/kgK)   [12 M]

AR13

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) Define the term ripple factor.
   b) What is the difference between line and load regulation?
   c) Define the terms S and S'
   d) Draw the fixed bias circuit of a transistor.
   e) Express h_{rc} in terms of h_{re}
   f) What are the typical values of h_{fe} and h_{re}
   g) Give any two characteristics of a CE amplifier
   h) Draw the small signal model of JFET
   i) What is the difference between h-parameter model and hybrid-π model?
   j) Define β-cutoff frequency.

PART-B

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

UNIT-I

2. a) Explain bridge rectifier with neat sketch   6M
   b) Draw and explain the L-section filter   6M

(OR)

3. a) Explain about π-section and multiple π-section filters.   6M
   b) Draw the circuit diagram of zener diode shunt voltage 6M
   regulator and explain its working?

UNIT-II

4. a) Draw a voltage divider biasing circuit and derive the   6M
   expression for stability factor.
   b) Explain base bias method   6M

(OR)

5. a) How will you provide temperature compensation for the variation of V_{BE} and stabilisation of the operating point?   6M

   b) Draw and explain the self bias circuit of a JFET.   6M

UNIT-III

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

(OR)

7. a) Express the CC h-parameters in terms of CE h-parameters.   6M

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

UNIT-IV

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

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

(OR)

9. a) Determine the voltage gain and input resistance of CB 6M amplifier using approximate hybrid model

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

UNIT-V

10. a) Draw the hybrid-π model of a CE transistor and derive the 6M expression for $r_{b'e}$ and $r_{bb'}$

    b) Explain how hybrid-π parameters are varies with respect to 6M I_c and T

(OR)

11. a) Define f_β and f_T and derive the relation between f_β and f_T.   6M

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

AR13

CODE: 13EC2006   **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Supplementary Examinations, December- 2017

DIGITAL LOGIC DESIGN
(Common to CSE and IT)

Time: 3 Hours   Max Marks: 70

PART – A

Answer all questions   [10 x1=10M]

1. a) $(1762.46)_8 = ( )_{16} = ( )_{10}$

    b) Express $(1324)_{10} = ( )_2 = ( )_{Gray\ code}$.

    c) What is a don't care combination.

    d) What is meant by encoder?

    e) Draw the truth table of Half adder.

    f) What is the difference b/w multiplexes & de-Multiplexes

    g) What is a PLA

    h) What is a latch.

    i) What do you mean by race around condition?

    j) Give the excitation table for SR flip-flop?

PART-B

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

UNIT-I

2. (a) Convert the following number with indicated bases to decimal   [3×2=6]
        i. $(231.23)_4 =$
        ii. $(C\ 5\ B)_{16} =$
        iii. $(614.15)_7 =$

  (b) Obtain the 1's and 2's complements of the following binary numbers   [3×2=6]
        i. 1 0 1 1 1 0 0 0 1 =
        ii. 1 1 0 1 0 1 1 1 =
        iii. 0 1 0 1 0 0 1 0 =

(OR)

3. (a) Simplify the following Boolean expression to a minimum number of literals.
        i. x'y'+xy+x'y

        ii. xy'+y'z'+x'z'

        iii. x'+xy+xz'+xy'z'   [6]

  (b) Express the following function in sum of Minterms and product of Maxterms.   [6]
        F(A, B, C, D) = C + AD + BD

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UNIT-II

4. Simplify the following Boolean expressions using K-map and implement them using NOR gates:
(a) F (A, B, C, D) = AB'C' + AC + A'CD'
(b) F (W, X, Y, Z) = W'X'Y'Z' + WXY'Z' + W'X'YZ + WXYZ.   [12]

(OR)

5 (a) Explain carry propagation in parallel adder with a neat diagram.   [6]

   (b) Design Full adder with Two Half adders.   [6]

UNIT-III

6. (a) Design 16-to-1-multiplexer by using Two 8-to-1 Multiplexers?   [6]

   (b) What is a decoder? Construct Design 2X4 decoder using NAND gates   [6]

(OR)

7.a) Draw a neat logic circuit of 3-bit comparator and explain.   [6]

   b) What is an encoder? Design octal to binary encoder?   [6]

UNIT-IV

8. a) Draw the PAL circuit to implement the logic function $AB^1+A^1BC+ AC^1$ and $A^1B {}^1C {}^1 +BC+AB$?
   b) Draw a neat figure and explain PLA?   [6 +6]

(OR)

9.a) Implement the following Boolean functions using PROM.   [8]
   P(A,B,C,D) = $\sum$m(0,2,6,7,8,9,12,13)
   Q (A,B,C,D) = $\sum$m(0,2,6,7,8,9,12,13,14)
   R (A,B,C,D) = $\sum$m(2,3,8,9,10,12,13)
   S (A,B,C,D) = $\sum$m(1,3,4,6,9,12,14)

 b) Explain the features of PAL.   [4]

UNIT-V

10. a)Design a 4 bit down counter using 'T' flip flop.   [6]
    b) Design a 4 bit serial in and serial out shift register and operation?   [6]
(OR)

11. (a) Convert SR flip-flop into D flip-flop?   [6]
    (b) Design a Mod-8 synchronous counter using J-K flip flops.   [6]