Tutorial – 1 (Module -3(Ch-6, 7, 8, 9))

1. What is Battery? Explain the construction and working of any battery.
2. Explain the following methods of charging a battery (i) Constant current method (ii) Constant voltage method
3. Draw & explain staircase wiring with necessary sketch.
4. Explain the following wiring systems (i) Cleat wiring (ii) conduit wring
5. What do you mean by (i) Ampere hour efficiency and (ii) Watt-hour efficiency of a battery
6. Explain the construction of a 3-Φ cable.
7. Explain different types of lighting schemes.
8. List lumens requirements for various categories of illumination.
9. What is the need of earthing? Explain the different method of earthing.
10. What is an electric shock? Why grounding is required?
11. List various protective devices used in the electrical circuit. Write a brief note on ELCB.
12. Explain working of ELCB &MCB.
13. Explain the working of a miniature circuit breaker.
14. Explain Plate Earthing & Pipe Earthing.
15. Explain the wiring diagram of a tube light with choke and glow starter.
16. State types of fuse and explain any one.

Tutorial – 2 (Module-2(Ch-4, 5))

1. Prove that current through pure inductor is always lagging by 90^o to its voltage and power consumed is zero.
2. Define the following term: (1) RMS value (2) Average value (3) Form factor (4) Peak factor regarding a.c. Quantity.
3. Draw the phasor diagram in R-L circuit. Draw impedance triangle and power triangle.
4. Explain series R-L-C circuit with the phasor diagram for XL>XC; XL<XC & X L =XC.
5. Explain the phenomena of electrical resonance in R –L –C series circuit connected to variable frequency supply. Draw relevant vector diagram& define Q factor of the circuit.
6. Explain the addition of two vectors by a parallelogram method and by resolution method.
7. Establish relation between line voltage & phase voltage and current relation in3-Φ star connection. Draw phasor diagram.
8. Explain two wattmeter method for 3-Φ power measurement.
9. Derive the voltage and current relationship in delta and star connected load.
10. Established relationship between line and phase voltages and currents in balanced delta connection. Draw complete phasor diagram of voltages and currents.
11. A balanced star connected load of (4+j3) Ω per phase is connected to a balance 3 Φ 400V supply. Fine the line current, power factor, active power and reactive power.
12. A 3-Φ load consists of three similar inductive coils of resistances of 50 Ω and inductance 0.3 H. The supply is 415 V 50 Hz. Calculate:(i) the line current (ii)the power factor and the total power when the load is star connected.
13. Three similar coils each of resistance 28Ω and inductance 0.7H are connected in (i) star (ii) delta. If the supply voltage is 230V, 50Hz, calculate the line current and total power absorbed.
14. Three identical coils each of (4.2 +j5.6) Ω are connected in star across a 415 V, 3 Φ, 50 Hz AC supply. Find 1. Phase voltage. 2. Phase current. 3. Readings of two wattmeter's W1 and W2 when they are connected to measure the total power.
15. A delta connected load having branch impedances of (15 +j20) 5 is connected to a 220V, 3 Φ AC supply. Find 1. Line currents. 2. per phase power consumed. 3. What is the phasor sum of the line currents? Why does it have this value?

Tutorial – 3 (Module-1(Ch-1, 2, 3))

1. What is the temperature co-efficient of resistance? Derive equation of resistance at different temperature. Explain the effect of temperature on resistivity on different type of material. Prove that $\alpha_t = \frac{\alpha_0}{1+\alpha_0 t}$.
2. Derive the equation of Star to Delta and Delta to Star transformation.
3. State and explain the Kirchoff's current and voltage laws.
4. Find the resistance between terminals A and B as shown in figure 1. All values are in ohms.

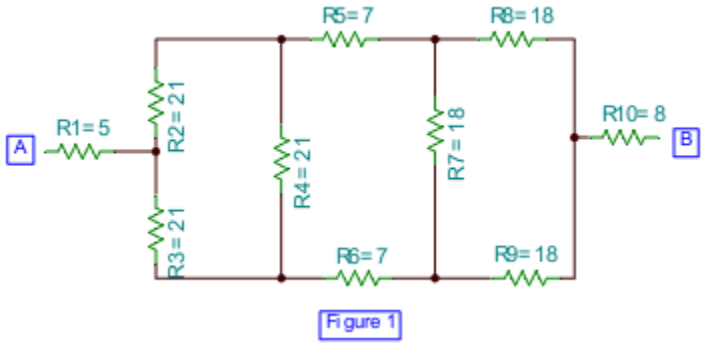
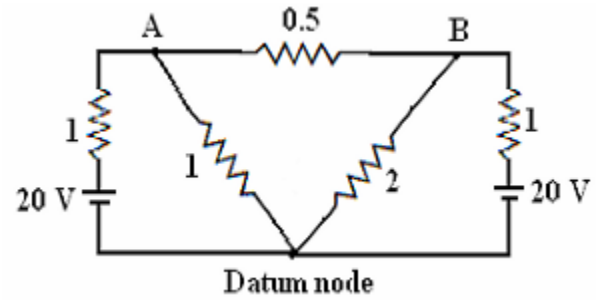
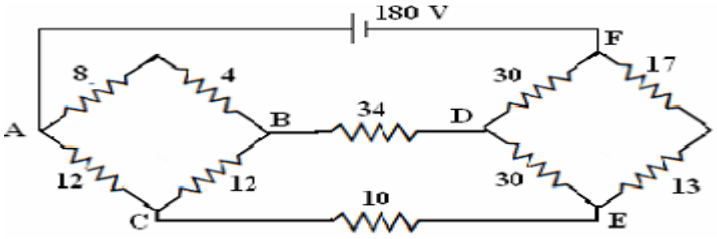


Figure 1

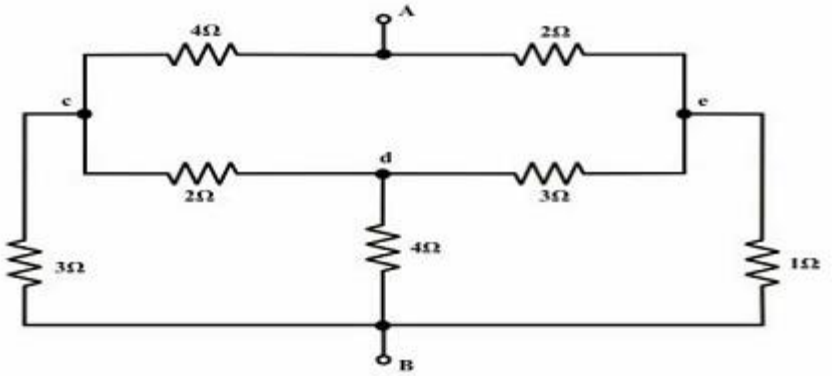
5. For the network shown in figure 1, determine the current supplied by the battery using star-delta transformation.(All resistances are in ohms).
6. A 100V, 60W bulb is connected in series with a 100V, 100W bulb and the combination is connected across the 200V mains. Find the values of resistance that should be connected across the first bulb, so that each bulb may get proper current at the proper voltage. Determine current drawn and power consumed by each lamp.
7. Calculate the value of branch currents for the network shown below, using nodal analysis. Values of resistors are in ohm.



8. Calculate the current flowing through the 10 resistor of circuit shown below, by using any method. Values of resistors are in ohm.



9. What is capacitor? Derive the expression for the equivalent capacitance of capacitors connected (i) in parallel (ii) in series.
10. Determine the equivalent resistance between the terminals A and B of network shown in figure.



11. Three capacitors having capacitances of 10 μF, 20 μF and 40 μF are connected in series to a 400 V DC source. Find total capacitance (ii) total charge in circuit (iii) total energy stored.
12. Derive the equation of capacitance of parallel plate capacitor with uniform dielectric medium and with composite dielectric medium.
13. Define & explain following terms: (1) Electric Field Intensity (2) Electric Potential (3) Electric Flux Density.
14. The equivalent capacitance of two capacitors when connected in series is 0.03 μF & when connected in parallel is 0.16 μF. Find the capacitance of the both the capacitors.
15. Define & explain following terms: (1) Magneto Motive Force (M.M.F.) (2) Reluctance (3) Magnetic Field Intensity.
16. State similarities between magnetic circuit and electrical circuit.
17. What is the faraday's law of electromagnetic of induction? Derive an expression $e = +N \, d\Phi/dt$ where notations have usual meanings.
18. State the Lenz's law and explain statically induced emf.
19. Explain self-induced emf and mutually induced emf.
20. Define and derive the co-efficient of self-inductance.
21. Derive the expressions of equivalent inductance, when two magnetically coupled coils are connected in series in two different ways.
22. Explain Magnetic Hysteresis phenomena using hysteresis loop.
23. Two coils X and Y are placed close to each other. Coil X has 1000 turns and carries a current 5Amp. The flux produced in this coil is 0.07 mWb. The same 5 Amp Current flows through coil Y having 1300 turns and produces a flux of 1 mWb in it. If 70% of the flux produced by coil X links with coil Y, find (a) Self inductances of both coils. (b) Mutual inductance between two coils. (c) Co-efficient of coupling.
24. Obtain the relation $L = (L_1L_2 - M^2)/ (L_1+L_2+2M)$ for equivalent inductance when two inductors are connected in parallel such that the mutually induced emf opposes the self-induced emf.