AR18

CODE: 18EST101 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech II Semester Regular Examinations, April-2019

BASIC ELECTRICAL ENGINEERING

(Common to CE, CSE, IT Branches)

Time: 3 Hours **Max Marks: 60**

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 Explain Kirchhoff's laws. 6M

b) Determine current flowing and power dissipated in each resistance for the given circuit. Consider a value of 10 Ohms for each resistance. 6M

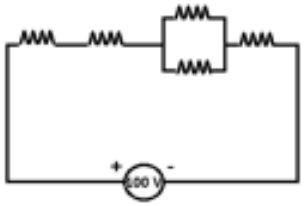

Fig-1

(OR)

2. a) Compute the equivalent resistance across voltage source using star/delta transformation for the circuit shown in fig-3. Also compute current delivered by voltage source. 7M

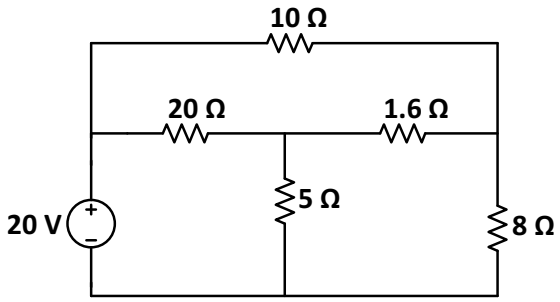

Fig-2

b) Derive the expression for equivalent resistance when two resistances are connected in series and connected in parallel? 5M

UNIT-II

3. a) A resistance of 120Ω and a capacitive reactance of 250Ω are connected in series across an A.C. voltage source. If a current of 0.9A is flowing in the circuit, Compute Power factor, supply voltage and impedance angle. 5M

   b) Compute the Form Factor and Peak Factor of the wave form shown in fig-5. 7M

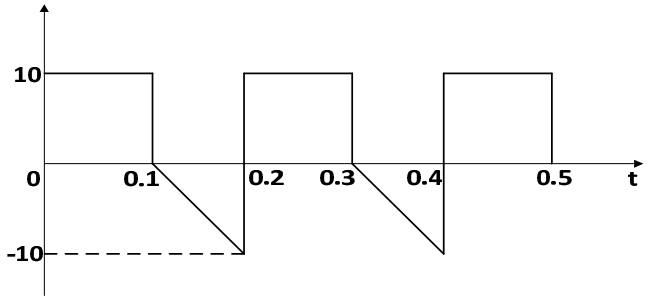

Fig-3

(OR)

4. a) A series RLC circuit operates with 100V, 50Hz having circuit parameters R=12 Ω, L=150mH, C=10μF. calculate (a) Impedance of the circuit (b) the current drown from the supply (c) Power factor (d) Reactive Power 5M

   b) The voltage waveform shown in fig-6, compute the RMS value, average value, form factor and peak factor. 7M

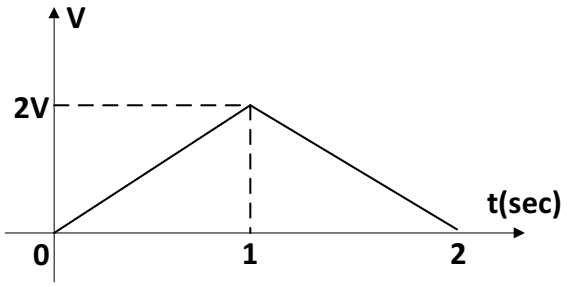

Fig-4

UNIT-III

5. a) Explain the working of simple loop generator 6M
   b) Derive the Emf equation of a DC generator. 6M

(OR)

6. a) Derive the torque equation of DC motor. 7M
   b) Determine the torque established by the armature of a 4-pole DC motor having 774 conductors, two paths in parallel, 24 mWb of pole flux and the armature current is 50 A. 5M

UNIT-IV

7. a) Discuss how will you perform O.C and S.C test on a single phase transformer? 8M
   b) Explain the principle operation of single phase transformer 4M

(OR)

8. The O.C and S.C test data are given below for a single phase, 5 kVA, 200V/400V, 50Hz transformer. O.C test from LV side : 200V 1.25A 150W S.C test from HV side : 20VV 12.5A 175W
   Determine the efficiency of a transformer at half load 0.8 power factor and regulation of transformer at 0.8 power factor lagging? 12M

UNIT-V

9. a) Describe the principle of operation and working of a three-phase induction motor. 12M

(OR)

10. a) Discuss the speed-torque characteristics of 3-phase Induction Motor. 7M
    b) Derive the torque equation for three phase induction motor. 5M

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AR18

CODE: 18EET102 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech II Semester Regular Examinations, April- 2019

ELECTRIC CIRCUIT THEORY

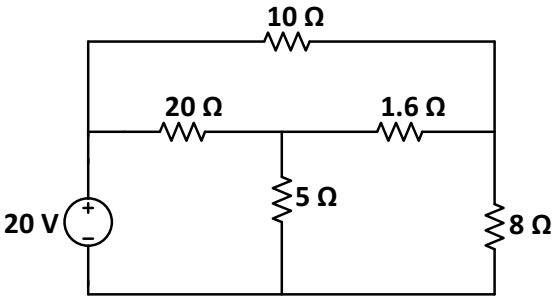
(Electrical and Electronics Engineering)

Time: 3 Hours **Max Marks: 60**

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

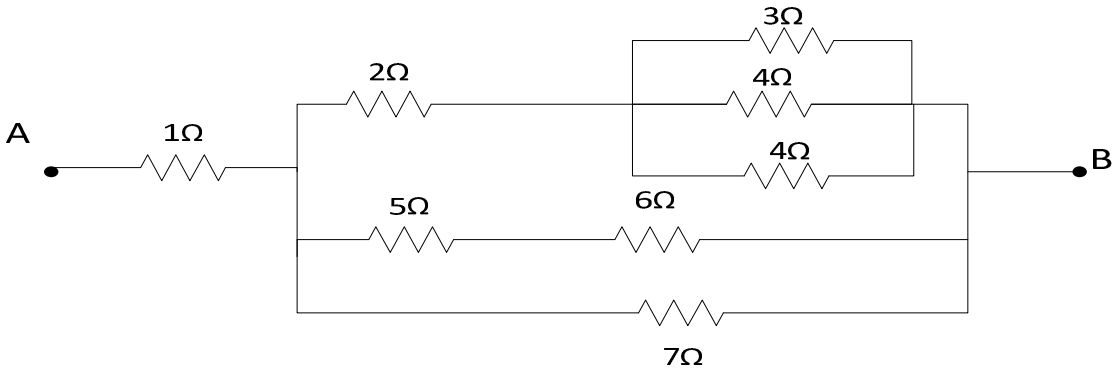
UNIT-I

1. a) Explain the volt-ampere relationships for R, L, and C parameters. 4M
   b) Find the current in the 20Ω resistance, using mesh analysis. 8M



(OR)

2. a) Derive the equivalent inductance of two inductors connected in parallel. 4M
   b) Find the equivalent resistance between the two points A and B shown in Fig 8M

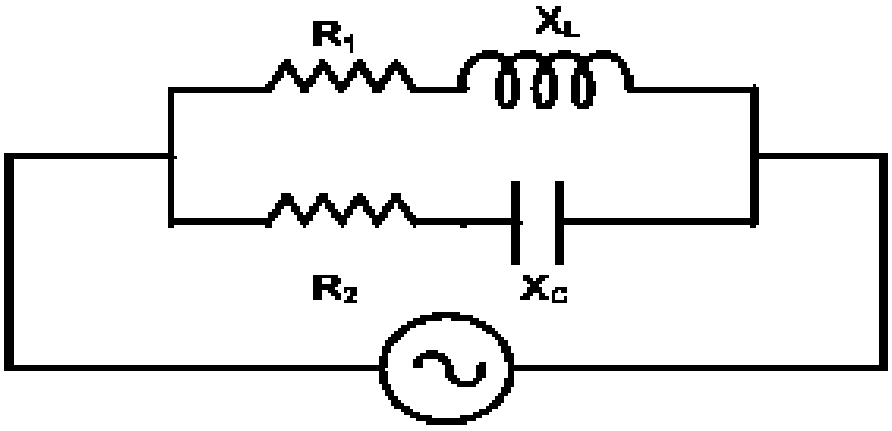


UNIT-II

3. a) Draw the current locus of a series RC circuit in which R is varying. 6M
   b) Derive the expression for bandwidth of a series RLC circuit as a function of resonant frequency 6M

(OR)

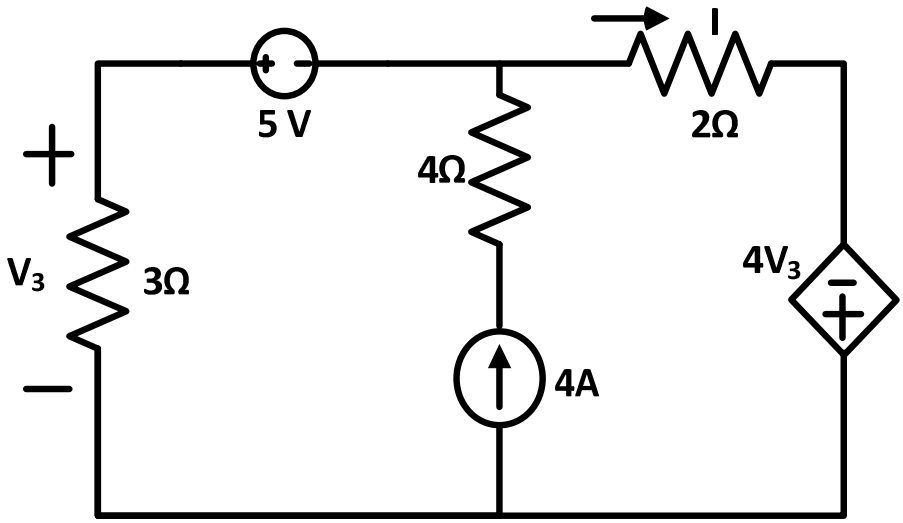
4. a) Derive an expression for the resonant frequency for a parallel circuit shown below 6M



   b) A series RLC circuit has R=20 ohm, L=5 mH and C = 0.2 μF. It is fed from a 100V variable frequency source. Find i) resonant frequency ii) impedance at this frequency iii) band width and iv) Q-factor 6M

UNIT-III

5. a) Determine the current flowing through 2Ω resistor as shown in the Fig. by using the superposition theorem. 6M



b) Enumerate the relation between Thevenin's theorem and Norton's theorems. 6M

(OR)

6. State and explain Norton's theorem with an example. 12M

UNIT-IV

7. a) State and explain maximum power transfer theorem. 6M
   b) State and explain Tellegen's theorem with suitable example. 6M

(OR)

8. a) State and explain compensation theorem with an example. 6M
   b) Derive the condition for receiving maximum power by resistive load in case of dc network. 6M

UNIT-V

9. Explain relation between phase voltage, line voltage and phase current, line current in 3-phase star connected system. 12M

(OR)

10. a) Mention the advantages of 3-phase systems over single phase system. 6M
    b) Three delta connected impedances Z_2= 20- j30Ω are connected across the line voltage of 440 V. Find the line current, the power factor, the active power and the reactive power drawn by the circuit. 6M

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AR18

CODE: 18EST105 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech II Semester Regular Examinations, April-2019

BASIC ELECTRONICS

(Mechanical Engineering)

Time: 3 Hours **Max Marks: 60**

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)	Explain V-I Characteristics of an ideal and practical PN Junction diode?	6M
	b)	Draw circuit diagram of a full wave rectifier and explain its working. Draw its input and output waveforms?	6M
		(OR)	
2.	a)	Explain working of a PN Junction under forward and reverse bias conditions?	6M
	b)	Explain the effect of biasing voltage on diode resistance?	6M

UNIT-II

3.	a)	Explain how BJT acts as an Amplifier?	6M
	b)	Explain the input and output characteristics of BJT in CC Configuration?	6M
		(OR)	
4.	a)	Explain transfer and drain characteristics of a JFET?	6M
	b)	Explain how JFET acts as a switch?	6M

UNIT-III

5.	a)	Classify small signal amplifiers based on operating frequency?	6M
	b)	Draw circuit diagram of CE Amplifier and explain its working?	6M
		(OR)	
6.	a)	Explain and draw the frequency response of CE Amplifier?	6M
	b)	Explain how nonlinear distortion is overcomed in an amplifier circuit?	6M

UNIT-IV

7.	a)	Draw and explain different feedback configurations?	6M
	b)	Explain advantages of feedback in Amplifiers?	6M
		(OR)	
8.	a)	What is difference between LC and RC Oscillators?	6M
	b)	Explain how frequency of oscillations is achieved in an LC Oscillator?	6M

UNIT-V

9.	a)	Explain how OpAmp is used as an inverting Amplifier?	6M
	b)	Explain how OpAmp is used as a voltage follower?	6M
		(OR)	
10.	a)	Draw pin configuration of an OpAmp and write meaning of each pin?	6M
	b)	Explain concept of virtual ground in an OpAmp?	6M

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AR18

CODE: 18ECT103 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech II Semester Regular Examinations, April-2019

ELECTRONIC CIRCUITS

(Electronics and Communication Engineering)

Time: 3 Hours **Max Marks: 60**

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) Explain the principle of operation of Half wave rectifier with neat circuit diagram and waveforms [6M]
   b) Derive the following parameters of Half wave rectifier [6M]
   i) ripple factor ii) efficiency

(OR)

2. a) Explain the principle of operation of Full wave rectifier with neat circuit diagram and waveforms [6M]
   b) Derive the following parameters of Full wave rectifier [6M]
   i) ripple factor ii) efficiency

UNIT-II

3. Explain the operation of capacitor filter and derive the ripple factor. [12M]

(OR)

4. Explain the operation of L section filter and derive the ripple factor. [12M]

UNIT-III

5. a) Explain thermal runaway and thermal resistance [6M]
   b) Draw a collector to base bias circuit and explain it. [6M]

(OR)

6. Draw a self bias circuit and derive the expression for the stability factor 'S'. [12M]

UNIT-IV

7. Determine the h-parameters from input and output characteristics [12M]

(OR)

8. Explain the analysis of transistor amplifier circuit with the help of h-parameters [12M]

UNIT-V

9. Explain the general characteristics of negative feedback amplifier [12M]

(OR)

10. a) Explain about the voltage series feedback amplifier [6M]
    b) Explain about the current series feedback amplifier [6M]

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AR16

CODE: 16EE1004 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

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

BASIC ELECTRICAL & ELECTRONICS ENGINEERING

(Common to CE & ME branches)

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 in one place only

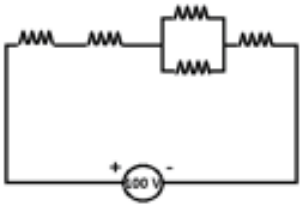
UNIT-I

1. a) State and Explain Kirchhoff's laws. [7M]

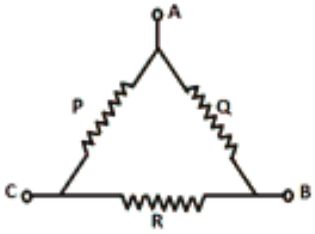
   b) Derive the expression for equivalent resistance when two resistances are connected in series and connected in parallel? [7M]

(OR)

2. a)Determine current flowing and power dissipated in each resistance for the given circuit. Consider a value of 10 ohms for each resistance. [6M]



   b) Determine the equivalent star connected network between the terminals A, B and C, where P=10Ω, Q=15Ω and R=20Ω [8M]



UNIT-II

3. a) Explain the Classification of DC generators with the help of necessary diagrams. [7M]

   b) Explain the constructional features of DC generator. [7M]

(OR)

4. a) Explain armature control method for controlling speed of dc shunt motor. [7M]

b) A 220V DC Shunt motor at no-load takes a current of 2.5A. The resistance of armature and shunt field is 0.8Ω and 200 Ω respectively. Estimate the efficiency of motor when input current is 32A. State the assumptions made. [7M]

UNIT-III

5. a) Derive the EMF equation of a transformer. [7M]

b) A 10KVA 200/400V, 50Hz single-phase transformer gave the following test results:

O.C. Test: 200V, 1.3A,120W … on LV side

S.C. Test: 22V, 30A, 200W … on HV side

Calculate (i) the magnetizing current and the component corresponding to core losses at normal frequency and voltage (ii) The magnetizing branch impedance and (iii) percentage voltage regulation when supplying full load at 0.8 p.f. leading. [7M]

(OR)

6. a) Explain the principle of operation of three phase induction motor. [7M]

b) Explain the torque-slip characteristics of induction motor. [7M]

UNIT-IV

7. a) Explain the principle of operation of alternator. [7M]

b) Explain synchronous impedance method for determining regulation of an alternator. [7M]

(OR)

8. Explain the working principle of PMMC instrument with neat diagram. [14M]

UNIT-V

9. a) Briefly explain the V-I characteristics of P-N junction diode. [7M]

b) Explain the operation of full wave bridge rectifier. [7M]

(OR)

10. a) Explain the output characteristics of common emitter configuration of an N-P-N transistor. [7M]

b)Draw the output characteristics of common base configuration. [7M]

AR16

CODE: 16EC1002 **SET-2**

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

SWITCHING THEORY AND LOGIC DESIGN
(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

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UNIT-I

1.	a	Represent the Gray code 10110110 in i) Binary ii) Decimal iii) Hex and iv) Octal.	8
	b	Carry out BCD subtraction for the following using r's complement. i) 786 – 427 ii) 294 – 357	6

(OR)

2.	a	Represent numeric digits 0 to 9 at least in any two self complementing codes	6
	b	Test the following hamming code sequence for 11 bit message and correct if necessary (100, 1101, 1110, 1011)	8

UNIT-II

3.	a	Given $\overline{AB}+\bar{A}B=C$, find $\overline{AC}+\bar{A}C$ and implement the resultant expression using NOR gates	8
	b	Find the minimum number of 2 input NAND gates required to implement the following expression F= $(AB+\bar{A}\bar{B})(C\bar{D}+\bar{C}D)$ and draw the logical diagram with minimum no.of NAND gates.	6

(OR)

4.	a)	Express the following functions in sum of minterms and product of maxterms i) F(A,B,C,D) = $\bar{B}D+\bar{A}D+B\bar{D}$ ii) F(x,y,z) = (xy+z)(xz+y)	8
	b)	Implement the 2- input XOR gate using minimum number of NAND gates.	6

UNIT-III

5. a Design a gray to binary code converter circuit? 6
   b Reduce the following function using k-map f (A,B,C,D) = Σm (4,5,6,7,8,12,13) + d (1,15) and draw the logical diagram using only NOR gates 8

(OR)

6. a Obtain the minimal expression for f (A,B,C,D)= ΠM (2,3,5,7,9,11,12,13,14,15) and implement it in NAND logic 8
   b Design a BCD to Excess-3 code converter circuit? 6

UNIT-IV

7. a Design a circuit that takes two 4- bit BCD numbers as inputs and produce its sum. Also explain the circuit operation. 8
   b Design and implement the 2-bit comparator (each input has 2-bits) 6

(OR)

8. a Implement the following multiple output combinational logic circuit using a 4 to 16 decoder: 8

   $F1=\sum m\ (0,1,4,7,12,14,15)$ $F2=\sum m\ (1,3,6,9,12)$

   $F3=\sum m\ (2,3,7,8,10)$

   $F4=\sum m\ (1,3,5)$

   b Draw the circuit diagram of a 4-bit adder/subtractor and briefly describe its functional principle. 6

UNIT-V

9. a Design a BCD up/down counter using SR flip-flop. 8
   b Draw the 4-bit parallel in Serial out shift Register and explain the operation. 6

(OR)

10. a Convert the following flip-flops from one to another. 8

    i) J-K flip-flop to T flip-flop
    ii) D flip-flop to J-K flip-flop

    b Design a synchronous counter using JK flip-flops that counts as 000, 010, 101, 110, 000, 010… Ensure that the unused states of 001, 011, 100 and 111 go to 000 on next clock pulse. 6

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AR16

CODE: 16EC1001 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

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

ELECTRONIC DEVICES

(Electronics & 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) Explain the motion of an electron in a magnetic field 8M
   b) Explain the motion of an electron in a electric field 6M

(OR)

2. a) Explain the electrostatic deflection and magnetic deflection system in a CRT 6M
   b) Explain CRO block diagram with neat sketch. 8M

UNIT-II

3. a) Find the conductivities of silicon 8M
   (i) in intrinsic at a room temperature of 300^oK
   (ii) With donor impurity of 1 in 10^8
   (iii) with acceptor impurity of 1 in $5 X 10^7$. And
   (iv) with both the above impurities present simultaneously. Given that n_i for silicon at 300^oK is $1.5 X10^{10}$ cm^{-3}, μ_n=1300 cm^2 /V-S , μ_p =500 cm^2 /V-S , number of si atoms per cm^3 $=5X10^{22}$.
   b) i)Find the concentration(densities) of holes and electrons in N-type silicon at 300^0K, If the conductivity is 300S/cm. Also find these values for P-ype silicon. Given that for silicon at 300^0K $n_i= 1.5\times10^{10}/cm^3$ 6M
   μ_n=1300cm^2/V-S
   μ_p=500cm^2/V-S

(OR)

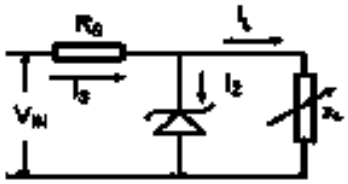
4. a) Bring out the effect of temperature on semiconductors and explain the concept of holes and discuss how holes can transport charge. 6M
   b) Explain the effect of temperature on intrinsic concentration, mobility, conductivity and Energy band gap. 8M

UNIT-III

5. a) Explain the V-I characteristics of semiconductor diode 5M
   b) Explain the energy band diagrams of semiconductors, conductors, insulators with neat sketches. 9M

(OR)

6. a) Distinguish between Avalanche and Zener breakdown 4M
   b) For the Zener voltage regulator shown below determine the range of RL and IL that gives the stabilizer voltage of 10V. (Given V_{IN}=40V ,R_S=1KΩ,V_Z=10V, I_{Zmax}=24mA I_{Zmin}=5mA) 10M



UNIT-IV

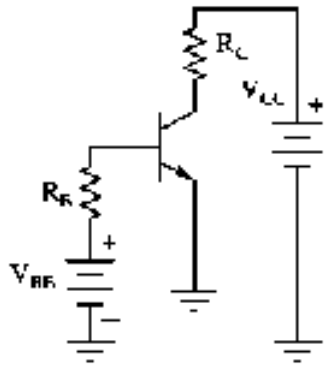
7. a) Sketch the profiles of the minority and majority carrier currents in the base region of an PNP transistor under active condition. Explain the transistor operation with the help of these profiles. 8M

   b) Explain V-I characteristics of common base configuration. 6M

(OR)

8. a) Explain the input and output characteristics of a transistor in CE configuration 8M

   b) (i)Consider the transistor circuit below. For V_{CC}=10V, V_{BB}=5V,V_{BE}=0.8V R_B=50KΩ,R_C=3KΩ, V_{CE}=0.2V and β=100. Determine the region of operation of the transistor. 6M



(ii) If R_B is varied to a value of 200KΩ while maintaining other parameters unchanged in (i) what is the min RC required to drive the transistor into saturation?

UNIT-V

9. a) Draw the schematic diagram and transfer characteristics of n-channel and p-channel enhancement type MOSFET 8M

   b) Explain the construction and operation of p-channel JFET with neat diagrams. 6M

(OR)

10. Give the construction details of UJT and explain the operation with the help of equivalent circuits 14M

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AR16

CODE: 16CS1002 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

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

Data Structures

(Common to CSE, IT Branches)

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 an algorithm? Write the structure and properties of an algorithm? How to measure the efficiency of an algorithm? 7M
   b) Write a program in C to generate Fibonacci sequence using recursion. 7M

(OR)

2. a) Use Big O notation to represent the complexity of an algorithm as a function of the size of the input n. Draw a table showing time complexities of different algorithms? 7M
   b) Write an algorithm to check whether the given matrix is magic square or not? 7M

UNIT-II

3. a) Explain the algorithm for binary search with an example. 7M
   b) Explain the algorithm of insertion sort and give a suitable example. 7M

(OR)

4. a) Explain the following two comparison sort algorithms with an example and write their time complexities? 10M
      i. Bubble sort ii. Selection sort
   b) List out the advantages and disadvantages of linear and binary search. 4M

UNIT-III

5. a) Compare between linear queue and circular queue? Write down algorithms for insert and delete operations in a queue? 8M

   b) Explain the concept of stack. Write an algorithm to insert and delete an element. 6M

(OR)

6. a) Discuss the conditions for stack overflow and underflow? 4M

   b) How to convert an infix expression to a postfix expression. Explain with an algorithm and suitable example. 10M

UNIT-IV

7. a) Perform the following operations with a pictorial representation and explanation on single linked list.
   i) insert at beginning of the linked list. ii) insert at a specific position. iii) insert at end of the linked list. 10M

   b) List out the merits and demerits of single linked list. 4M

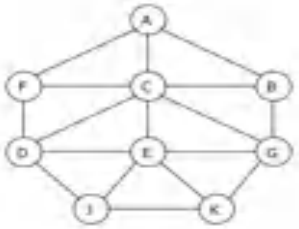
(OR)

8. a) Write an algorithm for polynomial addition using linked lists and give a suitable example. 7M

   b) What are the operations of double linked list. 7M

UNIT-V

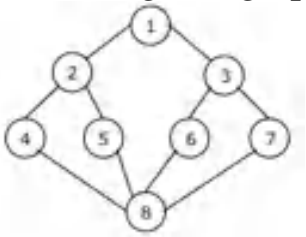
9. a) Write the DFS traversal for the following graph? 7M



   b) Construct a Binary Search Tree with the following elements and Explain deletion of element-13 from the obtained BST.
   25, 13, 45, 10, 15, 30, 65, 7, 12, 14, 18, 40 7M

(OR)

10. a) Write the BFS traversal of the given graph? 7M



   b) Explain in-order pre-order and post-order techniques of a Binary tree 7M

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AR13

Code: 13EE1002 **SET-1**

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

BASIC ELECTRICAL AND ELECTRONICS ENGINEERING
(Common to CIVIL & MECH)

Time – 3 hours **Max. Marks: 70**

PART – A

Answer all questions **[10 x 1M = 10M]**

1) a) Define bilateral element
b) Two resistors of resistance 20 Ω & 30 Ω are connected in parallel. The total current supplied to the parallel branch is 3A.Find the current through 20 Ω resistor.
c) What is the function of commutator in a D.C generator.
d) Write the expression for terminal voltage of a DC short shunt compound generator.
e) A 500/250v,50 Hz 1-ϕ trans former has emf per turn is 6v.Find the number of turns on primary and secondary windings.
f) A 4 pole 50Hz,3 ϕ Induction motor runs at 1400 rpm. Find the slip.
g) List out the controlling systems used in measuring instruments.
h) List out the types of measuring instruments.
i) Draw the V-I characteristics of a P-N junction Diode.
j) Draw the output current wave form of a half wave rectifier.

PART – B

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

UNIT-I

2) a) Draw and explain the V-I relationships of R,L and C elements. [6M]
b) For the resistive network shown in Fig.1, find the current through 2 Ω resistor [6M]

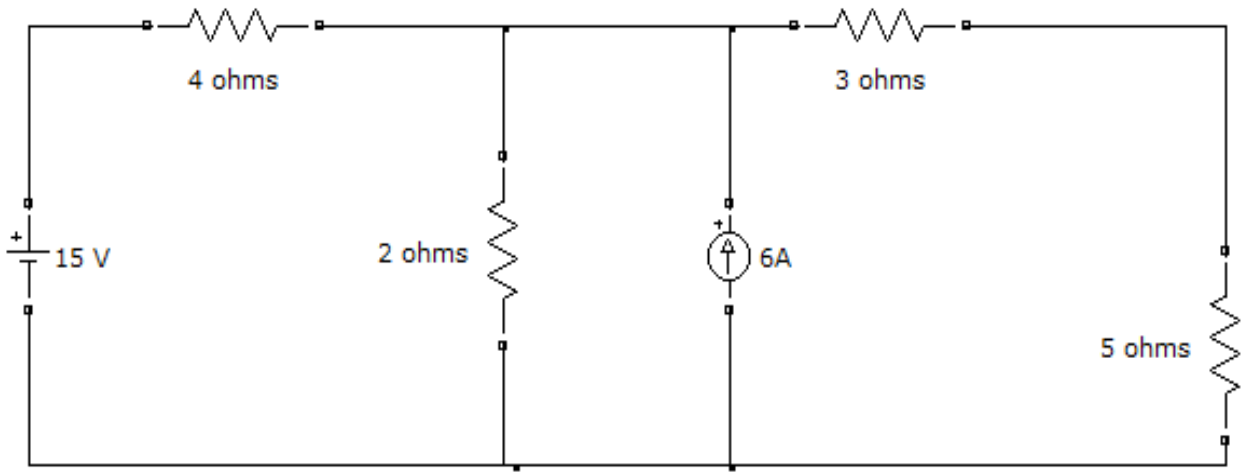

Fig.1
(OR)

AR13

Code: 13EE1002 **SET-1**

3) a) State and explain Kirchoff's current law, Kirchoff's voltage law [6M]
b) Find total resistance in a circuit shown in Fig.2 between A&B [6M]

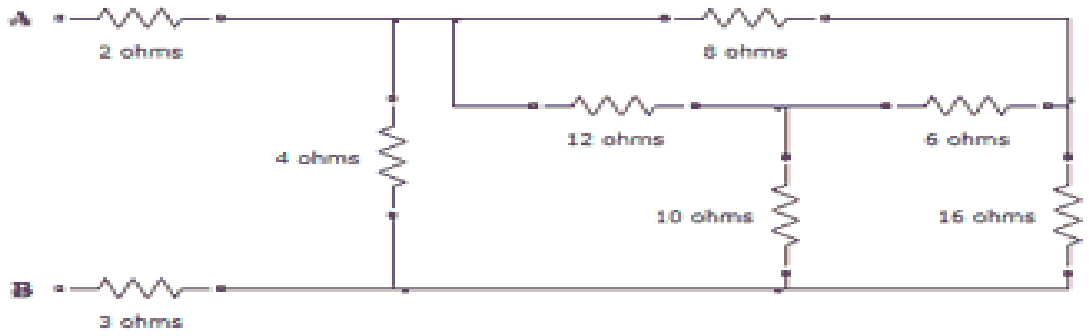

Fig.2

UNIT-II

4) a) Briefly describe the functions of various parts of D.C machine. [6M]
b) A 4 pole wave connected shunt generator has 900 conductors. If the flux per pole is 0.03wb and the speed of the generator is 700 rpm. What is the magnitude of generated voltage. And also find the terminal voltage, if the armature current is 40A and armature resistance is 0.25 Ω. [6M]

(OR)

5) a) Derive the expression for torque developed in DC motor. [4M]
b) A 6 pole wave wound DC motor has a useful flux of 0.03 wb per pole and the number of conductors is 1000. The motor draws a current of 30A at 500v and has an armature resistance of 50 Ω. Calculate (a) the speed (b) torque developed(c) metric horse power output. Assume the mechanical losses to be 2KW. [8M]

UNIT-III

6) a) Explain the operation of single phase transformer with its constructional features [6M]
b) Describe the torque-slip characteristics of a 3- ϕ induction motor [6M]

(OR)

7) a) Define regulation of alternator and explain how regulation is determined by the synchronous impedance method. [8M]
b) A 3 Φ induction motor has 2 poles and is connected to a 400V, 50Hz supply. Calculate the actual speed and rotor frequency when the slip is 4%. [4M]

UNIT-IV

8) (a) Discuss the classification of electrical measuring instruments. [6M]
(b) Describe the working principle of moving iron instrument. [6M]

(OR)

9) (a) Describe the important features of measuring instruments. [6M]
(b) Describe the working principle of PMMC instrument. [6M]

UNIT-V

10) Describe with neat diagrams the working of P-N junction diode when it is connected in
(a) Forward biased (b) reverse biased [6M+6M]

(OR)

11) What is rectification? Describe the working of half wave rectifier circuit and derive the average and RMS values of the output wave. [12M]

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AR13

CODE: 13BS1002 **SET-2**

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

ENGINEERING MATHEMATICS –II

(Common to EEE & ECE)

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

PART-A

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

1. a) Briefly write the condition for initial approximation for solving a transcendental equation.
   b) Write the normal equations of the straight line y=a+bx by least squares method.
   c) Prove that $\nabla = 1 - E^{-1}$.
   d) What is the rule required for Simpson's 1/3 rule for number of divisions of the interval?
   e) Write the formula used in modified Euler's method.
   f) What are multi step methods?
   g) Find $L\left[e^{-2t}\,\text{Sin}\,4t\right]$ if $L(Sin4t)=\frac{4}{S^2+16}$.
   h) Find the L.T of the function $Sin^2 t$ if $L(\text{Cos}\,2t)=\frac{S}{S^2+4}$.
   i) Write the auxiliary ODEs of the PDE p(z-y) + q(x-z) = y-x
   j) Solve : z = px + qy + $\sqrt{1+p^2+q^2}$

PART-B

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

UNIT-I

2 **a** The equation $x^3 - 3x + 4 = 0$ has one real root between -2 and -3. Find the root to four places after decimal by false position method. **6M**

b Fit a curve $y = ax^b$ to the following data by the method of least squares. **6M**

x	2	4	7	10	20	40	60	80
y	43	25	18	13	8	5	3	2

(OR)

3 **a** Using Newton-Raphson method find reciprocal of a number. Apply the methods to N = 24 to obtain the result correct to 2 decimals by taking the initial approximation as $x_0 = 0.045$. **6M**

b Fit a straight line to the following data by the method of least squares. **6M**

x	0	1	2	3	4
y	1	1.8	3.3	4.5	6.3

UNIT-II

4. a Form the backward difference table of $f(x) = x^3 - 3x^2 + 5x + 7$, for the values of 0,2,4,6,8 and verify for f(10) by interpolation and actual calculation. **6M**

b From the following table values of x and $y = e^x$ interpolate value of y when x = 1.91 by Gauss forward differences. **6M**

x	1.7	1.8	1.9	2.0	2.1	2.2
y	5.4739	6.0496	6.6859	7.3891	8.1662	9.0250

(OR)

5 a Use Gauss backward interpolation formula to find f(32), given that f(25) = 0.2707, f(30) = 0.3027, f(35) = 0.3386, f(40) = 0.3794. **6M**

b Given that **6M**

x	4	4.2	4.4	4.6	4.8	5.0	5.2
logx	1.3863	1.4351	1.4816	1.5261	1.5686	1.6094	1.6487

Evaluate $\int_4^{5.2} \log x dx$ by Simpson's 3/8 rule.

UNIT-III

6. a Solve the ODE $\frac{dy}{dx} = xe^{y}$, y(0) = 0 by Picard's method upto 2nd approximation. Estimate y(0.3), and y(1). **6M**

   b Discuss single and multistep methods and List out one Predictor-corrector method. **6M**

(OR)

7 Using modified Euler's method upto 4 approximations, find y(0.2) and y(0.4) given $\frac{dy}{dx} = y + e^{x}$, y(0) = 0 **12M**

UNIT-IV

8. **5M**

   a Evaluate $\int_0^{\infty} t^3 e^{-t} \operatorname{Sin} t \, dt$

   b Evaluate $L^{-1}\left[\frac{S^2}{\left(S^2+a^2\right)\left(S^2+b^2\right)}\right]$ by Convolution theorem. **7M**

(OR)

9. a Evaluate $L\left(t^2 \operatorname{Cos} at\right)$ **6M**

   b Find $L^{-1}\left[\frac{S^2}{\left(S^2+4\right)^2}\right]$ by Convolution theorem. **6M**

UNIT-V

10 a Solve : $y^2 p - xyq = x(z - 2y)$ **6M**

   b Solve: $(x^2 - y^2 - yz)p + (x^2 - y^2 - zx)p = z(x - y)$ **6M**

(OR)

11. A homogeneous rod of conducting material of length 100 cm has its ends kept at zero temperature and the temperature initially is u(x,0) = x for $0 \le x \le 50$ *and* $100 - x$ *for* $50 \le x \le 100$. Then find the temperature u(x,t) at any time t. **12M**

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13CS1002 AR13/SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I B.Tech II Semester Supplementary Examinations, April-2019
DATA STRUCTURES
(Common to CSE and IT)

Time: 3 hours **Max Marks: 70**

PART- A

Answer all questions [10 x 1=10M]

1. a) Define algorithm.
   b) Differentiate recursion and iteration.
   c) Mention applications of linked lists.
   d) What is FIFO data structure?
   e) What are the time complexities of quick sort and bubble sort?
   f) What is the basic requirement of binary search?
   g) List out the properties of a binary tree.
   h) What is a complete binary tree?
   i) Define adjacency matrix.
   j) What is a minimum spanning tree?

PART – B

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

UNIT – I

2. List and explain various types of data structures. [12M]

(OR)

3. a) What is recursion? Explain it with an example. [6M]
   b) Write an algorithm for finding the factorial of a given number. [6M]

UNIT – II

4. a) What is a stack? Explain its concept. [6M]
   b) Implement insert and delete operations on a queue. [6M]

(OR)

5. Write a C program to implement following operations on a singly linked list [12M]
i.Creation ii. Insertion iii. Deletion

UNIT – III

6. a) Write an algorithm to implement binary search. [6M]
b) Explain how to measure the best case, worst case, and average case time complexities of binary search [6M]

(OR)

7. Sort the following numbers using merge sort. Write C routine for implementing it. 12, 7, 34, 23, 54, 38, 76, 24, 18, 45. [12M]

UNIT – IV

8. a) What is a tree? Explain its concept. [6M]
b) Discuss about the inorder, preorder and postorder traversal techniques with suitable examples [6M]

(OR)

9. What is a balanced tree ? Explain its concept. [6M]
Write a routine to implement delete operation on binary search tree. [6M]

UNIT – V

10. a) What is a graph? Explain how to represent a graph. [6M]
b) Write and explain Dijkstra's algorithm with appropriate example. [6M]

(OR)

11. Explain in detail about graph traversal methods. [12M]

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