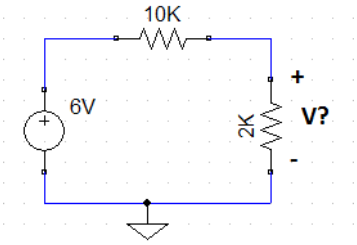
19EEE131: BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

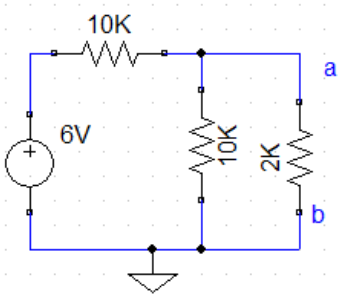
SECTION – A
(Short Answer Questions)-2 Marks

UNIT I

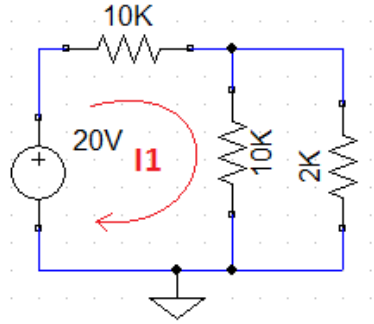
1. What is Kirchhoff's current and voltage law?
2. Find the equivalent resistance of 3 parallelly connected resisters of each 3 k Ohm
3. Determine the unknown current I through the node, which is connected with 3 more branches in which two branch currents are 2A and 3A flowing towards the junction and third branch current 2A is flowing away from node.
4. What are the basic principles applicable to Mesh and Node analysis
5. Explain Ohms law
6. Calculate unknown voltage V.



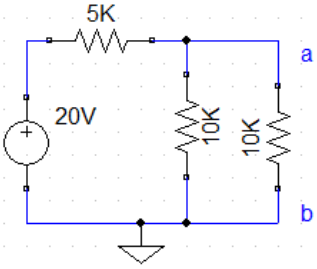
7. What is the Thevenin's voltage between the points a and b



8. Apply mesh analysis to find I1.



9. What is the Norton's current in the branch a and b.



10. What is the load resistance to get maximum power, connected to a voltage source of 20V, here source internal resistance is 10K Ohms.

Unit II

11. Define Lenzs law
12. List out different parts of DC motor
13. State Faradays law
14. Draw line diagram of brush holder
15. list various parts of DC generator
16. Write the significance of back emf
17. What are the applications of dc shunt generator
18. What is the purpose of brush
19. Draw the power flow diagram of a dc motor
20. Write the emf equation of a dc generator

UNIT III

21. How is magnetic leakage reduced to a minimum in commerical transformers
22. Mention the factors on which hysteresis loss depends ?
23. How can eddy current loss be minimised ?
24. In practice, what determines the thickness of the laminae or stampings ?
25. Does the transformer draw any current when its secondary is open ?
26. Is Cu loss affected by power factor ?
27. Why Cu loss affected by power factor ?
28. What effects are produced by change in voltage ?
29. How does change in frequency affect the operation of a given transformer ?
30. Why transformer rating is mentioned in KVA?

UNIT IV

31. What is a rectifier
32. What is the difference between p-n junction diode and Zener diode
33. Define ripple as referred to in a rectifier circuit
34. What are applications of p-n junction diode
35. What is barrier potential at the junction
36. What is meant by filter
37. What is drift current
38. What is PIV of a diode in a rectifier circuit
39. What is meant by pinchoff voltage
40. Derive the ripple factor of a full wave rectifier

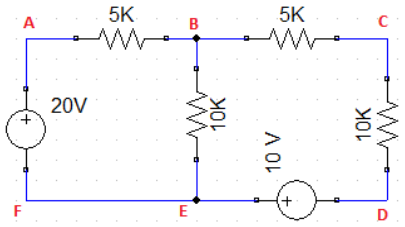
UNIT V

41. What are the different stages of the Op-Amp ?
42. What is an inverting op-amp?
43. What is an non inverting op-amp?
44. What is a differential Op-Amp?
45. What is a summing Op-amp?
46. What are the characteristics of ideal Op-Amp?
47. Draw the transfer characteristics of Op-Amp?
48. Draw the equivalent circuit of Op-Amp?
49. List out any 4 applications of open loop op-Amp configuration?
50. Draw the schematic block diagram of a the basic Op-Amp?

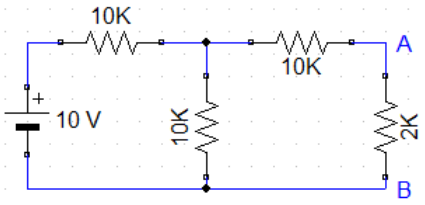
SECTION – B
(Essay Questions)- 8 Marks

UNIT I

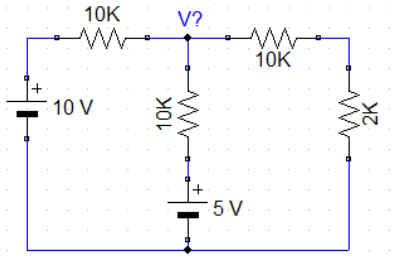
1. A) Explain KCL and KVL with an example
   B) State and explain Ohms law with example
2. A) When n number of equal resistances are connected in parallel, then find equivalent resistance.
3. B) When n number of equal resistances are connected in series, then find equivalent resistance.
4. State and explain Superposition theorem with example
5. What is maximum power transfer theorem explain with example
6. Apply Mesh analysis to find i1 and i2 in the two loops[ABEFA, BCDEB].



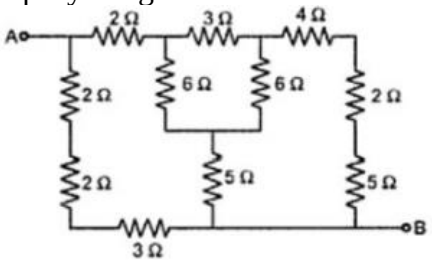
7. Apply Thevenin's theorm to find Thevenin's equivalent circuit. Between the nodes A-B



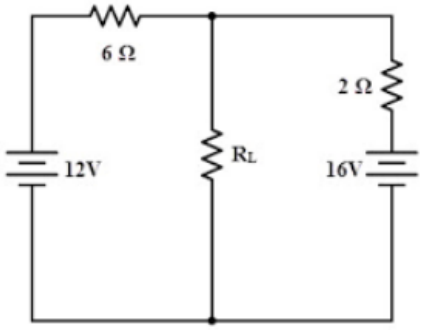
8. Apply the nodal analysis to find unknown voltage



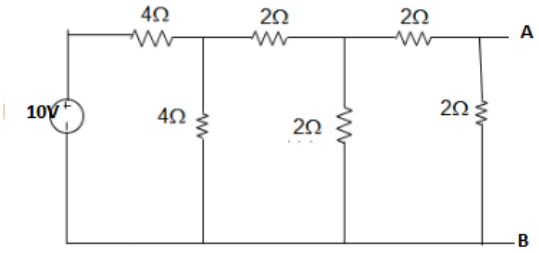
9. Simplify the given network into a single resister.



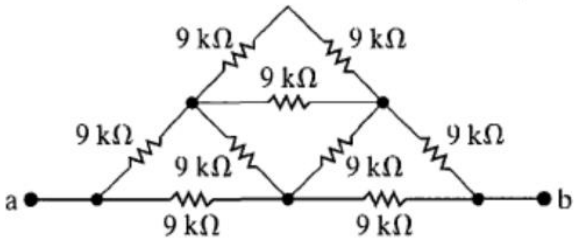
10. What is the RL value to get maximum power in the below given circuit



11. Find the Thevenins equivalent circuit at A-B, for the given below circuit.



12. Simplify the below circuit using Star-Delta transformation



Unit II

13. Discuss about applications of various dc generators
14. Explain the characteristics of dc generators
15. Explain the need of starter in a dc motor
16. Explain classification of dc generators.
17. A four pole generator having wave-wound armature winding has 51 slots, each slot containing 20 conductors. What will be the voltage generated in the machine when driven at 1500 rpm assuming the flux per pole to be 7.0 mWb ?
18. A shunt generator delivers 450 A at 230 V and the resistance of the shunt field and armature are 50 Ω and 0.03 Ω respectively. Calculate the generated e.m.f?
19. Explain differences between lap and wave winding of dc generator
20. Derive emf equation of dc generator.
21. Derive Torque equation of dc motor
22. A 25 kW 125 V separately excited DC machine is operated at a constant speed of 3000 rpm with a constant field current such that the open circuit armature voltage is 125 V. The machine is observed to be acting as a generator with a terminal voltage of 124 V and a terminal power of 24 kW. The armature resistance is 0.02 Ω. Calculate the speed of the generator.

UNIT III

23. Write the Working Principle of a Transformer
24. Explain the Transformer Construction
25. Derive the E.M.F. Equation of a Transformer
26. The maximum flux density in the core of a 250/3000-volts, 50-Hz single-phase transformer is 1.2 Wb/m2 . If the e.m.f. per turn is 8 volt, determine (i) primary and secondary turns (ii) area of the core
27. A single phase transformer has 500 turns in the primary and 1200 turns in the secondary. The cross-sectional area of the core is 80 sq. cm. If the primary winding is connected to a 50 Hz supply at 500 V, calculate (i) Peak flux-density, and (ii) Voltage induced in the secondary
28. A 25 kVA, single-phase transformer has 250 turns on the primary and 40 turns on the secondary winding. The primary is connected to 1500-volt, 50 Hz mains. Calculate (i) Primary and Secondary currents on full-load, (ii) Secondary e.m.f., (iii) maximum flux in the core.
    a. A 2,200/200-V transformer draws a no-load primary current of 0.6 A and absorbs 400 watts. Find the magnetising and iron loss currents.
29. (b) A 2,200/250-V transformer takes 0.5 A at a p.f. of 0.3 on open circuit. Find magnetising and working components of no-load primary current.

30. A single-phase transformer with a ratio of 440/110-V takes a no-load current of 5A at 0.2 power factor lagging. If the secondary supplies a current of 120 A at a p.f. of 0.8 lagging, estimate the current taken by the primary.
31. In no-load test of single-phase transformer, the following test data were obtained : Primary voltage : 220 V ; Secondary voltage : 110 V ; Primary current : 0.5 A ; Power input : 30 W. Find the following : (i) The turns ratio (ii) the magnetising component of no-load current (iii) its working (or loss) component (iv) the iron loss. Resistance of the primary winding = 0.6 ohm. Draw the no-load phasor diagram to scale
32. In a transformer, the core loss is found to be 52 W at 40 Hz and 90 W at 60 Hz measured at same peak flux density. Compute the hysteresis and eddy current losses at 50 Hz
33. Obtain the equivalent circuit of a 200/400-V, 50-Hz, 1-phase transformer from the following test data : O.C test : 200 V, 0.7 A, 70 W – on L.V. side S.C. test : 15 V, 10 A, 85 W – on H.V. side Calculate the secondary voltage when delivering 5 kW at 0.8 p.f. lagging, the primary voltage being 200V

UNIT IV

34. Explain the V-I Characteristics of p-n junction diode
35. Explain the difference between avalanche breakdown and zener breakdown
36. Explain about the operation of n-channel enhancement MOSFET
37. Explain the difference between enchancement MOSFET and Depletion MOSFET with neat diagrams
38. An a.c supply of 230v is applied to a half wave rectifier circuit through a transformer of turn ratio 10:1. Find the 1) the output d.c voltage 2) rms current 3) avg current 4) ripple factor 5) efficiency. Assume the diode to be ideal
39. A full wave rectifier uses two diodes, the internal resistance of each diode may be assumed constant at 25 ohms. The transformer r.m.s secondary voltage from centre tap to each end of secondary is 50v and load resistance is 980 ohms. Find the1) mean load current 2)the r.m.s value of load current
40. Derive the equations of rms current,avg current, ripple factor and efficiency of a full wave rectifier
41. Explain the regions of operation of a MOSFET
42. Explain about half wave rectifier with LC filter with neat input and output waveforms
43. Explain the V-I characteristics of a zener diode

UNIT V

44. Define CMRR? Explain the significance of a relatively large CMRR?
45. What is meant by slew rate in an Op-Amp?
46. Explain input bias current and input offset current?
47. Explain input offset voltage and output offset voltage ?
48. Describe inverting and non-inverting Op-Amps ?
49. Explain the characteristics of non-inverting configuration ?
50. Describe the function of Op-Amp as voltage follower?
51. Draw the non-inverting amplifier and derive the closed loop gain of it ?
52. Explain the virtual ground concept in an Op-Amp ?
53. Show that Op-Amp can be used to obtain the sum of two input signals ?
54. Explain the single Op-Amp Difference amplifier?