Basic Electrical and Electronic Engineering
Question Bank

UNIT I ELECTRICAL CIRCUITS & MEASURMENTS
PART-A

1. Define electric current.
2. Define electric resistance.
3. Define electric conductance.
4. Define specific resistance.
5. Differentiate electric power and energy.
6. Define electromotive force.
7. State ohms law.
8. What is an alternating quantity?
9. Define cycle.
10. Define time period.
11. Define frequency.
12. Define amplitude.
13. Define RMS value.
14. Define average value.
15. Define the expression for form factor and peak factor.
16. Define power factor.
17. What do you understand by balanced system?
18. What is an indicating instrument?
19. Write two essential requirements of indicating instruments.
20. List the three different torques employed in the measuring instruments for the satisfactory operation.
21. Write any four methods by which the deflecting torque can be obtained.
22. Mention the two methods of obtaining controlling torque.
23. What is meant by damping torque?

24. Write any two features of moving coil instrument.
25. Write any two features of moving iron instrument.
26. Mention the limitations of Ohm's Law.
27. State Kirchhoff's voltage law.
28. State Kirchhoff's Current law.
29. State two salient points of a series combination of resistance.
30. State two salient points of a parallel combination of resistance.
31. Give two applications of both series and parallel combination.
32. Define an ideal voltage source.
33. Define an ideal current source.
34. Explain how voltage source with a source resistance can be converted into an equivalent current source.
35. What is a phasor?
36. What is balanced voltage?
37. What are balanced impedance?
38. What is phase sequence?
39. Write the relation between the line and phase value of voltage and current in a balanced star connected load?
40. Write the relation between the line and phase voltage of voltage current in a balanced delta connected load.
41. Write the relation between the power factor and wattmeter readings in two-wattmeter method of power measurement.
42. In three phase circuit, what do you mean by balanced load?
43. When is a three phase supply system called balanced supply system?
44. List any two advantages of 3-phase system over 1-phase system.
45. How can ammeter and voltmeter are connected in a circuit? Why?
46. Mention any two types of Wattmeters.
47. List the major components of a single phase induction type energy meter?
48. List the measuring instruments you known.
49. Compare moving coil and moving iron instruments based on any two salient features.
50. Mention any two importance of MC and MI instruments.
51. What are the advantages of Induction type energy meter?

PART – B

1. (a) State and explain Kirchoff's law. (8)

(b) Explain the working of a Dynamometer wattmeter with a neat sketch. (8)

2. (a) Explain any one type of MI instruments. (8)

(b) Explain the working principle of PMMC instruments. (8)

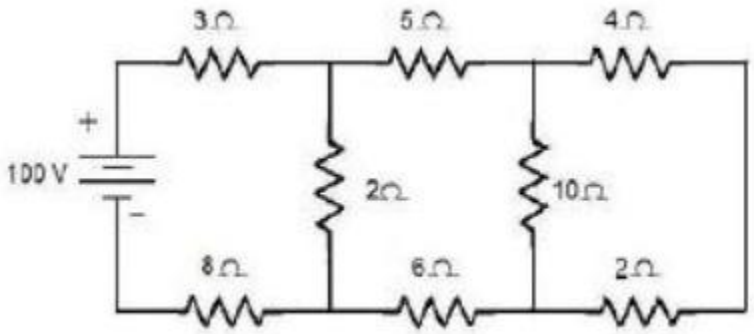
3. Explain the construction and principle of operation of single phase energy meter. (16)

4. (a) A series circuit has R=10Ω, L=50mH, and C=100μF and is supplied with 200V,50Hz. Find (i) Impedance (ii) current (iii) power (iv) power factor (v) voltage drop across the each element. (8)

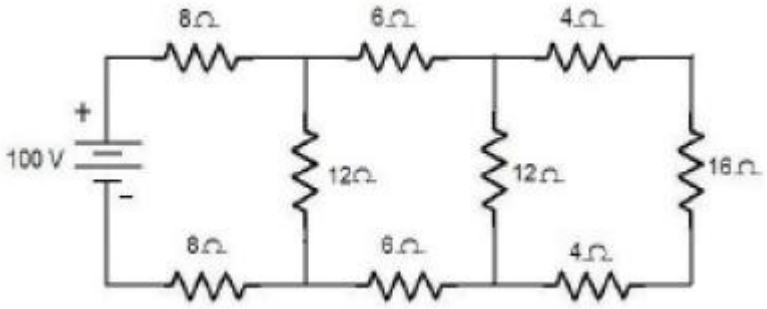
(b) Derive the equation for equivalent resistance of number of resistors connected in parallel. (8)

5. A 400V is applied to three star connected identical impedances each consisting of a 40 Ω resistance in series with 3Ω inductance reactance. Find (i) line current (ii) Total power supplied. (16)

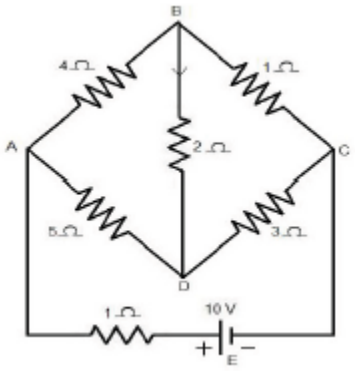
6. Find the current through each branch by network reduction technique. (16)



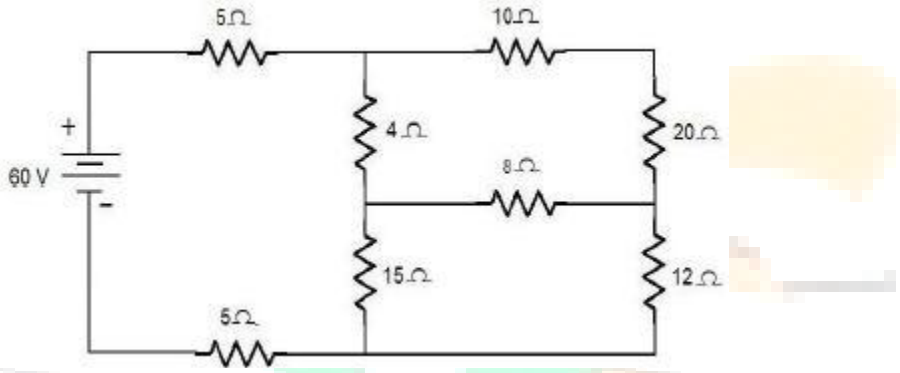
7. Calculate a) the equivalent resistances across the terminals of the supply, b) total current supplied by the source and c) power delivered to 16 ohm resistor in the circuit shown in figure. (16)



8. In the circuit shown, determine the current through the 2 ohm resistor and the total current delivered by the battery. Use Kirchhoff's laws. (16)

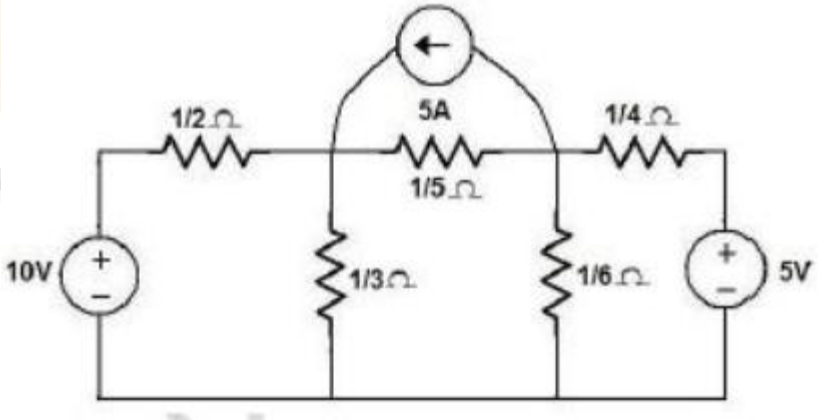


9. (a) In the network shown below, find the current delivered by the battery. (10)



(b) Discuss about voltage and current division principles. (6)

10. Using the node voltage analysis, find all the node voltages and currents in 1/3 ohm and 1/5 ohm resistances of figure. (16)



UNIT II ELECTRICAL MECHANICS

PART-A

1. State the three basic types of rotating electrical machines.
2. State two types of induction motors.
3. Mention the difference between core and shell type transformers.
4. What is the purpose of laminating the core in a transformer?
5. Give the emf equation of a transformer and define each term.
6. Does transformer draw any current when secondary is open? Why?
7. Define voltage regulation of a transformer.
8. What are the applications of step-up & step-down transformer?
9. How transformers are classified according to their construction?
10. Write down the emf equation for d.c.generator.
11. Why the armature core in d.c machines is constructed with laminated steel sheets instead of solid steel sheets?
12. Why commutator is employed in d.c.machines?
13. Distinguish between shunt and series field coil construction.
14. How does d.c. motor differ from d.c. generator in construction?
15. How will you change the direction of rotation of d.c.motor?
16. What is back emf in d.c. motor?
17. Why starter is necessary for a dc motor?
18. What are the conditions to be fulfilled by for a dc shunt generator to build back emf?
19. What are the losses occurring in a dc machine?
20. What is the function of capacitor in a single phase induction motor?
21. What kind of motor is used in a mixie?
22. In which direction does a shaded pole induction motor run?
23. Why singe phase induction motor has low power factor?
24. What happens when the centrifugal switch fails to close?
25. What are the classifications of single phase induction motor based on the method of starting?
26. What is torque?
27. What is speed regulation?
28. What is called armature torque?
29. What is called shaft torque?

30. Draw the characteristics curve of a dc shunt motor?
31. What are the various types of dc generators?
32. Draw the internal and external characteristic curves of dc shunt generator?
33. Draw the internal and external characteristic curves of dc series generator?
34. Draw the characteristics curves of dc compound generator?
35. What is the function of carbon brushes in DC generator?
36. Why the armature core is made by laminated sheets?
37. What is back emf?
38. What are the various types of dc motors?
39. What is KVA rating of a transformer?
40. What is meant transformation ratio?
41. How the transformers are classified?
42. What are the various losses that must be present in a transformer?
43. What are the applications of induction motors?

PART – B

1. Explain the construction and working principle of D.C. generator with neat diagram. (16)
2. Explain the different types of D.C. generators. (16)
3. Draw and explain the characteristics of different types of d.c.generators. (16)
4. Derive the emf equation of D.C. Generator. (8)
5. Sketch and explain the speed-current, speed-torque and torque-current characteristics of a shunt motor, series motor and compound motor. (16)
6. Draw the characteristic curves of D.C. shunt, series and compound motors. Use these curves to explain the applications for which these motors are used. (16)
7. a) List all the important parts of a D.C. Motor and explain the importance of each.
8. Calculate the emf generated by 4 pole wave wound generator having 65 slots with 12 conductors per slot when driven at 1200 rpm. The flux per pole is 0.02 wb. (8)
9. A 4 pole lap wound dc shunt generator has a useful flux per pole of 0.07wb. The armature winding consists of 220 turns, each of 0.004 ohm resistance. Calculate the terminal voltage when running at 900 rpm if the armature current is 50A. (16)
10. Explain the principle of working a single phase transformer

11. Discuss the difference between core type and shell type construction?
12. Derive the emf equation of a transformer?
13. Derive the condition for maximum efficiency?
14. Explain the construction and working principle of single-phase transformer.(16)
15. Enumerate the various types of transformer. (4)
16. Derive an expression for the emf of an ideal transformer winding. (6)
17. Explain various features of an ideal transformer. (8)
18. b)The no load current of a transformer is 10A at a power factor of 0.25 lagging, when connected to 400v,50Hz supply, calculate
    (i) magnetizing component of no load current
    (ii) iron loss and
    (iii) maximum value of the flux in the core. Assume primary winding turns as 500. (8)

UNIT IV SEMICONDUCTOR DEVICES AND APPLICATIONS

PART-A

1. Give the value of Charge, Mass of an electron.
2. Define Electron volts.
3. What are conductors? Give examples?
4. What are insulators? Give examples?
5. What are Semiconductors? Give examples?
6. What are the types of Semiconductor?
7. What is Intrinsic Semiconductor?
8. What is Extrinsic Semiconductor?
9. What are the types of Extrinsic Semiconductor?
10. What is P-type Semiconductor?
11. What is N-type Semiconductor?
12. What is doping?
13. Which charge carriers is majority and minority carrier in N-type Semiconductor?
14. Which charge carriers is majority and minority carrier in P-type Semiconductor?
15. What is depletion region in PN junction?
16. Give the other names of depletion region?
17. What is barrier potential?
18. What is meant by biasing a PN junction?

19. What are the types of biasing a PN junction?
20. What is forward bias and reverse bias in a PN junction?
21. What is meant by reverse recovery time?
22. What is break down? What are its types?
23. What is Zener breakdown?
24. What is avalanche break down?
25. Why transistor called a current controlled device?
26. When does a transistor act as a switch?
27. What is biasing?
28. What is operating point?
29. What is stability factor?
30. What is d.c load line?
31.What is a.c load line?
32. What is an amplifier?
33. How are amplifiers classified according to the input?
34. How are amplifiers classified according to the transistor configuration?
35. What is the different analysis available to analyze a transistor?
36. List out the common diode applications
37. Define zener breakdown
38. What is a rectifier?
39. What is transistor? State its types.

PART – B

1. Explain intrinsic and extrinsic semiconductors with neat diagrams. (16)
2. Describe the working of a PN junction diode with neat diagrams. Also explain its V-I characteristics. (16)
3. What is a Zener diode? Explain the operation of Zener diode and draw its characteristics. (16)
4. Explain the operation of half wave rectifier with neat sketch and derive the necessary expression. (16)
5. Explain the operation of centre tapped full wave rectifier with neat diagram. (16)
6. Explain with a neat diagram how the input and output characteristics of a CE configuration can be obtained. (16)

7. Compare the input resistance, output resistance and voltage gain of CB, CC and CE configuration. (16)

8. Explain the working of the CB configuration of a BJT. (16) 9. Explain in detail about small signal CE amplifier. (16)

9. Explain any two applications of diode with neat diagram . (8)

10. Explain the operation of PNP & NPN transistor? (12)

11. Compare CE – CB – CC Configuration? (8)

12. Explain the input & output characteristics of CE configuration of a transistor? (16)

13. Explain the input & output Characteristic of CB configuration of a transistor? (16)

UNIT V DIGITAL ELECTRONICS

PART-A

1. Define binary logic
2. What are the basic digital logic gates?
3. What is a Logic gate?
4. Which gates are called as the universal gates? What are its advantages?
5. Define combinational logic
6. Define half adder and full adder
7. What are the classifications of sequential circuits?
8. Define Flip flop.
9. What are the different types of flip-flop?
10. What is the operation of D flip-flop?
11. What is the operation of JK flip-flop?
12. What is the operation of T flip-flop?
13. Define race around condition.
14. What is edge-triggered flip-flop?
15. What is a master-slave flip-flop?
16. Define registers.
17. Define sequential circuit?
18. Give the comparison between combinational circuits and sequential circuits.
19. Mention the types of Analog to Digital converter.
20. Mention the types of Digital to Analog converter.
21. Convert $(100001110.010)_2$ to decimal.

22. Give that $(79)_{10} = (142)_b$. Determine the value of b.
23. Perform the arithmetic operations 35+40 and (-3.5)+(-40) with binary number in signed 2's complement representation.
24. Convert $(342.45)_{10}$ to binary and Octal.
25. Perform the following arithmetic operation using 1's complement scheme. (4-8) ,(8-4) ,(-2-3).
26. Convert the following: $(369)_{10} = (\ )_8 = (\ )_{16} = (\ )_2$.
27. How many bits are required to represent the decimal numbers in the ranges from 0 to 999 using straight binary code? Using BCD codes?
28. State de-Morgan's Law.
29. Why NAND gate is called as an universal gates?
30. Write the dual of AB+ĀC+BC.
31. Realize XOR function using only NAND gates.
32. How do you implement y=A+B using a 3 input OR gate?
33. Define distributive law.
34. What is mean by duality in Boolean Algebra?
35. Simplify the following function using algebraic method.

a. F=C(B+C)(A+B+C)

36. Implement AND and OR using NAND and NOR gates.
37. Give the truth table for JK flip-flop?
38. Name the problem associated with the asynchronous counter.
39. What is an universal shift register?
40. Distinguish between Synchronous and asynchronous counter.
41. Name the two problems that may arise in the ripple counter.

PART – B

1. Draw and explain the operation of AND, OR, NOT, NAND and NOR gates with suitable truth table. (16)
2. What are universal gates? Explain their principle of working with necessary truthtable.(16)
3. Explain half adder and full adder. (16)
4. Design a full adder and implement it using logic gates. (16)
5. Write short notes on: (16) i). RS-flip flop ii). D-flip flop iii). JK -flip flop iv). T-flip flop v). JK-master slave flip flop

6. Briefly explain the working of JK flip flop. (16)

7. Explain the operation of various types of shift register. (16)

8. Explain in details about Analog Digital and Digital to Analog conversion. (16) 9. Explain the operation of RS flip-flop with logic diagram and truth table. (16)

10. With necessary diagrams explain the functioning of the following: (16) i). Decade counter ii). D/A converter

11. What is a counter? Discuss briefly about Mod-5 counter. (16)

12. With necessary diagrams explain the functioning of any one type of A/D converter. (16)

13. Draw a neat diagram of a decade counter and explain the working of the decade counter with suitable waveforms and truth table (16)

14. Describe the operation of a 4-bit binary, ripple counter. (16)

15. Explain in detail any one type of D/A converter. (16)

16. Draw the circuit of up-down counter and explain its working.

17. What is mean by the term edge triggered?

18. Obtain the expression for SUM and CARRY outputs of a full adder and implement the same.