KINGS

COLLEGE OF ENGINEERING

DEPARTMENT OF MECHANICAL ENGINEERING

QUESTION BANK

SUBJECT NAME & CODE: EE 1153 – BASIC ELECTRICAL & ELECTRONICS ENGG.

YEAR / SEM : I / II

UNIT – I

ELECTRICAL CIRCUITS AND MEASUREMENTS

PART – A (2 MARKS)

1. State Ohm's law.
2. Mention the limitations of Ohm's Law.
3. State Kirchhoff's voltage law.
4. State Kirchhoff's Current law.
5. State two salient points of a series combination of resistance.
6. State two salient points of a parallel combination of resistance.
7. Give two applications of both series and parallel combination.
8. Define an ideal voltage source.
9. Define an ideal current source.
10. Explain how voltage source with a source resistance can be converted into an equivalent current source.
11. Define R.M.S value.
12. State the advantages of sinusoidal alternating quantity.
13. What is a phasor?

14. What is balanced voltage?

15. What are balanced impedance?

16. What is phase sequence?

17. Write the relation between the line and phase value of voltage and current in a balanced star connected load?

18. Write the relation between the line and phase voltage of voltage current in a balanced delta connected load.

19. Write the relation between the power factor and wattmeter readings in two-wattmeter method of power measurement.

20. In three phase circuit, what do you mean by balanced load?

21. When is a three phase supply system called balanced supply system?

22. List any two advantages of 3-phase system over 1-phase system.

23. Mention the two types of MI instruments.

24. How can ammeter and voltmeter are connected in a circuit? Why?

25. Mention any two types of Wattmeters.

26. List the major components of a single phase induction type energy meter?

27. List the measuring instruments you known.

28. Compare moving coil and moving iron instruments based on any two salient features.

29. Mention any two importance of MC and MI instruments.

30. 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)

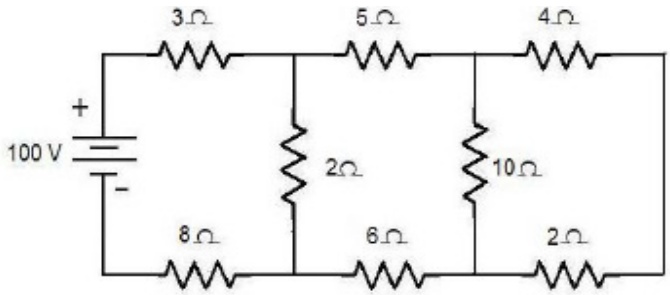
3. Explain the construction and principle of operation of single phase energy meter. (16)

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)

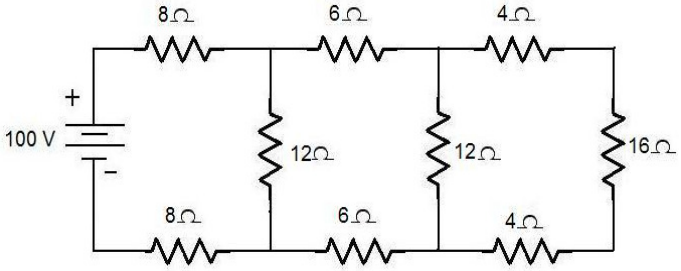
(b) Derive the equation for equivalent resistance of number of resistors connected in parallel. (8)

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)

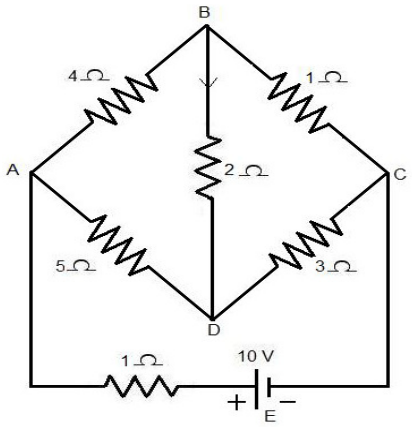
6. Find the current through each branch by network reduction technique. (16)



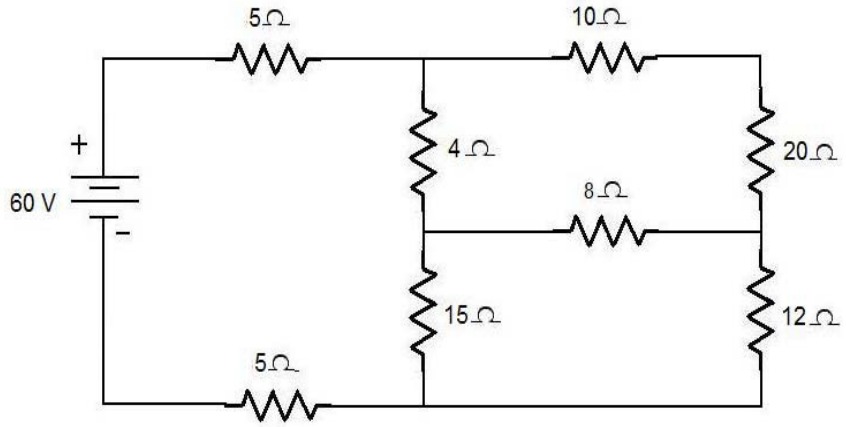
7. Calculate a) the equivalent resistances across the terminals of the supply, b) total current supplied by the source and c) power delivered to 16 ohm resistor in the circuit shown in figure. (16)



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)

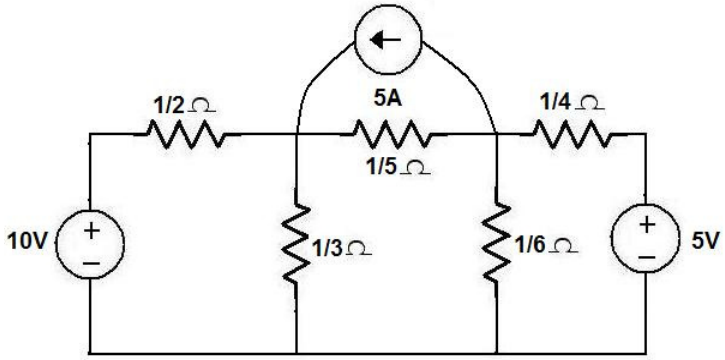


9. (a) In the network shown below, find the current delivered by the battery. (10)



(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 MACHINES

PART – A (2 MARKS)

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?

PART – B

1. Explain the construction and principle of operation of a DC generator with neat sketch. (16)

2. (a) Derive the equation for induced EMF of a DC machine. (8)

   (b) Derive the torque equation of DC motor. (8)

3. Describe the construction details of transformer and also explain the principle of operation. (16)

4. (a) Derive the EMF equation of a transformer. (8)

   (b) Explain the principle of operation of DC Motor. (8)

5. Explain the construction and principle of operation of single phase induction motor. (16)

6. A transformer with 40 turns on the high voltage winding is used to step down the voltage from 240V to 120V. Find the number of turns in the low voltage winding. (16)

7. A 4 pole, wave wound generator having 40 slots and 10 conductors placed per slot. The flux per pole is 0.02 wb. Calculate the generated emf when the generator is drive at 1200 rpm. (16)

8. A 25kw, 250V, dc shunt generator has armature and field resistances of 0.06ohm and 100ohm respectively. Determine the total armature power developed when working (1) as a generator delivering 25 kw output and (2) as a motor taking 25kw. (16)

UNIT – III

SEMICONDUCTOR DEVICES AND APPLICATIONS

PART – A (2 MARKS)

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?

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)

UNIT – IV

DIGITALS ELECTRONICS

PART – A (2 MARKS)

1. Define binary logic?

2. What are the basic digital logic gates?

3. What is a Logic gate?

4. Give the classification of logic families.

5. Which gates are called as the universal gates? What are its advantages?

6. Classify the logic family by operation?

7. Define combinational logic

8. Explain the design procedure for combinational circuits

9. Define half adder and full adder

10. What are the classifications of sequential circuits?

11. Define Flip flop.

12. What are the different types of flip-flop?

13. What is the operation of D flip-flop?

14. What is the operation of JK flip-flop?

15. What is the operation of T flip-flop?

16. Define race around condition.

17. What is edge-triggered flip-flop?

18. What is a master-slave flip-flop?

19. Define registers.

19. Define sequential circuit?

20. Give the comparison between combinational circuits and sequential circuits.

21. What do you mean by present state?

22. What do you mean by next state?

23. State the types of sequential circuits?

24. Define synchronous sequential circuit

25. Give the comparison between synchronous & Asynchronous counters.

26. Mention the types of Analog to Digital converter.

27. Mention the types of Digital to Analog converter.

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)

UNIT – V

FUNDAMENTALS OF COMMUNICATION ENGINEERING

PART – A (2 MARKS)

1. Define Communication.

2. What is an antenna?

3. Define analog signal.

4. Define digital signal.

5. What is meant by modulation?

6. What is meant by demodulation?

7. What are the types of modulation?

8. Compare amplitude modulation and frequency modulation.

9. What are the basic modes of Radio wave propagation?

10. Why are AM systems preferred in broadcasting than FM systems?

11. What are the various standards used in TV transmission systems?

12. What are the advantages of optical fiber communication?

13. What is packet loss?

14. What is the radio transmitter?

15. List the advantages of super heterodyne receiver.

16. List the various types of Microwave antennas.

PART – B

1. (a) With neat diagram, explain the principle of operation of Amplitude Modulation. Derive its power relations. (10)

   (b) Write detailed notes on microwave communication. (6)

2. (a) Explain satellite communication system. (8)

   (b) Write short notes on modulation and demodulation (8)

3. Draw the block diagram of radio broadcasting and reception system and explain the function of each block. (16)

4. (a) Draw the circuit diagram of balanced modulator and explain its operation. (8)

   (b) With a neat block diagram, explain the principle of operation of FAX. (8)

5. (a) Explain frequency modulation with necessary supporting diagrams. (8)

   (b) Define modulation index of AM signal. Explain it in terms of maximum and minimum voltage of modulated signal? (8)

6. (a) With help of a neat diagram explain the basic components of satellite communication. (8)

   (b) Explain the block diagram of optical fiber communication systems. (8)

7. Explain the principle of Amplitude and Frequency modulation. (16)

8. Draw and explain the functional block diagram of Monochrome TV transmitter and receiver. (16)