AR18

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I B.Tech I / I B.Tech II Semester Supplementary Examinations, Oct / November-2021
BASIC ELECTRICAL ENGINEERING
(Common to all Branches)

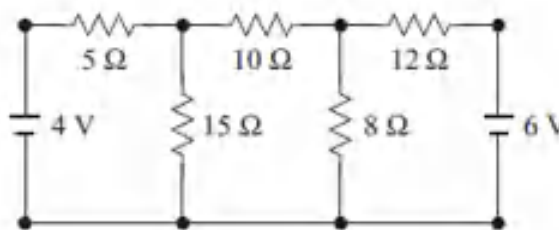Time: 3 Hours   Max Marks: 60

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   4M
    b) Solve the network shown in Fig, for the current in the 8Ω resistor by using   8M
        Kirchhoff's laws.

(OR)

2. a) Explain about Star–Delta transformation with example.   6M
    b) Find the equivalent resistance as viewed through the terminals   6M
        i) B and C   ii) A and N
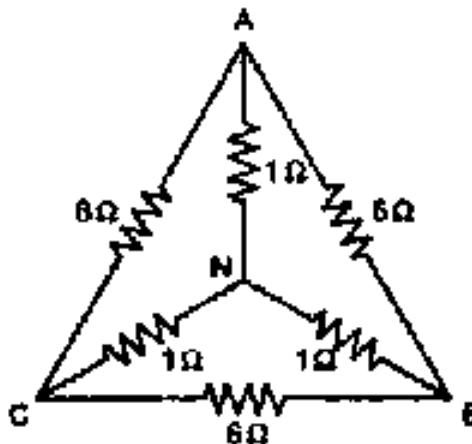
UNIT-II

3. a) Determine current passing through RL series circuit for supply voltage of   12M
        $v=v_m\sin\omega t$ using sinusoidal analysis and also draw phasor diagrams.

(OR)

4. a) Define i) RMS value ii) average value iii) form factor   6M
   b) Determine Average value, RMS value and Form factor for the sinusoidal   6M
      waveform.

UNIT-III

5. a) Derive EMF equation of a DC generator.   6M
   b) A 6-pole lap wound DC generator has 600 conductors on its armature. The   6M
      flux per pole is 0.02 wb. Calculate (i)the speed at which the generator must
      run to generate 300W (ii)What would the speed if it is wave wound

(OR)

6. a) Explain the working of three point starter with neat sketch?   6M
   b) A 4-pole, 250V dc shunt motor has a lap connected armature with 960   6M
      conductors. The flux per pole is 20mwb. Calculate the torque developed by
      the armature and the useful torque when the current taken by the motor is
      30A. The armature resistance is 0.12Ω and the field resistance is 125Ω. The
      mechanical and iron losses are 825W.

UNIT-IV

7. a) Explain how the maximum efficiency of a transformer can be predicted from   6M
      the results of OC and SC test results.
   b) A 5KVA,2000/250V,1-Φ Transformer gave the following test results   6M
      O.C TEST: 250V,0.8A, 50W (L.V SIDE)
      S.C TEST: 60V, 3A, 45W (H.V SIDE).
      Calculate the efficiency at full load and half load at 0.8 power factor
      lagging?

(OR)

8. a) Derive the EMF equation of a 1- ø transformer.   6M
   b) Explain open circuit and short circuit tests for a single phase transformer.   6M

UNIT-V

9. a) Explain the types of rotors in 3 phase induction motor.   6M
   b) A 3 phase, 6 pole 50HZ induction motor develops 3.73KW at 960r.p.m.   6M
      what will be the stator input if the stator loss is 240W.

(OR)

10. a) Draw and explain the Speed-Torque Characteristics?   6M
    b) The power input to a 4-pole,3-phase, 50HZ motor is 52KW; the speed is   6M
       14600r.p.m. the stator losses are 1.6KW and the friction and windage
       losses are 2KW. Find the slip, the rotor copper losses and the efficiency.

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I B.Tech I Semester Supplementary Examinations, Oct / November-2021
BASIC ELECTRIC CIRCUIT ANALYSIS
(Electrical and Electronics Engineering)

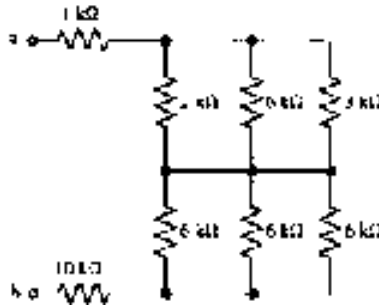Time: 3 Hours   Max Marks: 70

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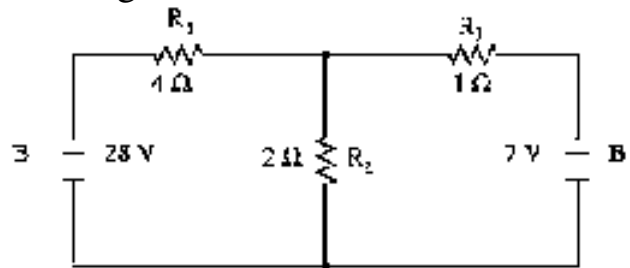All parts of the Question must be answered at one place

UNIT-I

1. a) Explain independent and dependent sources in brief   7M
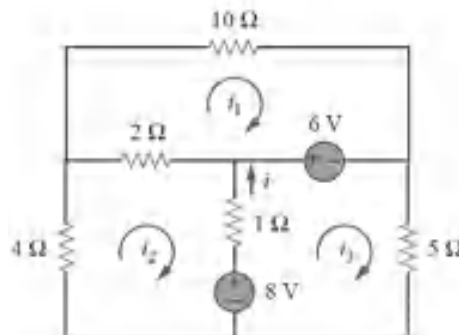   b) Find R_{ab} in fig. shown below.   7M

(OR)

2. a) Explain KCL and KVL in brief.   7M
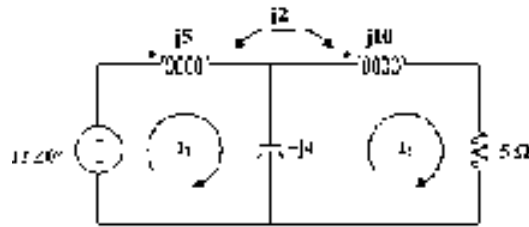   b) Find current through each resistor.   7M

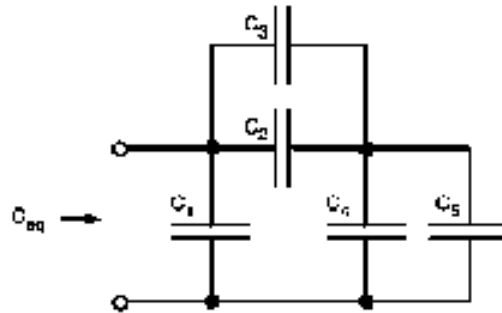

UNIT-II

3. a) Find i_1 i_2 i_3 in fig shown below.   7M

b) Find i_1, i_2 in fig shown below. 7M

(OR)

4. a) Find C_{eq} in fig. shown below. Each capacitance value is $2\mu F$. 4M

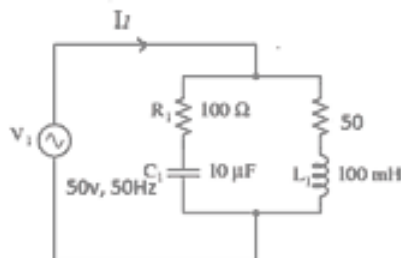b) i) Explain Faraday laws of Electromagnetic Induction. 6M
   ii) Define a) self induced emf b) mutual induced emf 4M
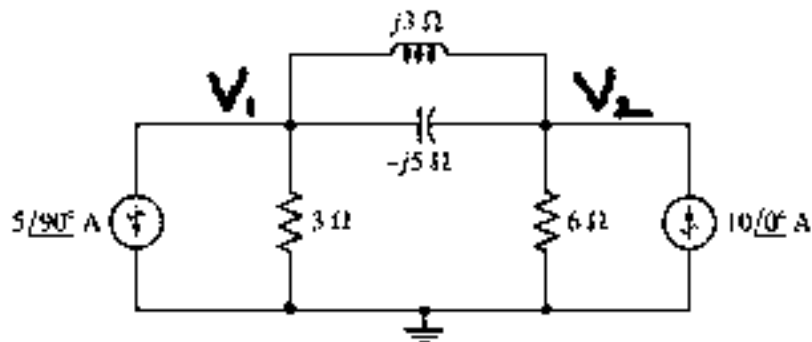
UNIT-III

5. a) Find I_1 in fig. shown below. 6M

b) Define i) form factor ii) peak factor iii) cycle iv) 8M
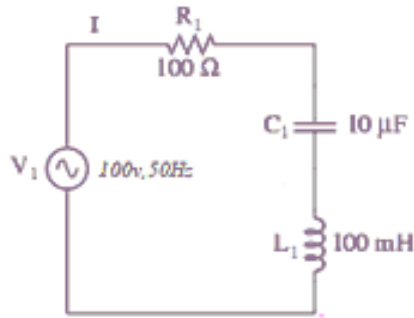   Admittance

(OR)

6. a) Find V_1 and V_2 in fig. shown below. 7M

b) Define i) RMS value ii) Average value iii) frequency iv)   **7M**
power factor of an alternating quantity.

UNIT-IV

7. a) Find I in fig. shown below.   **7M**

b) Write the differences between series and parallel resonances   **7M**

(OR)

8. a) A series RLC circuit consist of a 50Ω resistance ,0.2H **7M**
inductance and10µF capacitor with an applied voltage of
20V. Determine the resonant frequency. Find the Q factor of
the circuit. Compute the lower and upper frequency limit and
also find the bandwidth of the circuit

b) Find I in fig. shown below.   **7M**
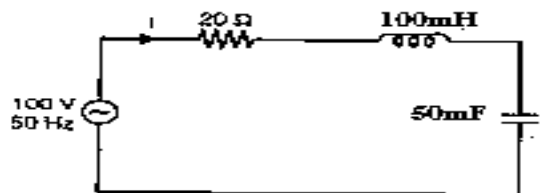
UNIT-V

9. a) Draw the phasor diagram for a balanced Star-connected   **7M**
supply system and establish the relation between line
voltages and phase voltages.

b) The phase voltage of a star connected 3 phase AC generator **7M**
is 230 volts. calculate the(i) line voltage (ii) active power
output if the line current of the system is 15A the power
factor of 0.7 and (iii) active power and reactive power
components of the phase current

10. a) Three impedances of $(7+4j)$ Ω $(3+2j)$ Ω and $(9+2j)$ Ω are 7M
    connected between neural and the red, yellow and blue
    phases respectively of a three phase four wire system, the
    line voltage is 440 volt Calculate i)the current in the each
    line and ii) the current in the neutral wire.

    b) Briefly explain 3 -phase unbalanced power using two 7M
    wattmeter method

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ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I B.Tech I Semester Supplementary Examinations, Oct / November-2021
NETWORK ANALYSIS
(Electronics & Communication Engineering)

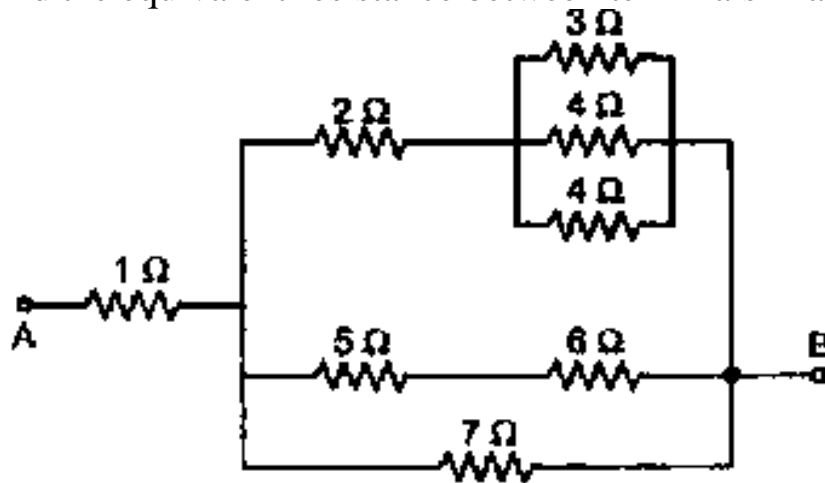Time: 3 Hours   Max Marks: 70

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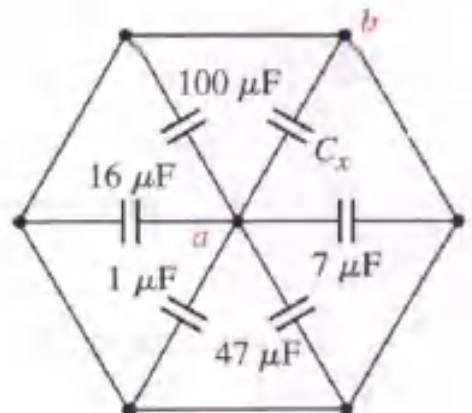
UNIT-I

1. a) Explain in brief elements of electrical network.   8M
   b) Find the equivalent resistance between terminals A and B   6M

(OR)

2. a) The network of figure stores 534.8 micro Joules of energy when a voltage of 2.5V is connected to terminals a and b, what is the value of Cx?   8M

   b) Discuss about voltage and current division rules.   6M

3. a) Explain in brief Kirchhoff's laws   6M
    b) Use mesh analysis to find i_x in the circuit shown in figure   8M
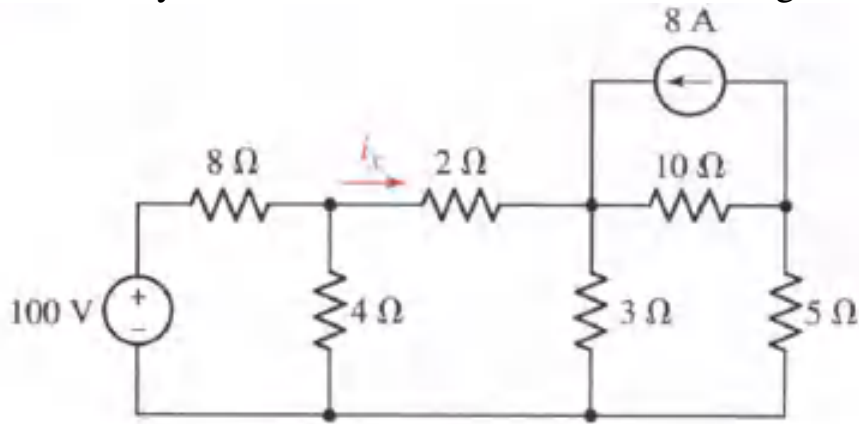
(OR)

4. a) Compute the I_{avg} and I_{rms} for the saw-tooth waveform shown   7M
        in Figure

    b) Use series and parallel reduction technique and find the   7M
        Power delivered by the source .
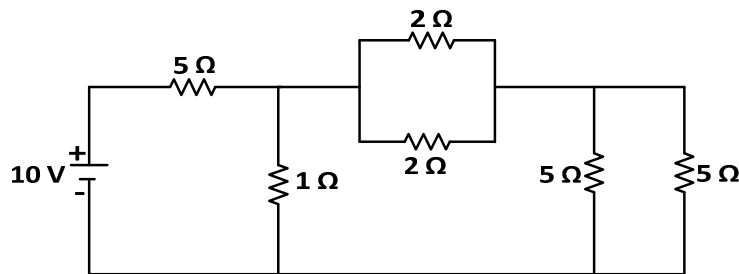
UNIT-III

5. a) Define impedance, admittance , reactance and conductance.   6M
   b) If $i_s = 0.4 \cos 500t$ A in the circuit shown in figure, simplify   8M
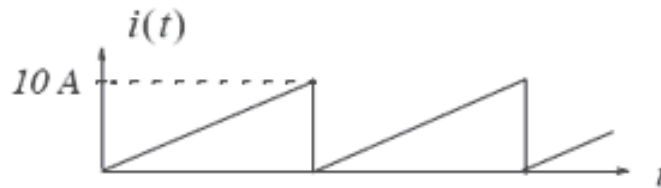   the circuit and then find (i) $i_L(t)$; (ii) i_X (t).
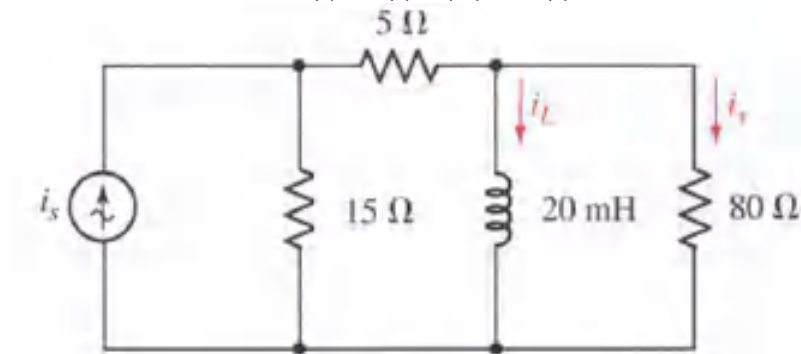
(OR)

6.   Obtain the resonant frequency and quality factor and   14M
   bandwidth for a parallel RLC circuit.

UNIT-IV

7. a) State and explain Superposition theorem with suitable   7M
      example
   b) State and explain Thevenin's theorem with suitable example   7M

(OR)

8. a) State and explain Reciprocity theorem with suitable example   6M
   b) Find the Maximum power that could drawn from source   8M
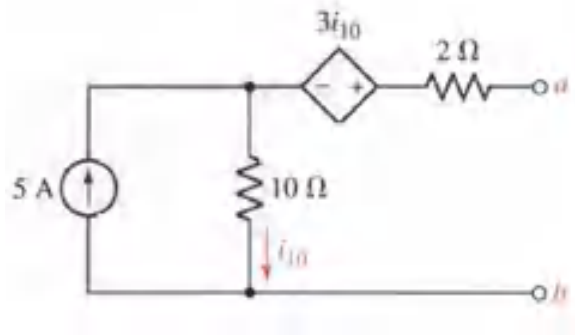
9. a) Obtain Z parameters in terms of Y parameters   7M
    b) Obtain ABCD parameters in terms of Z parameters   7M

(OR)

10. a) The switch in the circuit of figure has been closed since a   7M
       long time. If the switch is opened at t=0, find (i) i_L the instant
       after the switch changes.
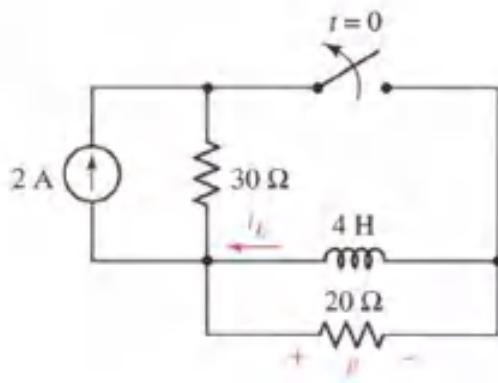
    b) Explain in brief the response of RLC series circuit   7M

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ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I B.Tech I Semester Supplementary Examinations, Oct / November-2021
ELECTRICAL AND ELECTRONICS ENGINEERING
(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. Compute the necessary equations for delta to star connection when the resistors $R_1, R_2 R_3$ are connected in delta.   **14M**

(OR)

2. a) Derive the expression for energy stored in capacitor?   **7M**
   b) (i) Find the value of an inductor which carries 2 A. of current and in which 20 J of energy is stored.   **7M**
      (ii) Find the value of a capacitor with 500 volts across it, in which 20 J of energy is stored.

UNIT-II

3. Discuss various speed control methods of a DC motor?   **14M**

(OR)

4. a) A four-pole generator has 500 conductors on the armature. If the generator is running at 1200 rpm, find the average voltage generated between brushes for (a) a lap winding, (b) a wave winding. The total flux per pole is 10^6 lines.   **7M**
   b) Explain the operation of 3-point starter?   **7M**

UNIT-III

5. a) An induction motor draws 25 A from a 460–V, three-phase line at a power factor of 0.85, lagging. The stator copper loss is 1000 W, and the rotor copper loss is 500 W. The "rotational" losses are friction and windage = 250 W, coreloss = 800 W, and stray load loss = 200 W. Calculate   **7M**
      (i) the air-gap power, P_g,
      (ii) the developed mechanical power, DMP,
      (iii) the output horsepower, and (iv) the efficiency.
   b) Discuss about Open circuit tests in single phase transformer?   **7M**

(OR)

6. a) Discuss the parameters of single phase transformers: 7M
        i. Efficiency   ii. Voltage regulation
   b) Explain torque-speed characteristics of three phase induction   7M
   motor?

UNIT-IV

7.   Explain the principle of operation of alternator and derive its   14M
   EMF equation?

(OR)

8.   Explain briefly the construction and operation of Moving   14M
   Coil instruments?

UNIT-V

9. a) Explain the operation of Center tapped rectifier with neat   7M
   diagrams?
   b) For the half-wave rectifier circuit shown, determine   7M
   (i) I_{dc},
   (ii) I_{rms},
   (iii) the ripple factor r,
   (iv) the rectifier efficiency
   (v) the peak inverse voltage PIV.

(OR)

10. a) Explain P-N junction diode and its V-I characteristics with   7M
   neat diagram?
   b) Discuss the modes of operation of N-P-N transistor?   7M

AR16

CODE: 16EE1004   SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I B.Tech II Semester Supplementary Examinations, Oct / November-2021
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 at one place

UNIT-I

1. a) State Kirchhoff's current and voltage laws. Explain with suitable examples.   7M
    b) Derive the expressions for converting a Delta network to a Star network.   7M

(OR)

2. a) Write the brief notes on V-I relationships for the following elements i) Inductor ii) capacitor.   6M
    b) Derive the expression for parallel RLC circuit to determine voltage drop across each element.   8M

UNIT-II

3. a) Derive an E.M.F. equation of D.C Generator.   7M
    b) Classify the D.C. generators, Draw and explain external characteristics of D.C. shunt generator.   7M

(OR)

4. a) Explain any one of the speed control methods of D.C. shunt motor.   8M
    b) A 4-pole motor is fed at 440v and takes an armature current of 50A. The resistance of the armature circuit is 0.28 ohms. The armature is wave-wound with 888 conductors and the useful flux per pole is 0.023Wb. Calculate the speed.   6M

UNIT-III

5. a) Explain the principle and operation of 3-Phase Induction motor with neat diagram.   7M
   b) Derive an E.M.F. equations of single phase transformer.   7M

(OR)

6. a) Discuss the procedure for implementing OC and SC tests on a single phase transformer. How the parameters can be found from these tests?   8M
   b) Compare 3-phase induction motors and determine the synchronous speed and slip of a 6pole, 3-phase, 50Hz induction motor.   6M

UNIT-IV

7. a) Explain the principle and operation of an alternator with neat diagram.   7M
   b) Explain the procedure to find the regulation of alternator by synchronous impedance method.   7M

(OR)

8. a) Explain the different torques in measuring instruments.   8M
   b) Explain the principle operation of attraction type moving iron instrument with neat diagram and mention its advantages.   6M

UNIT-V

9. a) Explain the working and operation of full wave rectifier and draw the output wave forms.   8M
   b) Explain the working of transistor and draw the symbols of P-N-P and N-P-N transistor.   6M

(OR)

10. a) Explain the working of P-N junction diode and its applications.   6M
    b) A half wave rectifier has a load of 3.5 kΩ. If the diode resistance and secondary coil resistance together has a resistance of 800 Ω. The input voltage has a single voltage of peak value 240V.Calculate i) Peak, average and RMS value of current flowing ii) D.C. power output iii) A.C. power input and iv) efficiency of the rectifier.   8M

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AR13

CODE: 13EE1002   **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I B.Tech II Semester Supplementary Examinations, Oct / November-2021

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

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

PART-A

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

1. a) V-I relation of R, L, C.
   b) Voltage division formula.
   c) Applications of DC Shunt Generator.
   d) Types of DC Motors.
   e) Equation for slip of a 3-phase induction motor.
   f) Condition for maximum efficiency of a transformer.
   g) Define voltage regulation of a transformer.
   h) Mention the three torques in an indicating instrument.
   i) Characteristics of a diode.
   j) Output wave form of a half wave rectified wave.

PART-B

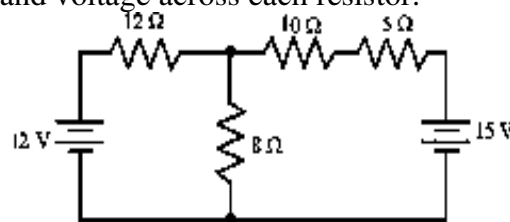**Answer one question from each unit**   **[5x12=60M]**

UNIT-I

2. a) Explain Kirchhoff's laws with suitable examples.   **6 M**
   b) Find current and voltage across each resistor.   **6 M**
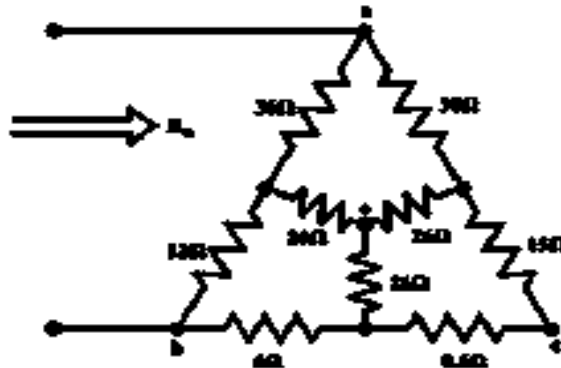

(OR)

3. a) Explain about current division and voltage division. Where do you use them?   **6 M**
   b) Find R_{eq} for the circuit.   **6 M**

UNIT-II

4. a) Derive the equation for the efficiency of a DC Machine.   **6 M**
    b) What is the necessity of a starter? Explain three point starter with a neat   **6 M**
        diagram.

(OR)

5. a) Derive the EMF equation of DC generator.   **6 M**
    b) Explain any one of the speed control methods of a DC Motor.   **6 M**

UNIT-III

6. a) Derive the emf equation of an alternator.   **6 M**
    b) What are the various parts of an induction motor? Explain in detail.   **6 M**

(OR)

7. a) How do you determine the efficiency of a transformer?   **6 M**
    b) How a rotating magnetic field is produced in 3-phase induction motor?   **6 M**

UNIT-IV

8.   What are the types of measuring instruments? Explain about any one type.   **12 M**

(OR)

9. a) What are the different torques needed for an indicating instrument?   **6 M**
    b) How do you increase the range of a volt meter?   **6 M**

UNIT-V

10. a) Explain about full wave rectifier. Also draw its waveform.   **6 M**
    b) Diode Characteristics and Applications.   **6 M**

(OR)

11. a) Explain the operation of PNP transistor. Draw its characteristics.   **6 M**
    b) Write about SCR.   **6 M**