CODE: 16CE2004 **AR16** **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMUS)
II B.Tech I Semester Regular Examinations, October, 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) Enlist the step to be taken to minimize errors in surveying. (8M)
   b) What are the qualities of a good surveyor? Describe briefly the various duties of a Surveyor? (6M)

(OR)

2. a) Find which stations are affected by local attraction. Work out correct bearings of the lines of a closed traverse ABCDEA

Line	FB	BB
AB	195^0 30’	17^0 0’
BC	73^0 30’	250^0 30’
CD	36^0 15’	214^0 30’
DE	266^0 45’	84^0 45’
EA	234^0 15’	57^0 0’

(8M)
   b) Discuss various types of random errors in taping. (6M)

UNIT – II

3. a) What is cross sectioning? What is its importance? How would you draw a longitudinal section and cross-section? (6M)
   b) The following consecutive readings were taken with a dumpy level and a 4 m leveling staff on continuously sloping ground at 20 m intervals, 0.680, 1.455, 1.855, 2.330, 2.885, 3.380, 1.055, 1.860, 2.265, 3.540, 0.835, 0.945, 1.530, 2.250
   The R.L of the starting point was 50.760

(i) Rule out a page of level book and enter the readings. ii) Carry out reductions of heights by collimation method iii) Apply the arithmetic checks and determine the gradients of the line joining the first and last point (8M)

(OR)

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

UNIT – III

5. a) Draw a neat sketch of a transit theodolite, and explain the functions of various parts? (10M)
   b) Explain about subtense bar method with neat sketch? (4M)

(OR)

6. a) Can you use a theodolite as a leveling instrument? If so, how? (7M)
   b) Determination of constants k and C (7M)

UNIT – IV

7. What are the various methods of adjustments of a closed traverse? Describe briefly. (14M)

(OR)

8. a) Explain about Checks in a closed traverse (4M)
   b) Write about the plotting of Traverse survey with neat diagram? (10M)

UNIT – V

9. a) Write the procedure to determine the height of the object when base is inaccessible by trigonometric method using theodolite? (10M)
   b) What is indirect leveling? What are the advantages and disadvantages of indirect leveling over direct leveling? (4M)

(OR)

10. a) Discuss various methods of setting out a horizontal curve with tape? (12M)
    b) What are the different types of horizontal circular curves with diagrams? (2M)

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AR16

CODE: 16EE2008 **SET-1**

zADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(An Autonomous Institution)

II B.Tech I SEMESTER REGULAR EXAMINATIONS, OCTOBER 2017

ELECTRICAL CIRCUIT ANALYSIS

(Electrical and Electronics Engineering)

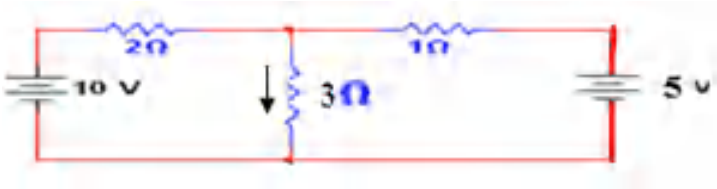
TIME: 3 HOURS **MAX. MARKS: 70**

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

UNIT-1

1. a) Explain the Thevenin's theorem with example. [5M]

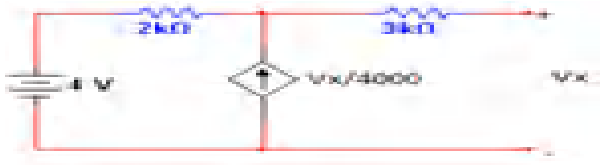
   b) Use super position principle to determine value of I in 3 Ω [9M]



(OR)

2. a) Explain the Norton's theorem with example. [6M]

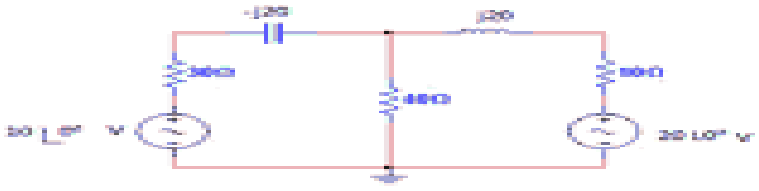
   b) Determine the Thevenin's equalent circuit for the below network. [8M]



UNIT-II

3. a) Explain Tellegen's theorem with example. [5M]

   b) Find the current " I " in the network using millman's theorem. [9M]



(OR)

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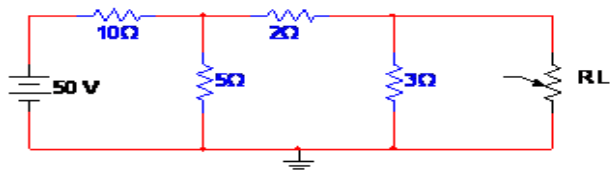
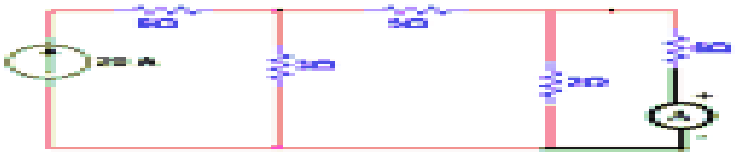
CODE: 16EE2008 **SET-1**

4. a) Determine the maximum power delivered to the load in the circuit shown below. [7M]



b) Using the compensation theorem, Determine the ammeter reading where it is connected to the 6 ohms resistor as shown below. The internal resistance of the ammeter is 2 ohms. [7M]



UNIT-III

5. a) Briefly explain series connection of two port networks with neat diagram &necessary expressions. [6M]

b) Give the relation between Y-parameters and Z-parameters (Y-parameters in terms of Z-parameters). [8M]

(OR)

6. a) Explain the transmission parameters of two port network with necessary equations and give example. [8M]

b) Give the relationship between Z-parameters and h-parameters (Z-parameters in terms of h-parameters). [6M]

UNIT-IV

7. a) Explain DC transient response (voltage and current response) of series RL circuit with necessary equations. [7M]

b) Obtain sinusoidal transient response of series RL circuit with necessary expressions. [7M]

(OR)

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

b) Obtain sinusoidal transient response of series R-C circuit with necessary expressions. [7M]

CODE: 16EE2008 **SET-1**

UNIT-V

9. a) What is Hurwitz polynomials? And give the properties of Hurwitz polynomial's. [4M]

b) Find the cauer forms of the RL impedance function Z(s) = $\frac{2(S+1)(S+3)}{(S+2)(S+6)}$. [10M]

(OR)

10. a) What is positive real function ?Write the properties of positive real function. [4M]

b) Realize the following RL impedance function in Foster-I and Foster-II forms. [10M]

$$Z(S) = \frac{2(S+1)(S+3)}{(S+2)(S+6)}$$

Code No: 16ME2007 **AR 16** **SET-II**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech., I Semester Regular Examinations, October-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 Questions must be answered at one place

UNIT-I

1. a) Explain macroscopic and microscopic approach of thermodynamics.
   b) Explain Zeroth law of thermodynamics

(OR)

2. a) State and explain first law of thermodynamics applied to a process and to a cycle.
   b) A gas undergoes a thermodynamic cycle consisting of the following processes -process 1-2: constant pressure p=1.4 bar, $V_1 = 0.028\ m^3$,W_{12}=10.5 kJ,
   - process 2-3: compression with PV = constant, U3=U2,
   -process 3-1: constant volume, U1-U3 = -26.4 kJ. There are no significant changes in K.E and P.E. (i) sketch the cycle on a P-V diagram. (ii) Calculate the net work for the cycle in kJ. (iii) Calculate the heat transfer for process 1-2
   (iv) show that ΣQcycle =ΣWcycle.

UNIT-II

3. a) Derive the steady flow energy equation for a simple steady flow process and apply it to a steam turbine.
   b) 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, 600kPa, and 16m/s. the inlet is 32 m above the floor and the discharge pipe is at floor level. The discharge conditions are 0.62 m^3 /kg, 100kPa, and 270 m/s. The total heat loss between inlet and discharge is 9 kJ/kg of fluid. In this flow determine specific internal energy increases or decreases, and by how much.

(OR)

4. a) Explain the principle of increase of entropy with examples
   b) A fluid undergoes a reversible adiabatic compression from 0.5 MPa, 0.2 m^3 to 0.05 m^3 according to the law $pv^{1.3}$=const. Determine the change of enthalpy, internal energy, entropy, the heat transfer and work transfer during the process

UNIT-III

5. a) Derive Maxwll's relations
   b) A pipe carries a stream of a liquid with a mass flow rate of 5 kg/s. Because of poor insulation the liquid temperature increases from 250 K at the pipe inlet to 253 K at the exit. Neglecting pressure losses, calculate the irreversibility rate associated with the heat leakage. Take T_0 as 293 K and specific heat for the liquid as 2.85 kJ/kg K.

(OR)

6. a) What is P-V-T surface? Explain its salient features.
   b) A large insulated vessel is divided in to two chambers, one containing 5 kg of dry saturated steam at 0.2 MPa and the other 10 kg of steam, 0.8 quality at 0.5 MPa. If the partition between the chambers is removed and the steam is mixed thoroughly and allowed to settle, find the final pressure, steam quality, and entropy change in the process.

UNIT-IV

7. a) One kg of CO_2 has a volume of 1 m^3 at 100°C. Compute the pressure by i) perfect gas equation ii) Vander Wall's equation. The Vander Wall's constants a=362850 Nm^4 / $(kg\text{-}mol)^2$ and b=0.0423 m^3 /kg-mol.
   b) A gaseous mixture consists of 1 kg of oxygen and 2 kg of nitrogen at a pressure of 150 kPa and a temperature of 200 °C. Determine the changes in internal energy, enthalpy and entropy when the mixture is heated to a temperature of 100°C, i) at constant volume and ii) at constant pressure

(OR)

8. a) State and prove Daltons law of partial pressures

   b) Atmospheric air at 1.0132 bar has a DBT of 32 °C and a WBT of 26 °C. Compute i) the partial pressure of water vapour, ii) Specific humidity, iii) Dew point temperature, iv) Relative humidity, v) Degree of saturation, vi) Density of air in the mixture

UNIT-V

9. a) Explain the working of Otto Cycle and derive the expression for thermal efficiency

   b) The compression ratio of a Dual cycle is 10. The temperature and pressure at the beginning of the cycle are 1 bar and 27°C. The maximum pressure of the cycle is limited to 70 bar and heat supplied is limited to 675 kJ/kg of air. Find the thermal efficiency of the cycle.

(OR)

10. a) Represent the following cycles on P-V and T-S diagrams

    i) Dual combustion cycle ii) Sterling cycle iii) Atkinson cycle and iv) Lenoir cycle

    b) An air-standard Diesel cycle has a compression ratio of 18, and the heat transferred to the working fluid per cycle is 1800 kJ/kg. At the beginning of the compression stroke, the pressure is 1 bar and the temperature is 300 K. Calculate : (i) Thermal efficiency, (ii) The mean effective pressure

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AR16

Code: 16EC2006 Set-I

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

II B.Tech I - Semester Regular Examinations, October, 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 principle of operation of HWR with and without capacitor filter and draw the waveforms. 6M

b In a FWR using an LC filter, L=10H, C=100μF and R_L=100Ω. Calculate V_{dc} for an input $V=30\sin(100\pi t)$ by choosing $R_f = R_{ch} = 50\Omega$. 8M

(OR)

2.a Draw the circuit diagram of a FW Bridge rectifier. Explain the operation of the circuit with relevant waveforms 6M

b A FWR circuit is fed from a transformer having a center-tapped secondary wiring. The rms voltage from either end of secondary to center tap is 30V. If the diode forward resistance is 5 and that of the secondary is 10 for a load of 900, calculate: 8M

(i) Power delivered to load (ii) % regulation at full load

(iii) Efficiency at full load (iv) TUF of secondary

UNIT-II

3.a A CE transistor amplifier with voltage divider bias circuit having the quiescent point at V_{CE} = 12V, I_C = 1mA and stability factor S≤3 of V_{CC} = 20V, V_{BE}=0.7V, β = 50 and R_C = 4.7KΩ. Determine R_1, R_2 and R_E of the circuit. 7M

b Explain thermal runaway and stabilization techniques. 7M

(OR)

4.a Draw a BJT fixed bias circuit and derive the expression for the stability factor 'S'. 7M

b An NPN transistor with β=50 is used in a common emitter circuit with V_{CC}=10V, R_C=2KΩ. The bias is obtained by connecting a 100KΩ resistance from collector to base. Assume V_{BE}=0.7V. Find (i) the quiescent point and (ii) the stability factor, S. 7M

UNIT-III

5.a	Convert the h-parameters in Common Base configuration to Common Emitter configuration	8M
b	Compare CE, CB and CC configurations.	6M

(OR)

6.a	Given that h_{ie} = 1200Ω, h_{fe} = 35, h_{re} = 0, h_{oe} = 2μA/V, R_s = 500Ω, and R_L = 2KΩ. Calculate the current gain, voltage gain, input impedance and output impedance.	8M
b	What are h-parameters? Why they called so? Define them and list the benefits of h-parameters.	6M

UNIT-IV

7.a	Draw the small signal model of CB amplifier and derive the expressions for voltage gain and current gain.	7M
b	Draw and explain JFET amplifier in CD configuration and derive expressions for voltage gain and output impedance.	7M

(OR)

8.a	Using the approximate h-parameter model, derive the expressions for current gain, input resistance, voltage gain and output admittance using CE h-parameters.	8M
b	Obtain small signal model of a FET. Compare FET model with the h-parameter model of the BJT.	6M

UNIT-V

9.a	A single stage CE amplifier has a voltage gain of 1000 without feedback. When feedback is employed, its gain reduces to 30. Calculate the percentage of the output which is fed back to the input.	7M
b	Draw the voltage series feedback amplifier. Derive the expressions for voltage gain, current gain, input impedance and output impedance.	7M

(OR)

10.a	Explain the concept of negative feedback. Give the advantages and disadvantages of negative feedback amplifier.	7M
b	Derive an expression for input and output resistance of current shunt feedback amplifier.	7M

AR16

Code: 16EC2011 **Set-I**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Regular Examinations, October-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 Encode the following numbers in Gray code and Excess-3 9M

(i) $(3B7)_{16}$ (ii) $(523)_5$ (iii) $(54)_8$

b Describe how signed number is represented in two's complement form. 5M

(OR)

2.a Find the complement of the following: 6M

(i) $F = AB\overline{C} + A\overline{B}C + \overline{A}BC$ (ii) $F = \left(\overline{A}B + \overline{C}D\right)\left(\overline{ABC}\right)$

b Implement the following functions with NAND and NOR gates 8M

(i) $f(a,b,c,d) = a + \overline{b}\left(c + \overline{a}d\right)$ (ii) $f(a,b,c,d) = a\overline{b}\overline{c}d + \overline{a}\left(bc\overline{d} + \overline{b}\overline{c}\right)$

UNIT-II

3.a Simplify the function $F(A,B,C,D) = \sum(1,3,5,7,9,11,13,15)$ using K-map 8M

b State the rules for K-map simplification. 6M

(OR)

4.a Draw a full adder circuit using NAND gates and explain its operation. 7M

b Design a 4-bit carry look-ahead adder circuit. 7M

UNIT-III

5.a Implement $F(A,B,C,D) = \sum m(0,1,5,7,10,14,15)$ using a 8X1 multiplexer. 7M

b Explain the design of 4 to 16 decoder using 3 to 8 decoders. 7M

(OR)

6.a Discuss the operation of parity encoder with the help of logic diagram and truth table. 7M

	b	Design and explain Binary to BCD code converter and draw the logic diagram.	7M

UNIT-IV

7.a		State the differences between PLA, PAL and PROM	6M
	b	Design a PLA using following functions	8M
		i) $F(A,B,C) = .\sum m(1,2,5,7)$	
		ii) $F(A,B,C,D) = .\sum m(0,1,2,5,7,9,11,15)$	

(OR)

8.a		Design a 2-bit comparator using PROM	7M
	b	Design a BCD to excess-3 code converter using PAL	7M

UNIT-V

9.a		Design conversion logic to convert SR flip flop to JK flip-flop.	7M
	b	Draw the circuit diagram of 4-bit Johnson counter using D flip-flops and explain its operation.	7M

(OR)

10.a		Design a mod-6 synchronous counter using clocked JK-flip flops.	7M
	b	What is race around condition? How does it get eliminated in a Master Slave JK flip-flop? Explain	7M

AR13

CODE: 13CE2002 **SET 2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, October-2017
SURVEYING
(Civil Engineering)

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

PART –A

ANSWER ALL QUESTIONS **[1x10=10M]**

1. a) Define fore bearing.
b) Explain compensative error in chain surveying.
c) Define the transiting the telescope.
d) What is face left observations?
e) Distinguish between the longitudinal section and cross section.
f) What do you mean by vertical cliff of a counter?
g) State two point problem in plane table surveying.
h) Distinguish between plumb bob and plumbing fork.
i) Explain point of tangency.
j) Define left hand curve.

PART – B

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

UNIT-I

2. What is Plane Table Surveying? Describe the instruments used with sketches. [12M]

(OR)

3. A closed traverse ABCDE was run and the observed bearings of lines were obtained as under. Correct the bearings for local attraction? [12M]

Line	FB	BB
AB	$72^\circ45^1$	$252^\circ0^1$
BC	$349^\circ0^1$	$167^\circ15^1$
CD	$298^\circ30^1$	$118^\circ30^1$
DE	$229^\circ0^1$	$48^\circ0^1$
EA	$135^\circ30^1$	$135^\circ0^1$

UNIT-II

4. The following consecutive readings were taken with a levelling 3m staff on a continuous sloping ground
0.602, 1.234, 1.860, 2.574, 0.238, 0.914, 1.936, 2.872, 0.568, 1.824, 2.772
Tabulate the page of field book and calculate the levels of the points. R. L of first point was 192.122 m? [12M]

(OR)

5. (a) What are the characteristics of contour? [6M]

(b) What are the different methods of contouring? Describe any one of them. [6M]

UNIT-III

6. (a) Discuss the process of reiteration in theodolite survey. [6M]

(b) Discuss about the temporary adjustments of a theodolite. [6M]

(OR)

7. A Tacheometer was set up at a station A and the readings on a vertically held staff at B were 2.255, 2.605 and 2.955 the line of sight being at an inclination of + 8^0 24′ . Another observation on the vertically held staff at B.M gave the readings 1.640, 1.920 and 2.200, the inclination of the line of sight being + 1^0 6′. Calculate the horizontal distance between A and B and the elevation of B if the R.L of B.M is 418.685 metres. The constants of the instruments were 100 and 0.3. [12M]

UNIT-IV

8. A series of off sets were taken from a chain line to a curved boundary line at intervals of 15 meters in the following order. 0, 2.65, 3.80, 3.70, 4.65, 3.60, 4.95, 5.85 m compute the area between the chain line, the curved boundary
(i) Trapezoidal rule [6M]
(ii) Simpson's rule [6M]

(OR)

9. A railway embankment is 10m wide at the formation level and has side slope 1 1/2 to 1. the ground levels at every 40m along the center line are as under:
0.90, 1.25, 2.15, 2.50, 1.85, 1.35, 0.85
Calculate the Volume of earthwork by Trapezoidal rule and Prismoidal formula [12M]

UNIT-V

10.List the various methods of setting out a simple circular curve. Explain briefly the Rankins's method of deflection angles. [12M]

(OR)

11.(a) Calculate the ordinates at 10m distance for circular curve having a long chord of 80m and a versed sine of 4m. [6M]
(b) Explain the functions of a transition curve. [6M]

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AR13

Code: 13EE2004 **SET2**

ADITYA INSTITUTE OF TECHNOLOGY & MANAGEMENT, TEKKALI
(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, October-2017

ELECTRICAL CIRCUIT ANALYSIS-I

(Electrical & Electronics Engineering)

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

- Answer all questions in PART-A
- Answer one question from each unit of PART-B

PART-A

1. (a) State the basic laws involved in Mesh analysis. [10X1=10M]
   (b) Mention any two applications of resonant circuits.
   (c) Express branch voltages of a graph in terms of tree branch voltages.
   (d) What are networks for which dual relationship is not present?
   (e) State reciprocity theorem.
   (f) Justify 'Super position theorem is not applicable to power calculation in a circuit'.
   (g) State Compensation theorem.
   (h) Mention any two applications of tellegen's theorem.
   (i) What is the unit of parameter D in ABCD parameters of a two port network?
   (j) Relate Y-parameters of individual two port networks and overall Y-parameters if 2 two port networks are connected in parallel.

PART-B [5x12=60M]

UNIT-I

2. (a) Define Resonance of an RLC circuit. Derive expressions for resonant frequency & bandwidth of a series RLC circuit. (6M)
   (b) Explain the procedure for drawing the locus diagram of a RC network with fixed R and variable C. (6M)

(OR)

3. (a) Analyze the behavior of series RL & RC circuits excited by sinusoidal input. Draw relevant phasor diagrams. (6M)
   (b) Find I_o using mesh analysis in the circuit shown in fig. 1. All impedances are in ohm (Ω). (6M)

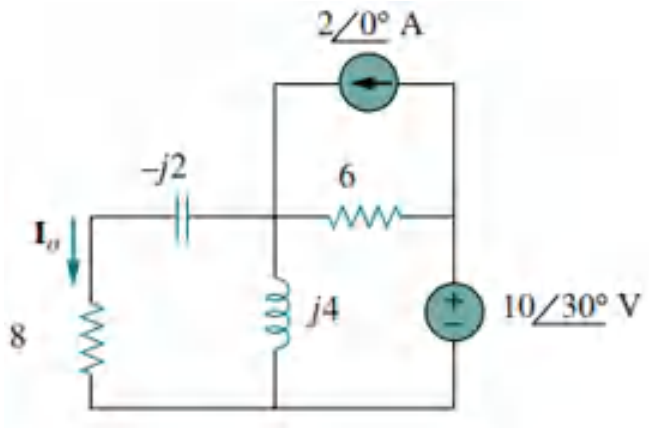

Fig. 1

UNIT-II

4. (a) For the network shown in fig.2, draw the graph. Formulate fundamental cut set matrix. (6M)

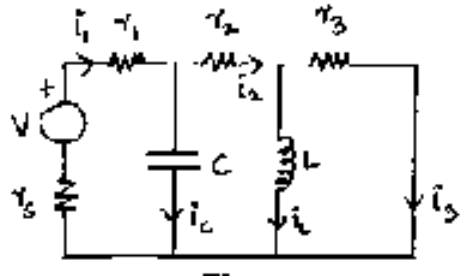

Fig. 2

(b) Define Duality. List the dual pairs of electrical networks. Mention the steps involved in constructing a dual circuit. (6M)

(OR)

5. Determine V_o & I_o in the circuit shown in fig. 3 using loop analysis method. All impedances are in ohm (Ω) (12M)

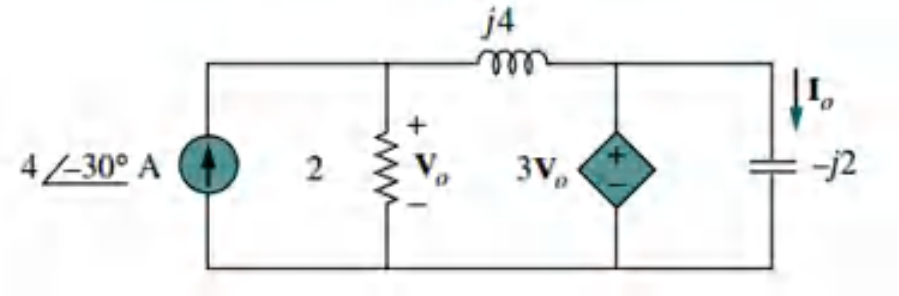

Fig. 3

UNIT-III

6. Determine Thevenin's equivalent circuit for the circuit shown in fig. 4 as seen from the terminals a & b. All impedances are in ohm (Ω). (12M)

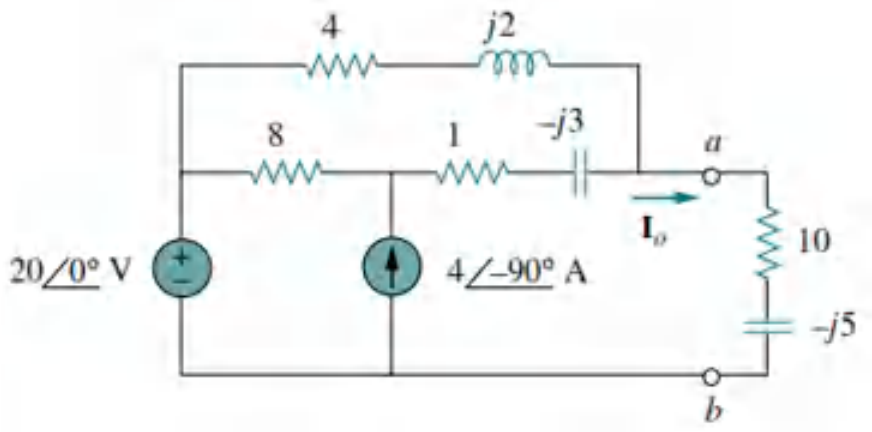

Fig. 4

(OR)

7. For the circuit shown in fig. 5, find I_x using super position principle. All impedances are in ohm (Ω). (12M)

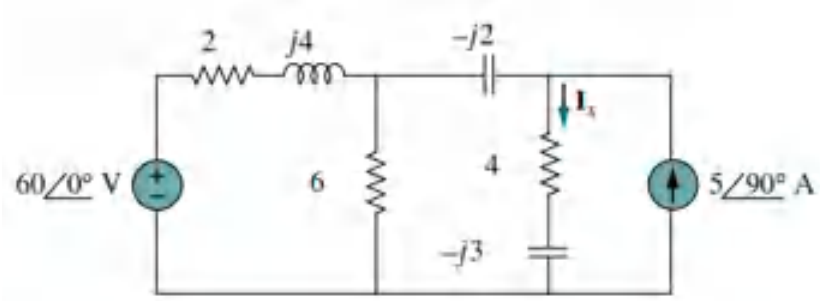

Fig. 5

UNIT-IV

8. (a) State & explain Milliman's theorem. (6M)
   (b) The 5Ω resistance in the circuit shown in fig. 6 increases by 5%. Verify the compensation theorem. (6M)

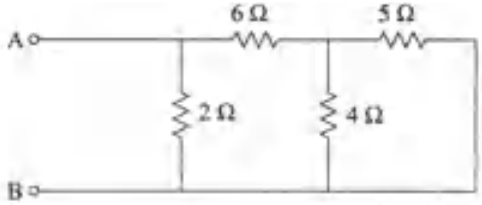

Fig. 6

(OR)

9. (a) State & explain Maximum Power transfer theorem as applicable to DC & AC circuits. (6M)

(b) Find the maximum power delivered to R in the circuit shown in fig. 7. (6M)

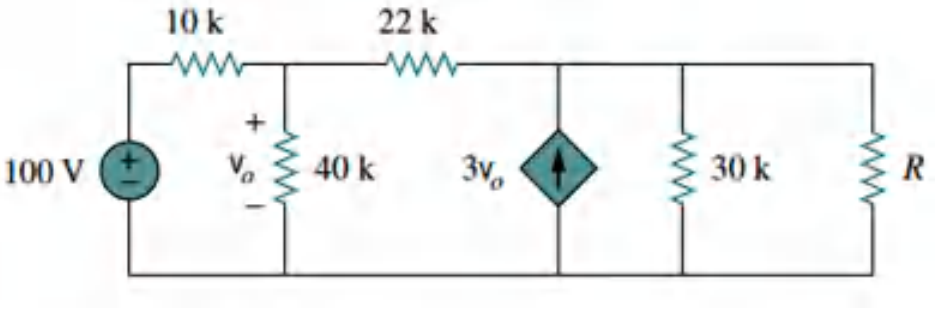

Fig. 7

UNIT-V

10. Determine h-parameters for the network shown in fig. 8. (12M)

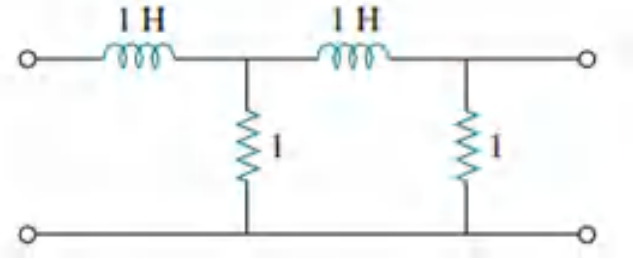

Fig. 8

(OR)

11. Determine Z & Y parameters for the network shown in fig. 9. (12M)

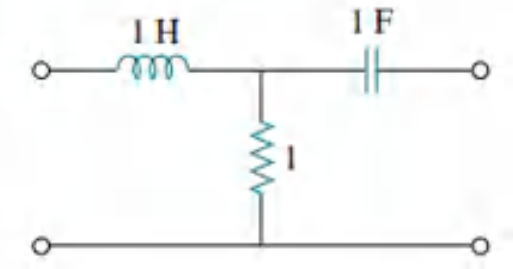

Fig. 9

AR13

CODE: 13ME2007 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, October-2017

THERMODYNAMICS
(Mechanical Engineering)

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

PART-A

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

1. a) Define zeroth law of thermodynamics ?
   b) What are the different mechanisms for transferring energy to or from a control volume?
   c) What are the limitations of the first law of thermodynamics?
   d) Define perpetual motion machine (PPM)?
   e) What is meant by irreversibility?
   f) Define pure substance and give examples?
   g) Define mass fraction?
   h) Define specific humidity?
   i) Define compression ratio of the I.C Engine?
   j) State the four processes of otto cycle?

PART-B

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

UNIT-I

2. (a) What is a quasi-static process? What is its characteristic feature? [3M]
   (b) The internal energy of a certain substance is given by the equation, [9M] $u=3.56\,pv+84$, Where "u" is in kJ/kg,"p" is in kPa and "v" is in m^3/kg. A system composed of 3kg of this substance expands from an initial pressure of 500 kPa and a volume of 0.22 m^3 to a final pressure 100 kPa in a process in which pressure and volume are related by $pv^{1.2}$=Constant, then find Q, ΔU and W for the process, if the expansion is quasi-static?

(OR)

3. (a) Show that energy is a property of a system? [5M]
   (b) A stationary mass of gas is compressed without friction from an initial [7M] state of $0.3m^3$ and 0.105MPa 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 initial energy of the gas change?

AR13

CODE: 13ME2007 **SET-1**

UNIT-II

4. a) Write the steady flow energy equation for a single stream entering and a single stream leaving a control volume and explain various terms in it? [3M]

b) Air flows steadily at the rate of 0.5 kg/s through an air compressor, entering at 7 m/s velocity, 100 kPa pressure, and 0.95 m^3/kg volume and leaving at 5 m/s,700 kPa and 0.19 m^3/kg. The internal energy of the air leaving is 90 kJ/kg greater than that of the air entering. Cooling water in the compressor jackets absorbs heat from the air at the rate of 58 kW. Calculate the rate of shaft work input to the air in kW? [9M]

(OR)

5. a) Show that Kelvin Plank and Clausius expressions of the second law are equivalent? [6M]

b) A Carnot heat engine, receives 500kJ of heat per cycle from a high temperature source at 652^0C and rejects to a low temperature sink at 30^0C. Determine [3M+3M]

i. Thermal efficiency of this engine?
ii. Amount of heat rejected to the sink per cycle?

UNIT-III

6. a) Define dryness fraction of a steam? [2M]

b) 4 kg of 0.5 dry steam at 6 bar pressure is heated so that it becomes [10M]

i. 0.95 dry at 6 bar pressure
ii. Dry and saturated at 6 bar
iii. Superheated to 300^0C at 6 bar
iv. Superheated to 250^0C at 8 bar

Determine in each case the quantity of heat to be supplied? (use steam tables)

(OR)

7. In a counter flow heat exchanger hot gases from turbine are used to heat water. Hot gases enter the heat exchanger at 225^0C and flow rate is 100 kg/min. Water is heated from 40^0C to 95^0C and the flow rate is 60 kg/min, available sink is at 5^0C,determine [12M]

i. The change of Availability of gas?
ii. The change of Availability of water?
iii. The net change of Availability?

Take C_P of gas=0.25 kJ/kgK, C_P of water=1 kJ/kgK

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CODE: 13ME2007 **SET-1**

UNIT-IV

8. A mixture of idle gases consists of 3 kg of N_2 and kg of CO_2 at a pressure of 300KPa and a temperature of 20^0C find [12 M]

   i. The mole fraction of each component?
   ii. The equivalent molecular weight of mixture?
   iii. The equivalent gas constant of the mixture?
   iv. Volume of the mixture?
   v. Density of the mixture

(OR)

9. Atmospheric air at 1.01325 bar has a DBT of 32^0C and attains WBT of 26^0C (adiabatic saturation process) compute Partial pressure of vapour? [12 M]

   i. The specific humidity?
   ii. The dew point temperature?
   iii. The relative humidity?
   iv. The degree of saturation?
   v. Enthalpy of the mixture? (use steam tables)

UNIT-V

10. In an air standard diesel cycle, the compression ratio is 16, and at the beginning of isentropic compression, the temperature is 15^0C and the pressure is 0.1MPa. Heat added until the temperature at the end of the constant pressure process is 1480^0C. Calculate [12 M]

    i. The cut-off ratio
    ii. The heat supplied per kg of air
    iii. Cycle efficiency
    iv. The Mean effective pressure

(OR)

11. With the help of PV and TS diagrams explain Lenoir air standard cycle and derive expression for cycle efficiency? [12M]

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AR13

CODE: 13EC2002 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, October-2017
ELECTRONIC CIRCUITS-I
(Electronics and Communication Engineering)

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

PART-A

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

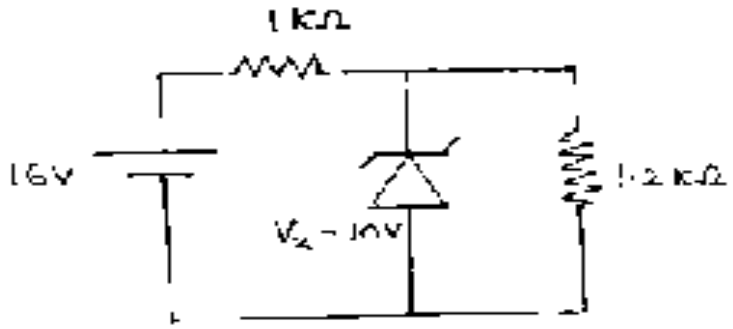
1. a) Compare shunt and series voltage regulator.
   b) Define ripple factor of a rectifier.
   c) What is the need for biasing?
   d) Mention the methods of transistor biasing.
   e) What are the parameters h_r and h_0 called?
   f) Why h-parameters are called hybrid parameters?
   g) Define bandwidth and gain of an amplifier.
   h) Explain the role of coupling capacitor in an amplifier circuit.
   i) Mention high frequency effects on BJT.
   j) Which of the BJT configuration is suitable for impedance matching application and why?

PART-B

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

UNIT-I

2. a Explain Zener diode as voltage regulator.For the Zener diode network of below figure, determine V_0, V_R, V_Z and P_Z. Repeat the same with $R_L = 3k\Omega$. 6M



b Explain full-wave rectifier with series inductor filter and also explain the expression for ripple factor. 6M

(OR)

3. a A full-wave rectifier with a load resistance of 15kΩuses an inductor filter of 15H. the peak value of the applied voltage is 250V and the frequency is 50 cycles/second. Calculate the dc load current, ripple factor and dc output voltage. 6M

   b Explain Half-wave rectifier with capacitor filter and also derive the expression for ripple factor. 6M

AR13

CODE: 13EC2002 **SET-1**

UNIT-II

4.	a	Define stability factor S and S^I and S^{II} .Discuss about Transistor current components	6M
	b	Explain thermal runway.	6M
		(OR)	
5.	a	Explain fixed bias with emitter resistor.	6M
	b	Explain collector-to-base bias method and its merits and de-merits.	6M

UNIT-III

6.	a	Explain about two port networks of hybrid model.	6M
	b	Determination of h-parameters in terms of z-parameters.	6M
		(OR)	
7.	a	Explain the combination of resistance, inductance and capacitances.	6M
	b	Determine the h-parameters in terms of ABCD parameters.	6M

UNIT-IV

8.	a	Explain the common emitter hybrid model and output characteristic curve.	6M
	b	Draw the circuit of CC transistor amplifier and give its h-parameter model. Derive all gains and impedances.	6M
		(OR)	
9.	a	Write short note on effect of negative feedback on output resistance of an amplifier.	6M
	b	Draw the block diagram of a multistage amplifier having n-stages. Write expression for its gain.	6M

UNIT-V

10.	a	Explain hybrid-π common-emitter transistor model.	6M
	b	Describe the variation of hybrid parameters.	6M
		(OR)	
11.	a	Explain single stage CE transistor amplifier response.	6M
	b	Describe the operation of emitter follower at high frequencies.	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, October-2017

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) Find the complement of F = $\bar{X}Y\bar{Z} + \bar{X}\bar{Y}Z$
   b) Define prime implicants and essential prime implicants.
   c) Reduce the following Boolean function (AB'+AC')(BC+BC')(ABC)
   d) Give 4-bit BCD code to Gray code
   e) Obtain the dual of A(A+B) & A(B.C).
   f) Differentiate between serial & parallel adder
   g) Draw the schematic of R-S flipflop with NOR gates.
   h) Simplify the Boolean function and implement using NAND gates f(A,B,C)= AB+AC+$\bar{A}$BC
   i) Explain what do you understand by a lock out in a counter.
   j) Write short note on types of ROMs and their applications. Difference between a PLA and ROM

PART-B

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

UNIT-I

2. a) Represent the decimal numbers 5137 is (i) BCD (ii) excess-3 code (iii) 6311 code. **6M**
   b) Express the complement of the following function in sum of minterms form (i) F(x,y,z)=xy+xz (ii) F(A,B,C)= Π(2,4,5,7) **6M**

(OR)

3. a) Determine the canonical sum form for *f*(ABC)=C+($\bar{A}$+B)(A+$\bar{B}$). **6M**
   b) Apply De Morgans theorem to the following **6M**
   (i) (ABC)'+(D'+E)'; (ii)((A+B)C)' ; (iii) (A+B+C)'+(D'E)'.

UNIT-II

4. a) Design a combinational circuit to convert gray code to BCD. **6M**
   b) Design an excess -3 to BCD converter using a 4 bit full adder. **6M**

(OR)

5. Minimize the following functions by using K-map **12M**
   i) F(A,B,C) = .∑m(0,1,3,5,7) ii)F(A,B,C,D) = .∑m(0,1,2,5,7,8,9,11,15)

AR13

CODE: 13EC2006 **SET-1**

UNIT-III

6.	a)	Design a full subtractor and implement it using NAND gates. Explain its operation with the help of a truth table.	**6M**
	b)	Explain the operation of de-multiplexer. State weather it can be used as a decoder with necessary reasons.	**6M**

(OR)

7.	a)	Draw the logic diagram of a 2-to-4 line decoder with only NOR gates. Include an enable input.	**7M**
	b)	Write a brief note on parity generator	**5M**

UNIT-IV

8.	a)	Give the logic implementation of 32*4 bit ROM using decoder of a suitable size.	**6M**
	b)	A logic circuit is required to be designed for the logic function $Y = \sum m (0,6,9,12,13,15)$ using a ROM . Determine the size of the ROM and the bit pattern to be stored in the ROM.	**6M**

(OR)

9.	a)	Implement the combinational circuit for the function $F(x,y,z) = \sum m(3,5,7)$ using 3x 3x2 PLA.	**6M**
	b)	Define Hazards. Explain different types of hazards.	**6M**

UNIT-V

10.	a)	Convert clock R-S flip-flop (FF) into (i) JK F-F (ii)D- F-F, (iii) T- F-F. Give the truth table for each. List the applications of each.	**6M**
	b)	Design a synchronous modulo-4 UP/DOWN counter circuit using JK flip flops	**6M**

(OR)

11.	a)	With the help of logic diagram, explain the working of a 4-bit register which uses parallel load.	**6M**
	b)	Explain the operation of a 4-bit ring counter with the help of a circuit diagram and waveforms	**6M**

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