Department of Electrical and Electronics Engineering

ELECTRONIC DEVICES AND CIRCUITS

Two marks Question and answers

UNIT -I

1. What are conductors? Give examples?

Conductors are materials in which the valence and conduction band overlap each other so there is a swift movement of electrons which leads to conduction. Ex. Copper, silver.

2. What are insulators? Give examples?

Insulators are materials in which the valence and conduction band are far away from each other. So no movement of free electrons and thus no conduction. Ex glass, plastic.

3. What are Semiconductors? Give examples?

The materials whose electrical property lies between those of conductors and insulators are known as Semiconductors. Ex germanium, silicon.

4. What are the types of Semiconductor?

1. Intrinsic semiconductor
2. Extrinsic semiconductor.

5. What is Intrinsic Semiconductor?

Pure form of semiconductors are said to be intrinsic semiconductor.

Ex: germanium, silicon

6. What is Extrinsic Semiconductor?

If certain amount of impurity atom is added to intrinsic semiconductor the resulting semiconductor is Extrinsic or impure Semiconductor.

7. What are the types of Extrinsic Semiconductor?

1. P-type Semiconductor 2. N- Type Semiconductor.

8. What is P-type Semiconductor?

The Semiconductor which are obtained by introducing pentavalent impurity atom (phosphorous, antimony) are known as P-type Semiconductor.

9. What is N-type Semiconductor?

The Semiconductor which is obtained by introducing trivalent impurity atom (gallium, indium) are known as N-type Semiconductor.

10. What is doping?

Process of adding impurity to a intrinsic semiconductor atom is doping. The impurity is called dopant.

11. Define drift current.

When an electric field is applied across the semiconductor, the holes move towards the negative terminal of the battery and electron move towards the positive terminal of the battery. This drift movement of charge carriers will result in a current termed as drift current.

12. Give the expression for drift current density due to electron.

$$J_n = q\, n\, \mu_n E$$

Where,

J_n - drift current density due to electron

q- Charge of electron

μ_n - Mobility of electron

E - applied electric field

13. Define the term diffusion current.

A concentration gradient exists, if the number of either electrons or holes is greater in one region of a semiconductor as compared to the rest of the region. The holes and electron tend to move from region of higher concentration to the region of lower concentration. This process in called diffusion and the current produced due this movement is diffusion current.

14. What is recovery time? Give its types.

When a diode has its state changed from one type of bias to other a transient accompanies the diode response, i.e., the diode reaches steady state only after an interval of time "t_r" called as recovery time. The recovery time can be divided in to two types such as

(i) forward recovery time (ii) reverse recovery time

15. Define storage time.

The interval time for the stored minority charge to become zero is called st2orage time. It is represented as t s.

16. Define transition time.

The time when the diode has normally recovered and the diode reverse current reaches reverse saturation current I_0 is called as transition time. It is represented as t t.

17. What is zener breakdown?

When a small value of reverse bias voltage is applied , a very strong electric field is set up across the thin depletion layer. This electric field is enough to break the covalent

bonds. Now extremely large number of free charge carriers are produced which constitute the zener current. This process is known as zener break down.

18. What is avalanche break down?

When bias is applied, thermally generated carriers which are already present in the diode acquire sufficient energy from the applied potential to produce new carriers by removing valence electron from their bonds. These newly generated additional carriers acquire more energy from the potential and they strike the lattice and create more number of free electrons and holes. This process goes on as long as bias is increased and the number of free carriers gets multiplied. This process is termed as avalanche multiplication. Thus the break down which occurs in the junction resulting in heavy flow of current is termed as avalanche break down.

19. What is rectifier? What are its types?

Rectifier is an electronic device which converts an alternating (ac) voltage or current into a unidirectional (dc) voltage or current.

Types of rectifier:

1. Half wave rectifier
2. Full wave rectifier
    i. Full wave rectifier with center tapped transformer
    ii. Full wave bridge rectifier

20. Define rectifying efficiency.

Rectifying efficiency is defined as the ratio of DC output power into AC input power of a rectifier.

21. What is the function of filters?

Filter is used to reduce the ripple contents in the output of a rectifier to obtain a pure dc.

22. List the advantages of Zener regulator.

1. Simple circuits
2. Only 2 or 3 components are required to be used
3. Low cost.

23. What is PN junction diode?

A PN junction diode is a two terminal device consisting of a PN junction formed either in germanium or silicon crystal. A PN junction is formed from a piece of semiconductor by diffusing P-type material to one half sides and N type material to other half side.

24. What is depletion region in a PN junction diode?

The region around the junction from which the charge carriers are depleted is called as depletion region. When a PN junction is forward biased, the depletion region width decreases When a PN junction is reversed biased the depletion region width increase.

25. Define the term transition capacitance CT of a diode.

When a PN junction is reverse biased the depletion layer acts like a dielectric material while P and N type region on either side have low resistance acts as the plates. In reverse biased PN junction may be regarded as parallel plate capacitor. This junction capacitance is called transition capacitance. It is denoted by CT and is also called as space charge capacitance or depletion layer capacitance.

26. List the application of PN junction diode.

- Used as rectifier diodes in dc power supplies
- Used as signal diodes in communication circuits for modulation and demodulation
- Used in clipped and clamper circuits
- Used as a switch in logic circuits used in computers

UNIT-II

1. What is bipolar junction transistor?

A bipolar junction transistor (BJT) is a three terminal semiconductor device in which the operation depends on the interaction of both majority and minority carriers and hence the name bipolar.

2. What are the different configurations of BJT?

- Common emitter configuration
- Common collector configuration
- Common base configuration

3. What is thermal runaway?

The continuous increase in collector current due to poor biasing causes the temperature at collector terminal to increase. If no stabilization is done, the collector leakage current also increases. This further increases the temperature. This action becomes cumulative and ultimately the transistor burns out. The self destruction of an un stabilized transistor is known as thermal runaway.

4. Define the different operating region of transistor.

Active region: The collector junction is reverse biased and emitter junction is forward biased.

Cut off region: The collector and emitter junction are both reverse biased.

Saturation region: The collector and emitter junction are forward biased.

5. List the uses of emitter follower (common collector configuration) circuit.

- It is widely used in electronic instruments because of low output impedance and high input impedance.
- It is used of impedance matching.

6. Define alpha and beta of the transistor.

The ratio of change in collector current IC to the change in emitter current I_E at constant collector base voltage V_{CB} (**α = IC/ IE)**

Base current amplification factor (β)

The ratio of change in collector current IC to the change in base current IB (**β = IC/ IB)**

7. What is meant by early effect?

When the collector base voltage is made to increase, it increase the depletion region across the collector base junction, with the result that the effective width of base terminal decreases. This variation of effective base width by collector base voltage is known as base width modulation or early effect.

8. Explain the significance of early effect or base width modulation.

It reduces the charges recombination of electron with holes in ht base region, hence the current gain increase with increase in collector base voltage. The charge gradient is increased within the base; hence the current due to minority carriers across emitter junction increases.

9. Which configuration provides better current gain?

CB configuration

10. What is the significance of VBE and ICO?

VBE and ICO are significant because any changes in VBE and ICO cause a drastic change in temperature and collector current IC. It leads to thermal runaway problem.

11. List out the different types of biasing.

- Voltage divider bias.
- Base bias
- Emitter feedback bias
- Collector feedback bias.

12. Why is the transistor called a current controlled device?

The output characteristics of the transistor depend on the input current. So transistor is called a current controlled device.

13. Define current amplification factor.

It is defined as the ratio of change in output current to the change in input current at constant other side voltage.

14. What are the requirements for biasing circuits?

- The q point must be taken at the Centre of the active region of the output characteristics.
- Stabilize the collector current against the temperature variations.
- Make the q point independent of the transistor parameters.
- When the transistor is replaced, it must be of same type.

15. When does a transistor act as a switch?

The transistor acts as a switch when it is operated at either cutoff region or saturation region.

16. What is biasing?

To use the transistor in any application it is necessary to provide sufficient voltage and current to operate the transistor. This is called biasing.

17. What is operating point?

For the proper operation of the transistor a fixed level of current and voltages are required. This values of currents and voltages defined at a point at which the transistor operate is called operating point.

18. What is stability factor?

Stability factor is defined as the rate of change of collector current with respect to the rate of change of reverse saturation current.

19. What is d.c load line?

The d.c load line is defined as a line on the output characteristics of the transistor which gives the value of Ic & Vce corresponding to zero signal condition.

20. What are the advantages of fixed bias circuit?

This is simple circuit which uses a few components. The operating point can be fixed anywhere on the Centre of the active region.

21. Explain about the various regions in a transistor.

The three regions are active region, saturation region and cutoff region.

22. Explain about the characteristics of a transistor.

Input characteristics: it is drawn between input voltage & input current while keeping output voltage as constant.

Output characteristics: It is drawn between the output voltage &output current while keeping input current as constant.

23. What is the necessary of the coupling capacitor?

It is used to block the c signal to the transistor amplifier. It allows ac &blocks the d c.

24. What is reverse saturation current?

The current due to the minority carriers is called the reverse saturation current.

25. What is a FET?

A field effect (FET) is a three terminal semiconductor device in which current conduction takes place by one type of carriers (either holes or electron) and is controlled by an electric field.

26. Why FET is called an unipolar device?

The operation of FET depends upon the flow of majority carriers only (either holes or electrons) the FET is said to be unipolar device.

27. Why the input impedance of FET is more than that of a BJT?

The input impedance of FET is more than that of a BJT because the input circuit of FET is reverse biased whereas the input circuit of BJT is forward biased.

28. What is meant by gate source threshold voltage of a FET?

The voltage at which the channel is completely cur off and the drain current becomes zero is called as gate source threshold voltage.

29. Why N channel FET's are preferred over P channel FET's?

In N channel FET the charge carriers are the electrons which have a mobility of about 1300 cm2/ VS, whereas in P channel FET's the charge carriers are the holes which have a mobility of about 500 cm2 /VS. the current in a semiconductor is directly proportional to mobility. Therefore the current in N channel FET is more than that of P channel FET.

30. What is JFET? And What are the terminals and types in JFET?

JFET- Junction Field Effect Transistor. And the terminals are Gate, Drain and Source and the types are N- Channel JFET and P- Channel JFET.

31. What are all the types of MOSFET?

i) Enhancement type ii) Depletion type

32. Differentiate Enhancement and Depletion MOSFET.

Enhancement MOSFET	Depletion MOSFET
Positive voltage at the gate	Negative voltage at the gate
Inversion layer is made	Depletion of majority carriers happens
Negative charges are formed	Positive charges are formed

UNIT-III

1. What is an amplifier?

An amplifier is a device which produces a large electrical output of similar characteristics to that of the input parameters.

2. How are amplifiers classified according to the input?

1. Small– signal amplifier
2. Large – signal amplifier.

3. How are amplifiers classified according to the transistor configuration?

1. Common emitter amplifier
2. Common base amplifier
3. Common collector amplifier.

3. What is the different analysis available to analyze a transistor?

1. AC analysis. 2. DC analysis.

4. How can a DC equivalent circuit of an amplifier be obtained?

By open circuiting the capacitor.

5. How can a AC equivalent circuit of a amplifier be obtained?

By replacing dc supply by a ground and short- circuiting capacitors.

6. What is an amplifier?

An amplifier is a device which produces a large electrical output of similar characteristics to that of the input parameters.

7. How are amplifiers classified according to the input?

1. Small – signal amplifier 2. Large – signal amplifier

8. How are amplifiers classified according to the transistor configuration?

1. Common emitter amplifier. 2. Common base amplifier. 3. Common collector amplifier.

9. List out the biasing schemes available to achieve the required bias in a FET.

Voltage divider bias, Base bias, Emitter feedback bias, Collector feedback bias, Emitter bias.

10. Mention the parameters of JFET.

- A.C. drain resistance
- Transconductance
- Amplification factor

11. What is transconductance in JFET?

It is the ratio of small change in drain current to the corresponding change in drain to source voltage.

12. What is amplification factor in JFET?

It is the ratio of small change in drain to source voltage to the corresponding change in Gate to source voltage.

13. Why do we choose q point at the center of the load line?

The operating point of a transistor is kept fixed usually at the center of the active region in order that the input signal is well amplified. If the point is fixed in the saturation region or the cut off region the positive and negative half cycle gets clipped off respectively.

14. Define MOSFET and what are all the terminals.

Metal oxide semiconductor field effect transistor. The terminals are gate, Drain and source.

15.Why bypass and coupling capacitor are used in amplifier circuits?

Bypass capacitor CE:

The capacitor connected in parallel with the emitter resistor RE is called as the emitter bypass capacitor.

This capacitor offers a low reactance to the amplified ac signal. Therefore the emitter resistor RE gets bypassed through CE.

16. How does the MOSFET has high input impedance?

The input impedance of a MOSFET is higher than that of FET since the gate is insulated from the channel by thin layer of silicon di oxide.

17. Define stability factor of an amplifier? What is its ideal value.

It is rate of change of collector current with respect to the reverse saturation current I_{CO} or β or V_{be}. This is the factor which is used to monitor the thermal stability of the amplifier circuit. The ideal value of stability factor 1.

18. What is the advantage of using emitter resistance in the context of biasing?

It is used to increase the stability by providing negative feedback.

19. What is bandwidth of an amplifier?

The range of frequencies between the upper cutoff frequency and lower cutoff frequency is known as bandwidth.

20. What are the features of cascode amplifier?

It is another type of wide band amplifier where the first stage is a CE amplifier and the second stage is the CB amplifier stage. This arrangement is designed to provide high input impedance with lower voltage gain to ensure that the miller capacitance is at a minimum with the CB stage providing good high frequency operation.

UNIT-IV

1. What is a differential amplifier?

An amplifier that has two inputs and produces on output signal that is a function of the difference between the two given output.

2. What are the applications of difference amplifier?

- Medical electronic field
- Input stage in the measuring instruments
- Analog computation
- Linear integrated circuit

3. What are the advantages of differential amplifier?

- It uses no frequency dependent coupling or bypassing capacitors.
- It can compare any tow signals and detect the difference.
- It gives higher gain than two cascaded stages of ordinary direct coupling.

4. What is operational amplifier?

An op amp to perform mathematical operation like summation, multiplication, differentiation and integration etc. in analog computers. It is very high directly couple negative fee back amplifier, which can amplify signals having frequency ranging from 0Hz to 1 MHz.

5. What are the specifications for an ideal operational amplifier?

Open loop gain = ∞, Input impedance = ∞

Output impedance = 0, Band width = ∞, CMRR = ∞

6. What is common mode voltage swing?

The common mode voltage swing is defined as the maximum peak input voltage which may be applied to either input terminal without causing abnormal operation or damage.

7. Define slew rate.

It measure of an operational amplifier's switching speed defined as the maximum time rate of change of the output voltage when subjected to a square wave input signal when the closed loop gain is unity. Unit is V/msec.

8. Define input off set voltage.

The algebraic difference between the currents into the (-) input and (+) input is referred to as input offset current.

9. Is the practical op-amp on ideal op-amp?

A practical op-amp is not ideal and has finite value of input offset voltage input offset current and input bias current. These produce a dc offset voltage at the output.

10. Can op-amp be used to amplify AC as well as DC output?

Op amp can be used to amplify AC and DC for amplifying AC .we use a capacitance coupled amplifier.

11. What is phase shift distortion?

If the phase shift introduced by the amplifier for different input frequencies are not proportional to frequency then phase distortion will take place. The phase distortions are not detectable by the human ears as they are insensitive to the phase changes.

Therefore, phase shift distortion takes place due to unequal phase shifts of the input signal at different frequencies.

12. What is difference between voltage amplifier and power amplifier?

Small signal amplifiers are also known as "Voltage amplifiers". This is because these amplifiers are used primarily for voltage amplification but they are not capable of supplying a large power to the loads such as loud speakers. The large signal amplifier (power amplifier) will increase the current sourcing and sinking capability. So at its output we get a high voltage, high current signal that means a high power signal. Thus the power amplifier is basically a current amplifier.

13. What are the types of bias method?

1. Fixed bias circuit (single base resistor biasing)
2. Collector to base bias circuit
3. Voltage divider bias (self-bias) circuit.

14. Define pinch off voltage.

The drain source voltage(V_{DS}) at which the drain current (I_D)reaches to its constant saturation level is called as "pinch off voltage, V_P"

$V_P = (q\ N_D\ a^2)/2\epsilon$

15. Why thermal runaway not present in FET?

Thermal runaway does not exist in JFET, because drain resistance rd increases with the temperature, which reduces I_D. Thus with the reduction of I_D the temperature of the device is reduced.

16. What is meant by monostable, bistable, astable multivibrator?

Bistable multivibrator-It has two stable states. The multivibrator can exist indefinitely ineither of the two stable states .It requires an external triggering pulse to change from one state to another.

Monostable Multivibrator: It has one stable state and one quasi state. The multivibratorremains in a stable state and when external triggering is applied, then multivibrator goes to quasi state .After some time interval, the circuit automatically returns to normal state.

Astable Multivibrator-The astable multivibrator has both the states as the quasi stablestates. None of the state is stable. Due to this, the multivibrator automatically makes the successive transition from one quasi stable state to other, without any triggering pulse

17. Mention few applications of UJT.

1. Phase control 2.Saw – tooth generators 3.Non-sinusoidal oscillators 4.Triggering device for SCR and DIAC.

18. List the various square wave generator circuits.

- Astable multivibrator.
- Monostable multivibrator.
- Bistable multivibrator.
- Schmitt trigger

19. List the various saw tooth generator circuit.

- Exponential charging
- Miller circuit.

- Bootstrap circuit.
- Phantastron circuit.
- Inductor circuit

20. How the frequency of oscillation varied in an astable multivibrator?

1/T = 1/ 1.38RC, so by varying the value of R or C, the frequency of oscillation can be varied.

UNIT-V

1. Define positive feedback.

If the feedback signal is in phase with input signal, then the net effect of the feedback will increase the input signal given to the amplifier. This type of feedback is said to be positive or regenerative feedback.

2. Define negative feedback.

If the feedback signal is out of phase with the input signal then the inputvoltage applied to the basic amplifier is decreased and correspondingly the output isdecreased. This type of feedback is known as negative or degenerative feedback.

3. Define sensitivity.

Sensitivity is defined as the ratio of percentage change in voltage gain with feedback to the percentage change in voltage gain without feedback.

4. What are the types of feedback?

i. Voltage-series feedback
ii. Voltage-shunt feedback
iii. Current-series feedback
iv. Current-shunt feedback

5. Define feedback.

A portion of the output signal is taken from the output of the amplifier and is combined with the normal input signal. This is known as feedback.

6. Give an example for voltage-series feedback.

The Common collector or Emitter follower amplifier is an example for voltage series feedback.

7. Give the effect of negative feedback on amplifier characteristics.

i. Negative feedback reduces the gain
ii. Distortion is very much reduce

8. What is Oscillator circuit?

A circuit with an active device is used to produce an alternating current is called an oscillator circuit.

9. What are the classifications of Oscillators?

Based on wave generated:

(i) Sinusoidal Oscillator (ii)Non-sinusoidal Oscillator or Relaxation Oscillator

Ex: Square wave, Triangular wave, Rectangular wave etc.

10. Give the properties of negative feedback.

i. Negative feedback reduces the gain

ii. Distortion is very much reduced.

11. What are the types of feedback oscillators?

i. RC-Phase shift Oscillator

ii. LC-Oscillators

a. Tuned collector Oscillator

b. Tuned emitter Oscillator

c. Tuned collector base Oscillator

d. Hartley Oscillator

e. Colpits Oscillator

f. Clap Oscillator.

12. What are the conditions for oscillation?

The total phase shift of an oscillator should be 360^{o}. For feedback oscillator i should satisfies Barhausen criterion.

13. What is Miller crystal oscillator? Explain its operation.

It is a Hartley oscillator its feedback Network is replaced by a crystal. Crystal normally generate higher frequency reactance due to the miller capacitance are in effect between the transistor terminal.

14. Define Oscillator.

A circuit with an active device is used to produce an alternating current is called an oscillator circuit.

15. What is feed back?

It is the process of injecting some energy from the output and then returns it back to the input.

16. What is the disadvantage of negative feedback?

Reduces amplifier gain

17. Define Blocking Oscillator.

A special type of wave generator which is used to produce a single narrow pulse or train of pulses.

18. What are the two important elements of Blocking Oscillator?

Transistor and pulse transformer.

19. What are the applications of blocking Oscillator?

It is used in frequency dividers, counter circuits and for switching the other circuits.

21. Define Hartley oscillator.

A LC oscillator which uses two inductive reactance and one capacitive reactance in its feedback network is called Hartley Oscillator.

22. Define Colpitts oscillator.

A LC oscillator which uses two capacitive reactance and one inductive reactance in its feedback network is called Hartley Oscillator.

23. What are the main advantages of crystal oscillator?

The main advantages of crystal oscillator are frequency accuracy, stability and low power consumption.

24. What do you mean by Multivibrators and mention its types?

The Multivibrators are used to produce the non – sinusoidal input signal. Types:

(1)Astable multivibrators (2) Monostable multivibrators (3) Bistable multivibrators

16 Marks Questions

UNIT-I

1. Explain the forward and revere bias operation and VI characteristics of a PN junction diode.
2. Explain the working of centre-tapped full wave rectifier (with and without filter) with neat diagrams.
3. Discuss the effect of temperature on VI characteristics of a diode.
4. Explain the characteristics and applications of Zener diode.
5. Explain the mechanism of avalanche and Zener break down.
6. Define and derive the expression for diffusion capacitance of a PN diode.
7. Discuss the effect of doping on depletion region.
8. Define regulator. Explain the operation of any one type of regulator.
9. Explain about filters and also explain the operation of CLC and LC filter.

10. Explain about LED,LCD and its applications.
11. Draw the circuit diagram of half wave rectifier and explain its operation with necessary waveform.

UNIT-II

1. Explain the operation of PNP& NPN transistor.
2. Explain input and output characteristics of CE configurations in NPN transistors.
3. Explain the operation of NPN transistor in CE configuration with its input and output Characteristics. Also define active, saturation and cut –off regions.
4. How could transistor act as a switch?
5. Compare JFET and MOSFET. Also give a detailed description of construction and operation of JFET.
6. Explain the principle of operation of a unijunction transistor.
7. Explain how D-MOSFETs and E-MOSFETs differ.
8. Explain the construction, principle of operation, Characteristics and applications of Thyristor.
9. Explain the construction, principle of operation, Characteristics and applications of IGBT.
10. Compare pinch off and cutoff in JFET. Also discuss how voltage controls the current in JFET.

UNIT-III

1. With the hybrid equivalent circuit define the various h parameters of the CE transistor configuration and derive the analytical expression for each of them.
2. A common base transistor amplifier is driven by a voltage source Vs and internal resistance RS=1200Ω. The load impedance is a resistor R_L OF 1000Ω. The 'h' parameters are given below: h_{ib} = 220Ω; h_{rb} =3*10^{-}4 ; h_{fb}= -0.98; h_{ob}=0.5μA/V Compute, current gain (Ai), Input impedance (Ri), Voltage gain Av, input impedance (Ro) and Power gain Ap.
3. Explain in detail on voltage and current gain expressions for CB configuration using hybrid model.
4. Discuss on the following (i) JFET Small signal model (ii) Darlington connection.
5. Explain how different hybrid parameters are found out using CB configuration.

6. Explain About Thermal Runaway and Thermal Stability.
7. Derive the relations among ά, β, γ of a transistor.
8. What are called h-parameters? Explain the analysis of CE small signal amplifier using h-parameter.
9. Draw the small signal equivalent circuit of FET amplifier in CS connection and derive the equations for voltage gain, Input Impedance and output impedance.
10. Compare CB, CE and CC amplifiers.

UNIT-IV

1. Explain the different amplifier with common mode and differential mode of operations.
2. Explain the biasing techniques of JFET under different conditions.
3. Discuss the working of various types of power amplifiers.
4. What do you understand by Differential amplifiers? Draw the circuit diagram and explain the Working of differential amplifier. Explain the circuit operation of CM and DM.
5. Draw the circuit diagram and explain the working of differential amplifier. Explain the circuit Operation at CM and DM.
6. Draw the drain and transfer characteristics of A N-Channel JFET and explain.
7. Explain about i) CS amplifier ii) CD amplifier iii) CG amplifier.
8. Derive the voltage gain, input resistances of CS, CD, CG amplifiers.
9. Write short notes on cascade and cascode amplifiers.
10. Write short notes on Darlington connections.

UNIT-V

1. Explain the effects of negative feedback in amplifiers.
2. Explain the operation of crystal oscillator with neat diagram and write the expression of its frequency of oscillations.
3. Describe the characteristics i) positive feedback ii) negative feedback.
4. With the suitable block diagrams, derive the expression for input and output resistances for i) voltage series amplifier ii) voltage shunt amplifier iii) current series & shunt amplifier.
5. Explain the concept of oscillators.
6. Explain the principle of operation and derive the expression for Wein Bridge oscillator.
7. Explain the principle of operation and derive the expression for Colpitts oscillator.
8. Derive the expression and characteristics of i) RC phase shift oscillator ii) Hartley

oscillator.

9. What is Barkhausen criterion? Explain in detail?

10. Explain the principle of operation and derive the expression for any one LC oscillator.

ELECTRICAL MACHINES-I

Two Marks Questions and Answers

UNIT-I MAGNETIC CIRCUITS AND MAGNETIC MATERIALS

1. Mentionthetypes ofelectricalmachines.

Therearethree basicrotatingmachinestypes, namely
a.Thedcmachines
b. the polyphasesynchronousmachine(ac),and
c.Polyandsingle phaseinductionmachine(ac)andastationarymachine,namely Transformer.

2. Define magneto motive force?

MMF is the cause for producing flux in a magnetic circuit. the amount of flux setup in the core decent upon current(I)and number of turns(N).the product of NI is called MMF and it determine the amount of flux setup in the magnetic circuit

MMF=NI ampere turns (AT).