AR18

CODE: 18EST101 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech II Semester Supplementary Examinations, July-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 with an example. 6M
   b) For the circuit shown in Fig.1 Calculate the $V_1 and V_2$ 6M

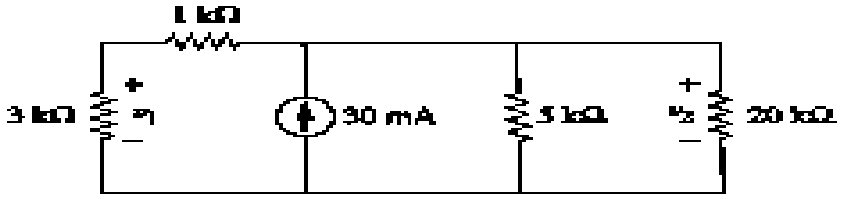

Fig.1

(OR)

2. Determine the **i** and **Vo** in the circuit of Fig. 2. 12M

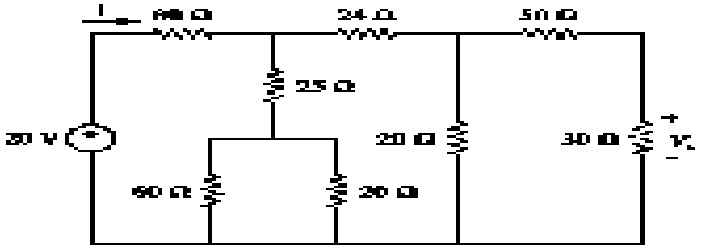

Fig. 2.

UNIT-II

3. a) Define the following i) RMS value, ii) Average value and iii) Form factor iv) Peak factor of an alternating quantity. 6M
   b) In a series RC circuit R= 5 ohms and C= 0.0006F and the voltage across Resistor is V_R=15sin200t. Find the current and total voltage across the circuit. 6M

(OR)

4. a) Give the expressions for average value, RMS value of a sinusoidal waveform. 6M
   b) In a series RL circuit R= 3 ohms and L= 0.03H and the voltage across inductor is V_L=15sin300t. Find the current and Draw the phasor diagram of the circuit. 6M

UNIT-III

5. a) Derive the EMF equation of a DC shunt generator? 6M
   b) Explain the working of 3- point starter with neat diagram. 6M

(OR)

6. a) Derive an expression for the electromagnetic torque developed in a dc machine. 6M
   b) Explain and Draw the Internal and external characteristics of DC shunt generator? 6M

UNIT-IV

7. a) Draw and explain a circuit diagram to perform a test for determining constant loss of single phase transformer? 6M
   b) A 20 KVA,2500/250V, 50Hz, Single-phase transformer gave the following test results: 6M
   O.C Test: 250V, 1.4A, 105W
   S.C Test: 104V, 8A, 320W
   Calculate the voltage regulation at full load at 0.8 p.f.

(OR)

8. a) What is meant by voltage regulation? Derive the expression in a single phase Transformer? 6M
   b) A 10 KVA,2500/250V, Single-phase transformer gave the following test results: 6M
   O.C Test: 250V, 0.8A, 50W
   S.C Test: 60V, 3A, 45W
   Calculate the efficiency at full load at 0.8 p.f.

UNIT-V

9. a) Explain the Principle of Operation of Three- phase induction motor? 6M
   b) Derive an expression for the electromagnetic torque developed in a three phase induction motor? 6M

(OR)

10. a) Draw and explain torque-speed characteristics of three phase induction motor? 8M
    b) A 3-phase, 6 poles, 30Hz induction motor has a full-load slip of 4%. For this motor, calculate the Full-Load speed? 4M

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AR18

CODE: 18EET102 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

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

ELECTRIC CIRCUIT THEORY

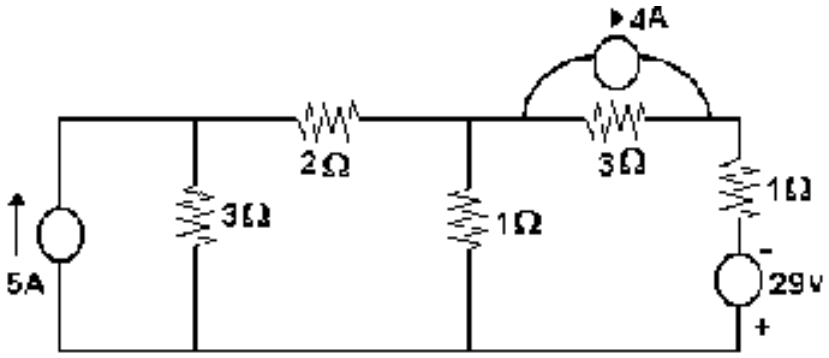
(Electrical and Electronics Engineering)

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

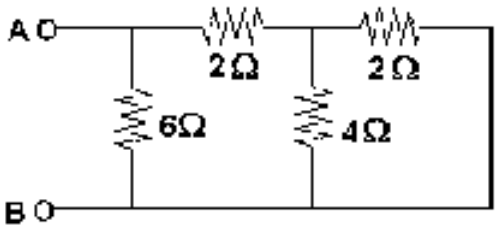
UNIT-I

1. a) Derive expression for energy stored in a capacitor. 6M
   b) Determine the current in the 2 ohms resistor for the circuit shown using nodal analysis. 6M



(OR)

2. a) Determine the equivalent resistance between A and B of the network shown 4M



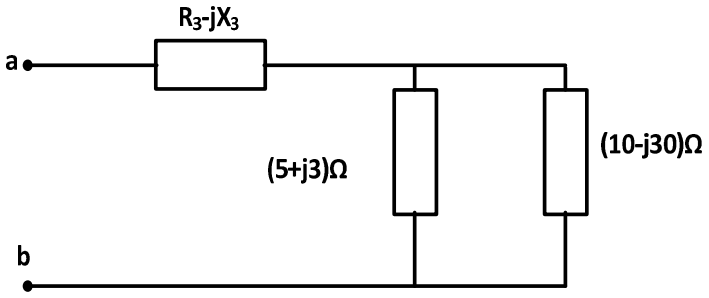
   b) Use mesh analysis to find current through three ohms resistor in the circuit shown in below 8M

UNIT-II

3. Obtain the resonant frequency for a circuit consisting of RL elements connected in parallel to capacitance. Also obtain expression for Q-factor in terms of R, L and C — 12M

(OR)

4. a) The impendence $Z_1 = (5+j3)\ \Omega$ and $Z_2 = (10-j30)\ \Omega$ are connected in parallel as shown in figure. Find the value of X_3 which will produce resonance at the terminals a and b. — 6M



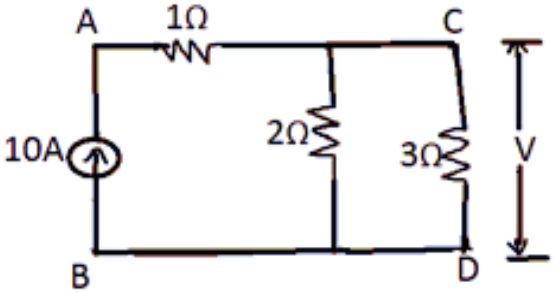
b) A RLC series circuit is to be chosen to produce a magnification of 10 at 100rad/sec. The source can supply a maximum current of 10A and the supply voltage is 100V.The Power frequency impendence of the circuit should not be more than 14.14Ω.Find the values of R,L and C — 6M

UNIT-III

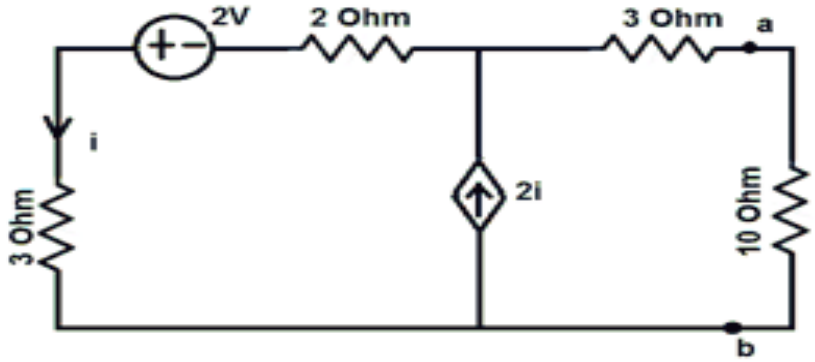
5. With suitable example, explain Super position theorem. — 12M

(OR)

6. a) Verify the reciprocity theorem for the circuit shown in figure. — 6M



b) Find the Norton's equivalent across the terminals **ab** as shown in figure. Hence find the current through resistor 10Ω. 6M

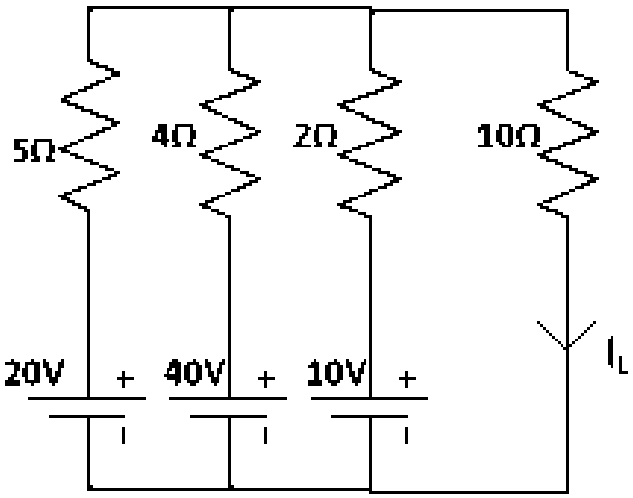


UNIT-IV

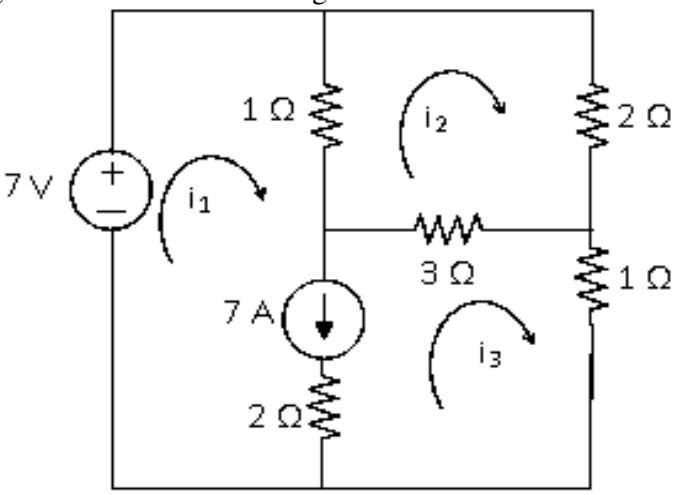
7. a) Explain the compensation theorem. 6M
   b) Derive the condition for receiving maximum power by impedance in case of ac network. 6M

(OR)

8. a) Find the current in 100 ohm resistor by using Millman's theorem. 6M



b) Verify Tellegen's theorem for following circuit 6M



UNIT-V

9.	a)	Derive the relations between line and phase quantities of a balanced three phase star connected system.	6M
	b)	A symmetrical 400 V, 3-phase, supplies a star connected load with $Z_R = 5\ \Omega$, $Z_Y = j5\ \Omega$ and $Z_B = -j5\ \Omega$. Determine the line currents when the phase sequence is RYB.	6M

(OR)

10.	a)	Two wattmeters are used to measure power in a 3 phase, 3 wire load. Determine the total power, power factor and reactive power if the two wattmeter read (i) 1000 watt each, both positive (ii) 1000 watt each, but of opposite sign.	4M
	b)	A 400V, 3 phase, unbalanced, star connected, 3-wire system has $Z_R=(5+j6)\Omega$, $Z_Y=(10+j2)\Omega$, $Z_B=(2+j3)\Omega$. Calculate the line voltages and line currents using Star-delta transformation technique. Assume RYB phase sequence.	8M

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AR18

CODE: 18EST105 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech II Semester Supplementary Examinations, July-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 the operation of Full Wave Rectifier with Induction filter with necessary diagrams. 6M
   b) What are the current components in a p-n diode? Deduce the expression for diode equation 6M

(OR)

2. a) Explain the terms 'Avalanche breakdown' and 'Zener breakdown'. 5M
   b) Derive the expression for transition capacitance of a diode. 7M

UNIT-II

3. a) What is Transistor? Explain operation of a Transistor in CE configuration. 7M
   b) Define α and β of a transistor. For a transistor the base current is 100μA and collector current is 2.9μA. find α and β. 5M

(OR)

4. a) With neat sketches, explain the flow of different current components of a p-n-p transistor. Give their relationship. 5M
   b) Derive the trans conductance g_m and drain resistance r_d of Field Effect Transistor small signal model. 7M

UNIT-III

5. a) Why transistor parameters are called as h-parameters? State the advantages and disadvantages. 7M
   b) In a single stage CE-amplifier circuit, R_s=1KΩ, R_c=10KΩ, V_{cc}=20V, h_{ie}=1KΩ, h_{fe}=50, $h_{re}=2.5X10^{-4}$, h_{oe}=25μA/V. find out R_i, R_o, A_i, and A_v. 5M

(OR)

6. a) Derive an expression for voltage gain of CE amplifier with emitter resistance. 7M
   b) Draw the circuit diagram of CB-amplifier and its h-parameter equivalent circuit 5M

UNIT-IV

7. a) Derive the gain, input resistance and output resistance with feedback for voltage series negative feedback amplifier with the help of block diagram. 7M
   b) Discuss about general characteristics of negative feedback amplifier. 5M

(OR)

8. a) Explain the working of Wien Bridge Oscillator using BJT. Also derive the expression for the frequency of oscillation. 7M
   b) Explain Barkhausen criterion for oscillations. 5M

UNIT-V

9. a) What are the limitations of open-loop configuration? Derive the voltage gain expression for closed loop inverting and non-inverting amplifiers. 7M
   b) Explain briefly the concept of virtual ground in op-amps. 5M

(OR)

10. a) Draw the block diagram of op-amp. Explain the operation of each block. 7M
    b) An inverting amplifier with a gain of 10, uses an op-amp with a slew rate of 0.5v/μs. It must have a flat response up to 40KHz. What maximum peak input signal can be applied without distorting the output. 5M

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AR18

CODE: 18ECT103 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech II Semester Supplementary Examinations, July-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)	Draw the circuit diagram of a full wave rectifier and explain its operation. Draw the input and output waveforms?	6M
	b)	Prove that the efficiency of a full wave rectifier is 81.6%?	6M
		(OR)	
2.	a)	Define the term ripple factor and prove that the ripple factor is 1.21 for half wave rectifier?	6M
	b)	Discuss about the harmonics present in the rectifier circuit?	6M

UNIT-II

3.	a)	Explain how the ripple voltage is eliminated in a full wave rectifier using capacitive filter?	6M
	b)	Compare the performance of various filters used in rectifiers?	6M
		(OR)	
4.	a)	Define the term regulation and explain the working of a transistor series regulator?	6M
	b)	Explain why Zener diodes are used for voltage regulation applications?	6M

UNIT-III

5.	a)	Explain the need of an operating point in the amplifier circuit?	6M
	b)	Explain the terms thermal runaway and thermal stability?	6M
		(OR)	
6.	a)	Explain how stability is achieved in collector to base bias circuit?	6M
	b)	Derive the expression for stability factor S in a Collector base bias circuit?	6M

UNIT-IV

7.	a)	Draw the low frequency hybrid model of a transistor and define various h parameters?	6M
	b)	Draw the input and output characteristics of a BJT in CB configuration and write the expression for h parameters?	6M
		(OR)	
8.	a)	Draw the low frequency model of BJT in CE configuration and derive the expression for amplifier parameters?	6M
	b)	Compare CE, CB, CC with respect to their low frequency h parameters?	6M

UNIT-V

9.	a)	Derive the expression for closed loop gain of a negative feedback amplifier?	6M
	b)	Explain the effect of negative feedback on input and output resistances and derive necessary expressions?	6M
		(OR)	
10.		Explain different feedback configurations and compare their parameters?	12M

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AR16

CODE: 16EE1004 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

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

BASIC ELECTRICAL & ELECTRONICS ENGINEERING

(Common to CE & ME Branches)

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

Answer ONE Question from each Unit

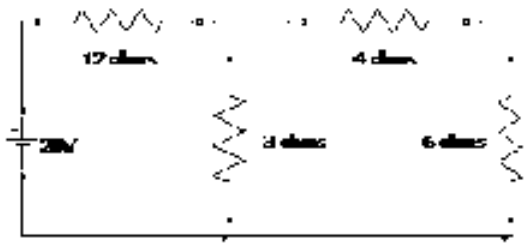
All Questions Carry Equal Marks

All parts of the question must be answered in one place only

UNIT-I

1. a State and Explain Kirchhoff's laws with an example. **8M**

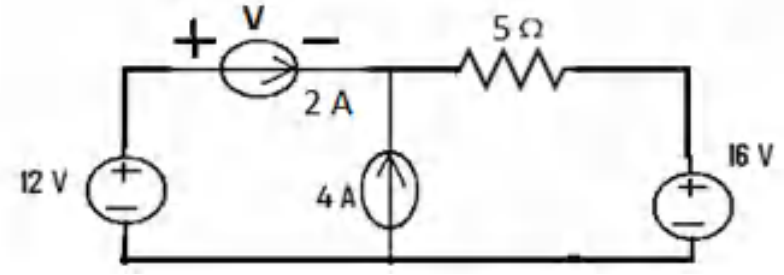
   b Find the current in 3 Ω resistor for the circuit shown in Figure **6M**



(OR)

2. a Explain the star-delta and delta-star transformation for a resistive network **6M**

   b Find the voltage 'V' in the circuit shown in the figure below **8M**



UNIT-II

3. a Derive the expression for the e.m.f induced in a DC machine by using fundamental terms. **8M**

   b A 6-pole machine has an armature with 90 slots and 8conductors/slot and runs at 1000rpm, the flux/ pole is 0.05wb. Determine the induced e.m.f if the winding is lap connected. **6M**

(OR)

4.		With Neat diagram, explain the construction and operation of DC Machine	**14M**

UNIT-III

5.	a	Derive EMF equation of a single-phase transformer	**6M**
	b	A 40 KVA,3300/240 –V,50 Hz,1- phase transformer has 660 turns on the primary. Determine (i) the number of turns on the secondary (ii) the approximate value of primary and secondary full load currents.	**8M**

(OR)

6.	a	What is meant by voltage regulation? Derive the expression for voltage regulation in a single phase transformer	**7M**
	b	Explain the working principle of three phase induction motor.	**7M**

UNIT-IV

7.	a	With the help of neat sketch, explain the working principle of 3Phase alternator	**8M**
	b	Explain the procedure to find the regulation of three phase alternators by using synchronous impedance method	**6M**

(OR)

8.	a	Discuss the types of electrical instruments	**6M**
	b	Explain the principle of operation of permanent magnet moving coil instrument	**8M**

UNIT-V

9.	a	With a neat sketch explain operation of a PN junction diode Draw its V-I characteristics	**7M**
	b	Explain the operation of PNP transistor and draw its characteristics.	**7M**

(OR)

10.		Draw and explain the circuit diagram of full wave rectifier having two diodes and also derive expression for average value and rms value.	**14M**

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AR16

CODE: 16EC1002 **SET-1**

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

UNIT-I

1	(a)	Convert the following binary codes into gray codes i. $(11001100)_2$ ii. $(1111)_2$ iii. $(0000)_2$	**6M**
	(b)	Draw the block diagram of 4 bit even parity generator and write its application.	**8M**
		(OR)	
2	(a)	Find the 2's complement of the following binary numbers i. 1001 ii. 0110 iii. 1111	**6M**
	(b)	Find the Hamming codeword for the message vector M = {1101}. Use evenparity.	**8M**

UNIT-II

3	(a)	Simplify the following Boolean expression $Y = A + \bar{A}B + ABC + ABCD$	**6M**
	(b)	Design Ex-OR gate using minimum number of NAND gates	**8M**
		(OR)	
4	(a)	Convert the following Boolean expression in to standard SOP form $Y = AC + \bar{B}$	**6M**
	(b)	Prove that $AB + \bar{A}C + BC = AB + \bar{A}C$ using Boolean algebra.	**8M**

UNIT-III

5 (a) Simplify the following SOP using K-map method. **6M**

$$Y = \sum(0,2) + \sum d(1,3,4,5,6,7)$$

(b) Simplify the following SOP using K-map method. **8M**

$$Y = \sum(1,3,5,7,9,10,11,13,14) + \sum d(0,4,6,8)$$

(OR)

6 (a) Simplify the following SOP using K-map method. **6M**

$$Y = \sum(0,1,3,4,6,7)$$

(b) Simplify the following POS using K-map method. **8M**

$$Y = \pi(2,4,5,6,9,10,12,13)$$

UNIT-IV

7 (a) What is the advantages of look-a-head adder circuit anddraw the circuit diagram. **6M**

(b) Design 8X1 multiplexor using two 4x1 multiplexors. **8M**

(OR)

8 (a) Explain the differences between de-multiplexor and decoder. **6M**

(b) Draw the logic circuit for a two bit magnitude comparator and explain the operation. **8M**

UNIT-V

9 (a) What are the differences between synchronous and asynchronous counters. **6M**

(b) Draw the logic circuit of JK flip-flop and explain its operation. Also explain the advantage of JK flip-flop over SR flip-flop. **8M**

(OR)

10 (a) Explain how JK flip-flop can be converted in to D flip-flop. **6M**

(b) Design MOD- 10 Johnson counter and explain its operation using truth table. **8M**

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AR16

CODE: 16EC1001 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech II Semester Supplementary Examinations, July-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) Derive the expression for the velocity acquired by an electron, when placed in an accelerating field E. 10M

   b) An electron starts at the negative plate of a plane parallel plate capacitor across which a voltage of 2000 V is applied. The distance between the plates is 3 cm.
   i. How long has the electron been travelling when it acquires a speed of 10^7 m/sec? 4M
   ii. How far has the electron travelled before it acquires this speed?
   iii. What potential has the electron fallen through when it acquires this speed?

(OR)

2. a) What are the applications of CRO? Give the block schematic of CRO and explain. 10M

   b) In a CRT, the length of the deflecting plates in the direction of the beam is 2 cm, the spacing of the plates is 0.5 cm and the distance of the fluorescent screen from the centre of the plate is 18 cm. Calculate the deflection sensitivity in m/volt if the final anode voltage is (i) 500 V (ii) 1000 V (iii) 1500 V 4M

UNIT-II

3. a) Explain about classification of materials using energy band diagram. 10M

   b) A specimen of intrinsic Germanium at 300^oK having a concentration of carriers of $2.5x10^{13}/cm^3$ is doped with impurity atoms of one for every million germanium atoms. Assuming that all the impurity atoms are ionised and that the concentration of Ge atoms is $4.4x10^{22}/cm^3$, find the resistivity of doped material. (μ_n for Ge = 3600 cm^2/volt-sec). 4M

(OR)

4. a) Explain about Hall Effect. Derive the expression for Hall Voltage. 10M

b) The Hall Effect is used to determine the mobility of holes in a p-type Silicon bar. Assume the bar resistivity is 200,000 Ω-cm, the magnetic field $B_z = 0.1$ Wb/m^2 and d = w = 3mm. The measured values of the current and Hall voltage are 10mA and 50 mv respectively. Find μ_p mobility of holes. 4M

UNIT-III

5. a) Draw the forward and reverse characteristics of a p-n junction diode and explain them qualitatively. 10M

b) Find the value of (i) D.C resistance and a.c resistance of a Germanium junction diode, if the temperature is 25°C and 10= 20μA with an applied voltage of 0.1 V. 4M

(OR)

6. a) Compare Avalanche, Zener and Thermal Breakdown Mechanisms. 7M

b) Explain the working of a Zener diode voltage regulator. 7M

UNIT-IV

7. a) Describe the V-I characteristics of a BJT in Common emitter Configuration 10M

b) A Germanium transistor has I_{CBO}=5μA at 27^{o}C and β= 100. Find I_C when I_B =0.2mA and assuming β does not increase with temperature, find the value of new collector current, if the transistor's temperature rises to 47^{o}C. 4M

(OR)

8. a) Derive relation between α, β and γ. 8M

b) A transistor has I_B=20μA and I_C=1mA. Find
i) β of the transistor, ii) α of the transistor, iii) emitter current I_E, iv) if I_B changes by +10μA and I_C changes by +1.5 mA, find the new value of β. 6M

UNIT-V

9. a) Show that for a JFET, $g_m = \frac{2}{|V_p|}\sqrt{I_{DSS} I_D}$ 7M

b) Explain the construction details of JFET. 7M

(OR)

10. a) Compare JFET and MOSFET 7M

b) Explain the V-I characteristics of UJT 7M

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AR16

CODE: 16CS1002 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech II Semester Supplementary Examinations, July-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 algorithm. Write the characteristics of it. What is need of analysing algorithms?	7M
	b)	What are the main objectives of data structure? Define data structure with examples.	7M
		(OR)	
2.	a)	Discuss about various asymptotic notations to analyse algorithms.	7M
	b)	Explain the design methodology for implementing recursive algorithms	7M

UNIT-II

3.	a)	Explain bubble sort with an example.	7M
	b)	Show the step by step procedure to search the element 50 from the given list of elements using binary search: 10, 20, 30, 40, 50, 60, 70, 80	7M
		(OR)	
4.	a)	Sort the following list of elements using quick sort: 15, 12, 34, 23, 56, 30, 7, 5, 10	7M
	b)	Write the algorithm for linear search.	7M

UNIT-III

5.	a)	How a stack can be represented by an array?	7M
	b)	How the enqueue and dequeue operations are performed in a queue?	7M
		(OR)	
6.	a)	Write the algorithm to evaluate a postfix expression using stack.	7M
	b)	Write the algorithm to convert an infix expression into prefix expression using stack.	7M

UNIT-IV

7.	a)	Write an algorithm to insert an element at the end of a single linked list.	7M
	b)	Discuss how to delete an element at a particular position in a single linked list.	7M
		(OR)	
8.	a)	Write an algorithm to represent a Queue using linked list.	7M
	b)	Explain the insertion and deletion operation in a double linked list.	7M

UNIT-V

9.	a)	Write the algorithm to perform in-order, post-order traversal in a binary tree.	7M
	b)	Explain the BFS technique to traverse a graph with an example.	7M
		(OR)	
10.	a)	Create a binary search tree from the following list of elements: 15, 14, 45, 23, 54, 67, 21, 3, 7, 8, 36. Then delete the root of the binary tree.	7M
	b)	Write the steps and routine for non-recursive pre-order traversal in a binary tree.	7M

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AR13

Code: 13EE1002 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

I B.Tech. II Semester Supplementary Examinations, July, 2019

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

Time – 3 hours **Max. Marks: 70**

PART – A

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

1) a) Define ohms law
   b) Two resistors of equal resistance 4Ω are connected in parallel. Find its equivalent resistance.
   c) What is the function of brushes in a DC machine?
   d) Write the expression for terminal voltage of a DC shunt generator
   e) What you mean by an ideal transformer.
   f) Define slip.
   g) What is indicating instruments?
   h) What are the various controlling systems used in measuring instruments.
   i) Draw the average voltage wave form of half wave bridge rectifier.
   j) What is SCR?

PART – B

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

UNIT-I

2) a) State and explain KCL and KVL. [6M]
   b) Find the current in 3 Ω resistor for the circuit shown in Fig.1. [6M]

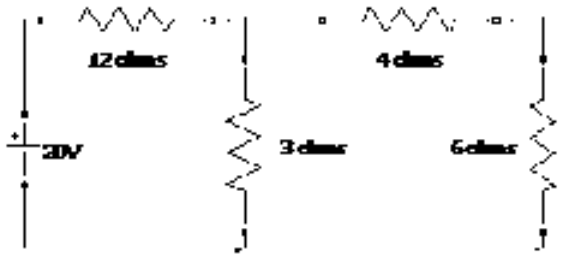

Fig.1

(OR)

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Code: 13EE1002 **SET-2**

3) Determine the current flowing through 2Ω resistor in the network shown in Fig.2 [12M]

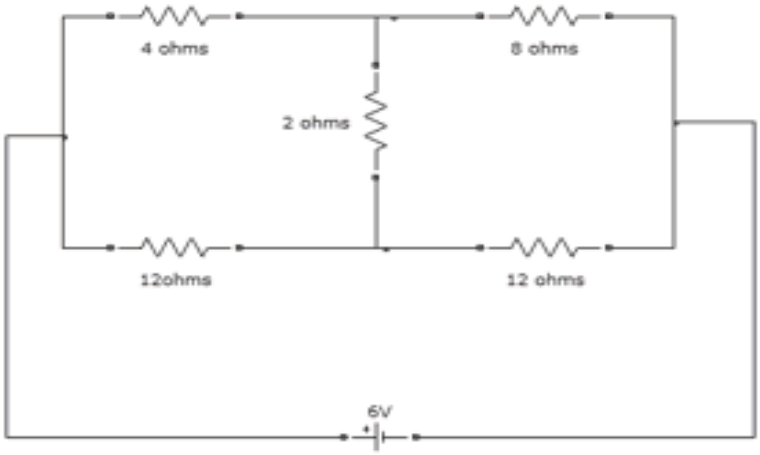

Fig. 2

UNIT-II

4) a) Explain the principle of operation and working of a dc shunt motor. [6M]
b) A 6-pole machine has an armature with 90 slots and 8 conductors/slot and runs at 1000rpm, the flux/ pole is 0.05wb. Determine the induced e.m.f if the winding is lap connected. [6M]

(OR)

5) a) Discuss briefly the characteristics of DC shunt and series motor. [6M]
b) Draw the neat diagram of 3 point starter and explain its operation. [6M]

UNIT-III

6) a) Deduce the expression for e.m.f in a1- ϕ transformer and give the expressions for voltage ratio and turns ratio. [6M]
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%. [6M]

(OR)

7) a) Draw and explain torque speed characteristics of 3- ϕ induction motor. [6M]
b) Describe the regulation of alternator by synchronous impedance method. [6M]

UNIT-IV

8) a) Describe the various torques associated with measuring instruments. [6M]
b) With the help of neat diagram, explain the principle of a moving iron instrument. [6M]

(OR)

9) a) With the help of neat diagram, explain the principle of a PMMC instrument. [6M]
b) Explain the various basis for classification of electrical measuring instruments. [6M]

UNIT-V

10) Describe the working of full wave bridge rectifier and derive the average and RMS value of output waveform. [12M]

(OR)

11) Describe the working of SCR and explain its V-I characteristics. [12M]

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CODE: 13BS1002 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

I B.Tech II Semester Supplementary Examinations, July-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) Write merits of Newton-Raphson Method
   b) Check whether the equation $e^x - 3x = 0$ has a root in the interval (0,1),
   c) Find $\Delta \log f(x)$
   d) State Lagrange's interpolation formula
   e) State Simpson's $\frac{1}{3}$ rule
   f) Write demerits of the Taylor's series
   g) Find change of scale property
   h) Find $L\{2^t\}$
   i) Find the general solution of $z = px + qy + f(p,q)$
   j) Solve $\left(D^2 + 2DD' + D'^2\right)z = 0$

PART-B

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

UNIT-I

2. Find the root of the equation $x\log_{10}(x) = 1.2$ using False position method **12M**

(OR)

3. a) Find out the square root of 25 given $x_0 = 2, x_1 = 7$ using Bisection method **6M**
   b) Fit a curve of the form $y = ab^x$ in least square method for the following data **6M**

x	2	3	4	5	6
y	144	172.8	207.4	248.8	298.5

UNIT-II

4. a) Show that $(i)\Delta\nabla = \Delta - \nabla = \delta^2 \; (ii)\mu^2 = 1 + \frac{\delta^2}{4}$ **3M+3M**

   b) Applying Newton's interpolation formula, compute the value of $\sqrt{5.5}$ given that $\sqrt{5} = 2.236, \sqrt{6} = 2.449, \sqrt{7} = 2.646$ and $\sqrt{8} = 2.828$ **6M**

(OR)

5. Using Simpson's $\frac{1}{3}$ rule evaluate $\int_0^6 \frac{1}{1+x^2}\,dx$ by dividing the range into 6 equal parts **12M**

UNIT-III

6. Find $y(0.1)$ using Runge-Kutta fourth order formula given that $\frac{dy}{dx} = x + x^2 y, y(0) = 1$ **12M**

(OR)

7. Find the value of y for $x = 0.4$ by Picard's method, given that $\frac{dy}{dx} = x^2 + y^2, y(0) = 0$ **12M**

UNIT-IV

8. a) Find $L\{t^2 \cos at\}$ **6M**

   b) Evaluate $L\left\{\int_0^t \frac{\sin t}{t}\,dt\right\}$ **6M**

(OR)

9. Solve the equation by transform method **12M**
   $(D^2 - 3D + 2)y = e^{3t}$ with $y(0) = 1, y'(0) = 0$

UNIT-V

10. a) From the partial differential equation by eliminating the arbitrary function from $xyz = f(x + y + z)$ **6M**

    b) Solve $p^2 + q^2 = x^2 + y^2$ **6M**

(OR)

11. Solve $x(y - z)p + y(z - x)q = z(x - y)$ **12M**