GE8251 - BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

UNIT-I ELECTRICAL CIRCUITS AND MEASUREMENTS

TWO MARKS:

1. Explain how voltage source with a source resistance can be converted into an equivalent current source.

A current source is parallel with a resistance is equivalent to a voltage source in series with the same resistor, provided that the value of the voltage source is equal to the value of the current source, and multiplied by the resistance.

2.Define active elements and passive elements

Active elements are energy sources. Example voltage source, current source. The elements which store or dissipate the energy is called passive element. Example R, L, C.

3. Under what condition AC circuit said to be resonant?

If the inductive reactance of the circuit is equal to capacitive reactance then the circuit is said to be resonance. XL=XC

4. State the different types of instruments based on their operating principles.(AU MAY 2012)

1. Moving coil instruments
2. Moving iron instruments

5. Define electric potential.

Capacity of charged body to do work is electric potential. Electric potential = Work done / Charge = W/Q When one joule of work is done to charge a body to one coulomb, the body is said to have an electric potential of one volt. The unit of electric potential is volt; symbol is V. Smaller values of electric potentials are measured by mill volts and microvolt.

6. Define power.

The rate of doing work by electrical energy or energy supplied per unit time is called the power. Its unit is watts .P = V I; P = I^2R; P = E2 / R. P = Energy / time = W/t

7. Mention the two types of MI instruments. (AUMAY2012)

1. Moving iron attraction type
2. Moving iron repulsion type

8. Write down the expression for effective resistance when three resistances are connected in series and parallel.

For series connection (for three resistors)

R= R1 + R2 + R3

9. A sine wave has a peak value of 25 V. Determine the following (a) RMS and (b) Peak to peak value.

$V_{rms}=Vm/\sqrt{2}$

$=25/\sqrt{2}=17.68$

$V_{peak\ to\ peak}=2V_{max}=17.68*2=35V$

10. What is meant by electrical energy?

Energy is the total amount of work done and hence is the product of power and time.

W = Pt = EIt = I2Rt = E2 / Rt Joules (watt – second)

11. It is required to convert a 5mA meter with 20Ω internal resistor into 5A ammeter. Calculate the value of shunt resistance required and multiply factor shunt.

According to ohm's law V=IR

$=5*.001*20=0.1V$

For 5A current, R=V/I=0.1/20=0.2Ω

12. State Kirchhoff's laws. (AU NOV 2011) (AU MAY 2012) (AU NOV 2014) (AU MAY 2015)

Kirchhoff's Current Law

The sum of currents flowing towards the junction is equal to the sum of the currents flowing away from it.

Kirchhoff's Voltage Law (AU AP/MAY 2015)

In a closed circuit, the sum of the potential drops is equal to the sum of the potential rises.

13. A 120Ω resistor has a specified maximum power dissipation of 1 W. Calculate the maximum current level.(AU MAY 2013)

$P=I^2R$ (w)

$1=I^2(120)$

$I^2=1/120=8.33\times10^{-3}$

I=0.0912A

14. What are the advantages of electromechanical measuring instruments? (AU NOV 2012) (AU MAY 2011)

1. Simplicity
2. Reality
3. Low price
4. It can work without any additional device

15. State Ohm's law. (AU NOV 2015)

When temperature remains constant, current flowing through a circuit is directly proportional to

potential deference across the conductor.

16. Three inductive coils each with resistance of 15Ω and an inductance of 0.03H are connected in star to a 3 phase 400V, 50Hz supply. Calculate the phase voltage. (AU MAY 2013)

$V_{ph} = V_{line}/\sqrt{3}$

$V_{ph} = 400/\sqrt{3} = 231V$

17. Define frequency. (May 2004)

The number cycles occurring per second is called frequency f = 1/T Hz.

18. Give the voltage and current equation for a purely resistance circuit.

$e = E_M \sin wt$

$I = I_M \sin wt$

Where,

e, i are instantaneous value of voltage and current respectively.

E_M, I_M are maximum voltage and current respectively.

w - Angular velocity, T – Time period.

19. Define inductance.

When a time varying current passes through circuit varying flux is produced. Because of this change in flux, a voltage is induced in the circuit proportional time rate of change of flux or current i.eEmf induced a di/dt = L di/dt.

Where L, the constant proportionality has come to be called as self-inductance of the circuit .The self-inductance is the property of coil by which it oppose any change of current. It is well known that the unit of inductance is Henry.

20. Define power factor. (AU MAY 2011)

The power factor is the cosine of the phase angle between voltage and current.

Cos q = Resistance / Impedance

Cos q = Real power / Apparent power

21. Define real power.

The actual power consumed in an ac circuit is called real power. If E and I are rms value of voltage and current respectively and q is the phase angle between V and I. P = EI cos q.

22. Define apparent power.

The maximum power consumed by the circuit is called apparent power. The unit VA.

Represented by Apparent Power, S = VI.

23. Define RMS value (AU NOV 2011)(AU NOV 2012)(AU NOV 2013)

It is the mean of the squares of the instantaneous value of current over one complete cycle.

23. What is charge?

The charge is an electrical property of the atom particles of which matter consists. The unit of charge is coulomb.

24. State the principle of moving iron instrument. (AU NOV 2011)(AU MAY 2013)

For moving iron attraction type a soft iron piece if brought near the magnets gets attracted by the magnet. For Repulsion type instruments have two vanes inside the coil, the one is fixed and other is moveable. When the current flows in the coil, both the vanes are magnetized with like polarities induced on the same side. Hence due to the repulsion of like polarities, there is force of repulsion between the two vanes causing the movement of the moving vane.

25. Define current.

The flow of free electron in a metal is called electric current. The unit current is ampere. Current (I) = Q / t Where, Q is the total charge transferred in coulomb. t is the time required to transfer the charge.

26. Two resistances of 4 ohm and 6 ohm are connected in parallel across 10v battery. Determine the current through 6 ohm resistance.(AU NOV 2013)

I6=V*R1/(R1+R2)

= (10*4)/10=4A

27. State ohm's law and its limitations. (AU MAY 2014) (AU NOV 2015)

When the temperature remains constant, current flowing through a circuit is directly proportional to potential difference across the conductor.

(i) Does not apply to all non-metallic conductors, non-linear devices such as zener diode, vacuum tubesetc

(ii) True for metal conductors at constant temperature.

28.Define the principle of moving iron instrument for attraction type. (AU MAY 2014)

The moving iron is a flat disc and when the current flows through the coil, a magnetic field is produced and the moving iron is attracted in. The controlling torque is provided by springs. Damping is provided by air friction with the help of light aluminum piston which moves ina field chamber close at one end.

29. List any three types of indicating instruments. (AU NOV 2011)

1. Ammeter
2. Wattmeter
3. Voltmeter.

30. Define power and power factor for single phase. (AU NOV 2014)

Power

The rate of doing work by electrical energy or energy supplied per unit time is called the power.

Its unit is watts .P = V I; P = I^2R; P = E2 / R. P = Energy / time = W/t

Power Factor

The power factor is the cosine of the phase angle between voltage and current.

Cos q = Resistance / Impedance

Cos q = Real power / Apparent power

31. Mention the errors in moving iron instruments. (AU MAY 2015) (AU NOV 2015)

Hysteresis errors, temperature error, stray magnetic fields, frequency error, eddy current error

Descriptive Type Questions

1. Explain the effect in series and parallel circuit.

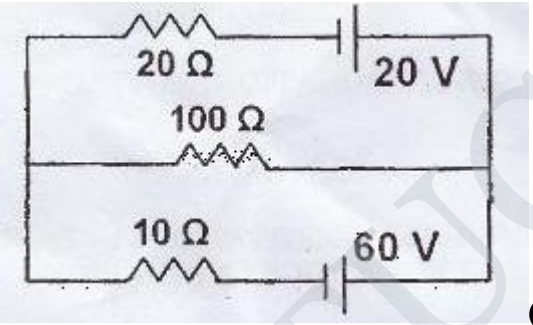
2. A coil of resistances 5.94Ω and inductance of 0.35H is connected in series with a capacitance of 35μF across a 200V, 50Hz supply. Find the impedance (Z), current and the phase difference between voltage and current (φ). **[6 Marks](AU NOV 2012)**

3. State and explain Kirchhoff's Laws.**[4 Marks](AU MAY 2013)**

4. Derive the expression for RMS and Average value of an alternating quantity (a sine wave).

5. Explain the the principle of operation of attraction-type and repulsion type of moving iron instruments with neat sketches. **[8Marks] (AU MAY 2012)**

6. For the circuit shown below, find the current through each of the three resistors. **[10 Marks]**



(AU NOV 2012)

7. Write short notes on moving iron measuring instruments under the following headings:

(i) Operating Principle **[4 Marks]**

(ii) Classification **[2 Marks]**

(iii) Advantages and Disadvantages **[2 Marks] (AU MAY 2013)**

8. With the help of a neat diagram, explain the construction and working of a permanent magnet moving coil (PMMC) type instrument. **[8 Marks] (AU MAY2011)**

9. 3φ, 200kW, 50Hz delta connected induction motor is supplied from a 3φ,440V, 50Hz supply system. The efficiency and power factor of 3φ induction motor are 91%and 0.86 respectively.

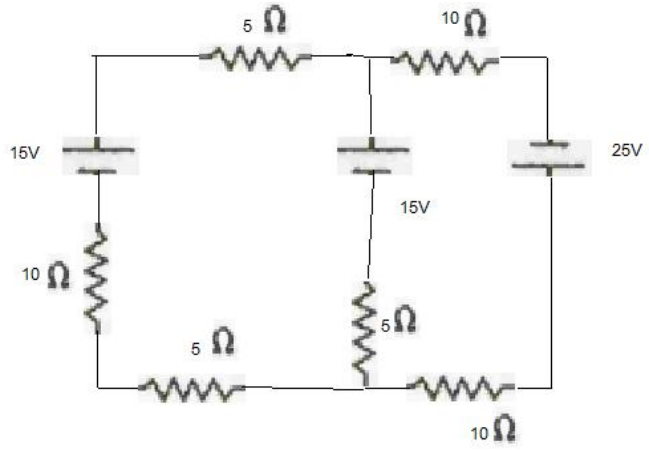
Calculate (1) a. Current in each motor phase **[2 Marks]**

b.Line Current **[2 Marks]**

(2) Phasor diagram of the circuit **[4 Marks] (AU MAY 2013)**

10. Find the current in the 8ohm resistor in the following circuit using Kirchhoff's Laws.

[8 Marks] (AU MAY 2013)



11.Three inductive coils each with a resistance of 15Ω and an inductance of 0.03H are connected in star to a 3phase 400V, 50Hz supply Calculate phase current, line current and power absorbed. **[6 Marks] (AU NOV 2012)**

12. A sinusoidal current wave is given by i=50sin(500πt) Determine the root mean square value. **[4 Marks](AU MAY 2013)**

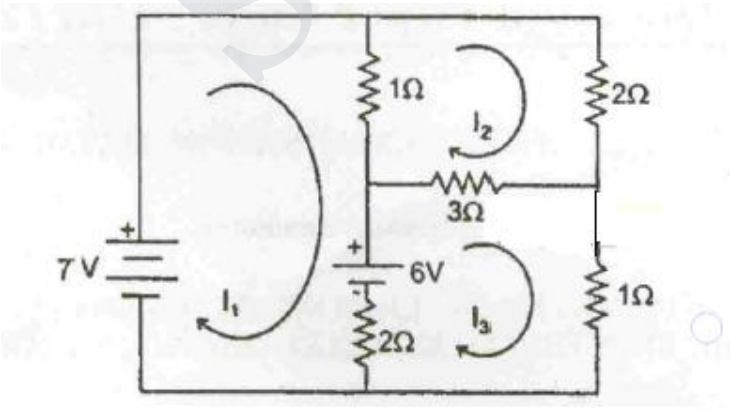
13. With a neat diagram explain the construction and principle of PMMI instruments. **[10 Marks] (AU NOV 2012)**

14. With neat diagram explain the moving iron attraction type instruments**(AU MAY 2012)**

15. Derive the expression for phase angle in the RL series circuit , RC series and RLC series circuit**.[16 Marks](AU NOV 2013)**

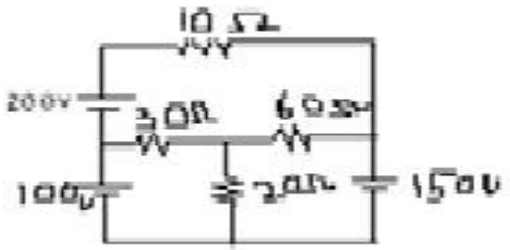
16. A series RC circuit R=20Ω C=127μf has 160V 50hz supply connected to it. Find the impedance, current and power factor.**[6Marks] (AU MAY2011) (AU MAY 2012) (AU NOV 2011)**

17. Use mesh analysis to determine thethree mesh currents in the circuit shown below.**[10Marks] (AU MAY2011) (AU MAY 2012) (AU NOV 2011)**



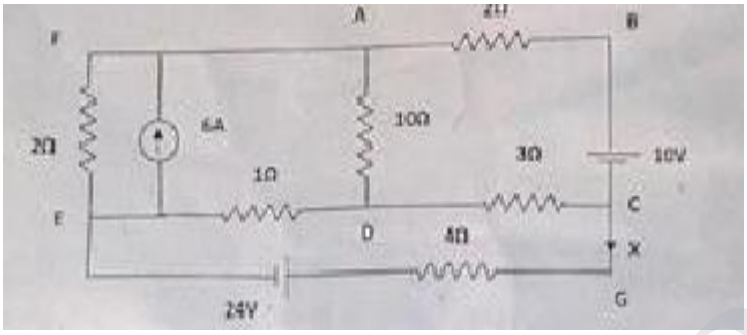
18. Using mesh analysis find the current through various branches in the circuit**. [16 Marks]**

(AU NOV 2013)



19.Determine the current, power in the 4 Ω resistance of the circuit shown below. **[10 marks]**

(AU MAY 2014) (AU NOV 2015)



20.RL series circuit having a resistance of 6Ω and an inductance of 0.03H is connected across a 100V,50Hz supply. Calculate the phase angle between the current and voltage, power factor. **[6 marks](MAY 2014)**

21. A 15V moving iron voltmeter has a resistance of 500 Ω and an inductance of 0.12H. Assuming that the instrument reads correctly on DC. What will be its reading on AC at 15 volts when the frequency is 25Hz and 50Hz **[6marks](AU MAY 2014)**

22.Explain the principle and operation of dynamometer type wattmeter and derive deflecting torque. Write advantages and disadvantages.**[10marks](AU MAY 2014)**

23. Three similar coils connected in star, take a power of 1.5KW at a power factor of 0.2 lagging from a 3 phase, 400V, 50Hz supply. Calculate the resistance and inductance of each coil.**[8Marks] (AU MAY 2011)**

24.Calculate (i) equivalent resistance across the terminal of the supply (ii) total current supplied by the source(iii) power delivered to 16Ω resistor the circuit shown below.(16) **(AU MAY 2015)**

25. Determine the line current, power factor and total power when a three phase 400V supply is given to a balanced load of impedance (8+j6)Ω in each branch, is connected in star. **[8 Marks] (AU NOV 2011)**

26. With the help of a neat diagram, explain the construction and operation of induction type energy meter. **[8 Marks] (AU NOV 2011)**

27. Three similar coils connected in star, take a power of 1.5kW at a power factor of 0.2 lagging from a 3 phase, 400V, 50Hz supply. Calculate the resistance and inductance of each coil. **[8 Marks] (AU MAY 2011)**

28. Obtain expression of power and power factor for three phase A.C star connected balanced load circuit. **[16 Marks] (AU NOV 2014)**

29. With diagram explain principle of operation of permanent magnet moving coil ammeter. **[16 Marks] (AU NOV 2014)**

30. Draw and explain the working principle of attraction type, repulsion type M.I instruments and derive its deflection torque**. (AU MAY 2015) (AU NOV 2015)**

UNIT-II ELECTRICAL MACHINES

TWO MARKS:

1. What is an electric generator?

An electrical machine, which converts mechanical energy into electrical Energy, is called as electric generator.

2. What is Transformer?(AU NOV 2011)

Transformer is a static device used to transfer electrical energy form one circuit to another with increase or decrease in voltage without changing the frequency of its supply.

3. Mention the difference between core and shell type transformers.

1. In core type the leakage is reduced by winding half low voltage and half voltage winding on each limb of the core. But in shell type leakage can be reduced by subdividing each winding into subsections each winding into subsections and inter leaving LV and HV windings

2. Core type construction has a longer mean length of core and a shorter mean length of coil turn. But in shelltype construction has better mechanical support and good provision for bracing the windings.

4. List the major parts of DC machine.(AU NOV 2011)

1. Field system
2. Armature core
3. Armature winding
4. Commutator
5. Brushes

5. Write down the condition for maximum efficiency in case of DC generator.

To get maximum efficiency the condition is variable loss =constant loss

6. Write down the power equation of DC motor.

$VI_a=E_bI_a+I_a^2R_a$

7. Classify capacitor motor.

1.Capacitor start motor

2. Capacitor start capacitor runs motor.

8. Give the emf equation of a transformer and define each term.

$E1=4.44f\emptyset mN1$

$E2=4.44\ f\emptyset mN2$

Where E1&E2 are induced emf in primary and secondary respectively

N1&N2 are no. of turns in primary and secondary respectively

F=frequency of supply

9. What is greatest advantage of DC motor?

DC motor can control speed even with load but in AC motor it is not possible

10. Why single phase induction motor is not self starting? (AU MAY 2015)

The single phase IM is not self starting because due to cutting of flux e.m.f gets induced in rotor which circulates rotor current. The rotor current produces rotor flux. This flux interacts with forward component $\emptyset f$ to produce torque in one particular direction say anitclock wise direction. While rotor interacts with backward component to produce a torque in the clockwise direction. The net torque experienced by the rotor is zero at start. And hence single phase IM is not self starting

11. What is Back e.m.f? (AUNOV 2012)(AU MAY 2011)

If the armature of a D.C motor rotates under the influence of the driving torque, the armature conductor moves through the magnetic field and hence e.m.f is induced in them as agenerator . The induced e.m.f is opposite to direction of the applied voltage

12. Define Transformation ratio of a Transformer?(AUNOV 2012)(AU MAY 2011)

E2/E1=I1/I2=N2/N1=K

14.A dc shunt generator supplies a load of 10kW at 220V through feeders of resistance 0.1Ω. The resistance of armature and shunt field windings is 0.05Ω and 100Ω respectively. Calculate the terminal voltage.(AU MAY 2013)

V=E-IaRa

Ia=I_L+Ish

Ish=V/Rsh= 220/100=2.2A

I_L=P/V =10000/220=45.45A

Ia=2.2+45.45=47.65A

V=220-(47.65*0.05)=217.85V

15. In a single phase transformer Np=350 turns,Ns=1050 turns,Ep=400V.Find Es(AU MAY 2013)

Es= (N_2 / N_1)*V_1 here N_2 = Ns and N_1 = Np and V_1 = Ep

= (1050/350)*400

Es=1200V.

16.What are all the applications of DC motor? (AUNOV 2011)

DC Shunt motor:

Blowers and fans_ Centrifugal and reciprocating pumps_ Lathe machines_ Machine tools _ Milling machines_ Drilling machines

DC Series motor:

Cranes Hoists, Elevators_ Trolleys_ Conveyors_ Electric locomotives

DC Cumulative compound motor:

Rolling mills_ PunchesShears Heavy planers Elevators

17. What are the types of transformer based on the construction?(AU MAY 2011)(AU MAY 2012)

Coretype,

Shell type and

Berry type.

18. What is the function yoke in a dc machine?(AU MAY 2012)

It serves the purpose of outermost cover of the dc machine. So that the insulating material gets protected from harmful atmospheric elements like moisture, dust and various gases like SO2, acidic fumes etc. It provides mechanical support to the poles.

19. What is the choice of material for the following?

1. Yoke: It is prepared by using cast iron because it is cheapest.
2. Pole: It is made up of cast iron or cast steel.
3. Field winding: It is made up of aluminum or copper.
4. Armature winding: It is made up of cast iron or cast steel.

20. Give the emf equation of dc generator.

E=ΦZNP/60A

where E- Generated emf in volts

Φ-Flux produced per pole in Weber

Z-Total no. of conductors

N-Speed of armature in rpm

E=ΦZN/60 for lap winding A=P

E=ΦZNP/120 for wave winding A=2

21. What are all the two types of excitation?

1. Separate excitation

When the field winding is supplied from external, separate dc supply i.e. Excitation of fieldwinding is separate then the generator is called separately excited generator.

2. Self excitation

When the field winding is supplied from the armature of the generator itself then it is called as self-excitation.

22. What is meant by residual magnetism?

Practically though the generator is not working, without any current through field winding, the field poles posses some magnetic flux. This is called as residual magnetism.

23. Give the types of DC generator.

1. Self excited generator
   (i) Series Generator
   (ii) Shunt Generator
   (iii)Compound Generator
2. Separately excited generator

24. List out the applications of various types of generators. **(AU NOV 2014)**

Separately excited generator:

As a separate supply is required to excite the field, the use is restricted to some special applications like electroplating, electro refining of materials etc

Shunt generator:

Commonly used in battery charging and ordinary lighting purposes.

Series Generators:

Commonly used as boosters on dc feeders, as a constant current generators for welding generator and arc lamps.

Cumulatively compound generators:

These are used for domestic lighting purposes and to transmit energy over long distance.

Differential compound generator:

The use of this type of generators is very rare and it is used for special application like electric arc welding.

25. Give the torque equation of a DC motor.

Ta=0.159fIa.PZ/A N-m

Ia- Armature current

P-Number of poles

Z-Total number of conductors

A-Number of parallel paths

26. Whatis the principle of DC motor? (AU NOV 2013) (AU MAY 2015)

It is working under the electromagnetic induction principle .It states that when current carrying conductor is placed in a magnetic field it experiences a force

27. Calculate the generated e.m.f, by a 4 pole, wave- wound armature having 45 slots with 18 conductors per slot when driven at 1200 rpm and the flux per pole is 0.016Wb. (AU MAY 2014) (AU NOV 2015)

Generated e.m.f ,E_g = PΦZN/ 60A

Given that P =4

A=2 (for wave wound)

Φ = 0.016 Wb

Z = 45*18*2 = 1,620

N = 1200 rpm

E_g = (0.016*1620*1200)/(60*2)

= 512.4 V

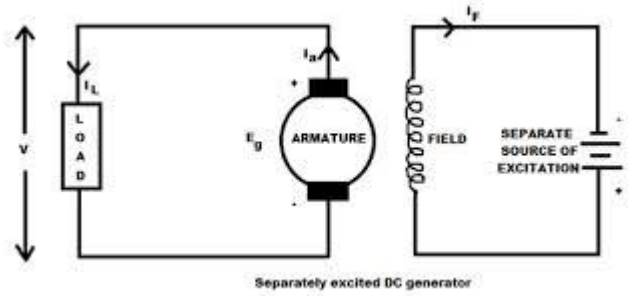
28. List out the types of single phase induction motors. (AU MAY 2014) (AU NOV 2014) (AU NOV 2015)

i. Shaded-pole induction motor

ii. Capacitor start induction motor

iii. Capacitor run induction motor
iv. Capacitor start-run induction motor
v. Split phase induction motor

29. Sketch the circuit diagram of separately excited dc generator. (AU NOV 2011)



Separately excited DC generator

Descriptive Type Questions

1. Draw a neat sketch of a DC generator and label the component parts. Name thematerial used for each component part. **(AU NOV 2011)**
2. Derive the torque and speed equation of dc motor**.(AU DEC 2015) (AU NOV 2015)**
3. Explain the construction and working principle of capacitor start and capacitor run single phase induction motor. What are its advantages and practical applications? **[8 Marks] (AU MAY 2012)**
4. Explain the characteristics of a dc shunt motor. Sketch the graphical representation of the concerned characteristics. **[6 Marks](AU MAY 2012)**
5. Write short notes on types of DC machines. **[8 Marks](A.U.MAY 2013)**
6. Draw the circuit diagram of the following three types of DC motors and write the relationships among the current and voltages.

i) Separately DC motor
ii) Shunt motor
iii) Series motor. **[6 Marks](AU MAY 2012)**

7. Explain the principle of operation of single phase transformer. **[8 Marks] (AU MAY 2012)(AU DEC 2015) (AU MAY 2015)**
8. Derive the emf equation of a dc generator. **[8 Marks](AU NOV2012)(AU MAY 2011)**
9. Derive the emf equation of a transformer. **[8 Marks] (AU NOV 2011)**
10. A short shunt cumulative compound DC generator supplies 7.5KW at 230V. The shunt field, series field, and armature resistances are 100,0.3and 0.4Ω respectively. Calculate the induced e.m.f and the load resistance.**[4 Marks](AU NOV 2012) (AU MAY 2011)**
11. A 30KW,300V,DC shunt generator has armature and field resistance of 0.05 and 100Ω

respectively. Calculate the total power developed by the armature when it delivers full output power.**[4 Marks](AU NOV 2012) (AU MAY 2011)**

12. A single phase 2200/250V, 50Hz transformer has net core area of 36cm2 and maximum flux density of 6Wb/m^2. Calculate the number of primary turns andsecondary turns.**[4 Marks] (AU NOV 2012) (AU MAY 2011)**

13. Explain the construction and operating principle of split phase Induction motor. **[12 Marks] (AU NOV 2012)(AU MAY 2011)**

14. With neat diagram explain the construction and principle of a single phase transformer. What are the characteristics of an ideal transformer?**[8 Marks] (AU MAY 2013)**

15. Explain the basic nature of the emf induced in the armature of a dc machine.**[8 Marks] (AU MAY2013)**

16. A 200V DC shunt motor takes a load current of 100A and runs at 750rpm. The resistance of the armature winding and of shunt field winding is 0.1Ω and 40Ω respectively. Find the torque developed by the armature**[8 Marks] (AU MAY 2013)**

17. Explain the working principle of DC generator with neat diagram.**[16 Marks](AU NOV 2013)**

18. Explain the working principles of various types of single phase induction motor with neat diagram.
[16 Marks] (AU NOV2013)

19. A DC motor connected to a 460V supply has an armature resistance of 0.15 ohms. Calculate
(1) the value of back emf when the armature current is 120A.
(2) the value of armature current when the back emf is 447V. **[4 Marks](AU MAY 2012)**

20.With the neat sketches, explain the working principle and the construction of DC motor. Also derive the torque and speed equation.**[12 marks](AU MAY 2014) (AU NOV 2015) (AU NOV 2015)**

21. A DC shunt generator supplies a load of 7.5KW at 200V. Calculate the induced emf if the armature resistance is 0.6Ωand the field resistance is 80Ω. [4 marks] **(AU MAY 2014)**

22.At starting the windings of a 230V,50Hz, split phase induction motor, main winding: R = 4Ω, X_L = 7.5Ω. Find 1. Current I_M in the main winding. 2.Current I_S in the starting winding. 3. Phase angle between I_M and I_S. 4. Line current. 5. Power factor of the motor. [10 marks]**(AU MAY 2014)**

23.Explain the principle and working of a single phase transformer.[6 marks]**(AU MAY 2014)**

24. How can the alternating current waveform in the armature be converted into a dc waveform?**[8 Marks](AU MAY 2013)**

25. With neat sketches, explain the construction and the working principle of dc generator. Also derive The emf equation.**[12 Marks] (AU NOV 2011)**

26. Why a single phase induction motor is not self-starting? Explain the working of split phase CapacitorStart induction motor. **[8 Marks] (AU NOV 2011)**

27. With diagram explain construction and operation of dc motor. Also derive torque and speedequation**[16 Marks] (AU NOV 2014) (AU NOV 2015)**

28. With diagram describe construction and operation of single phase transformer. **[16 Marks] (AU NOV 2014)**

UNIT – III SEMICONDUCTOR DEVICES AND APPLICATIONS

TWO MARKS:

1. Define current amplification factor for CE configuration in transistors. (AU NOV 2011)

The ratio of dc collector current to dc base current is called dc current gain which is given by

$B_{dc} = I_C/I_B$

The value of β is much greater than unity.

2. Write the current amplification factor for a CB transistor.

A = Change in Collector Current / at constant VCB Change in emitter current

3. Write the formula for input resistance in a CB transistor

Input resistance = Change in base - emitter voltage / Change in emitter current/at constant VCB

4. Write the current amplification factor for a CE transistor.(AU NOV-2011)

b = Change in Collector Current / Change in base current at constant VCE

5. Define transistor action.

A transistor consists of 2 coupled PN junctions. The base is a common region to both junctions and makes a coupling between them. Since the base regions are smaller, a significant interaction between junctions will be available. This is called transistor actions.

6. Define delay time.

It is defined as the time required for the current to rise from 0 to 10% of its maximum value.

7. Define hybrid parameters.

Any linear circuit having input and output terminals can be analyzed by four parameters(one measured on ohm, one in mho and two dimensionless) called hybrid or h -parameters.

8. What are the uses of h - Parameters?

1. It perfectly isolates the input and output circuits.
2. Its source and load currents are taken into account.

9. Define current amplification factor in CC transistor.

Change in base current / Change in emitter current at constant VCE

10. Which is the most commonly used transistor configuration? Why?

The CE Configuration is most commonly used. The reasons are

1. High Current gain
2. High voltage gain
3. High power gain
4. Moderate input to output ratio.

11. What are the values of input resistance in CB, CE & CC Configuration

CB - Low about 75

CE - Medium About 750

CC - Very high about 750

12. Write the voltage and current equation for hybrid parameters.

V1 = h11i1 + h12V2

I2 = h21i1 + h22V2

13. What are the values of h-parameters?

h11 = V1/ i1

h12 = V1 / v2

h21 = i2 / i1

h22 = i2 / v2

14. What are the advantages of transistors?

1. Low operating voltage.
2. Higher efficiency.
3. Small size and ruggedness

15. What are the types of BJT? (AU NOV-2011)

n-p-n type.

p-n-p type.

16. Write any two salient points on a p-n junction.(AU MAY-2013)

1. It acts as a rectifiers and switch.
2. It acts as a voltage reference in an electronics circuits.

17. When should a transistor be biased? Name two common biasing circuits. (AU MAY 2013)

Transistor Biasing is the process of setting a transistors DC operating voltage or current conditions to the correct level so that any AC input signal can be amplified correctly by the transistor. A transistors steady state of operation depends on its base current, collector voltage, and collector current.

1. Current biasing circuit
2. Voltage biasing circuit

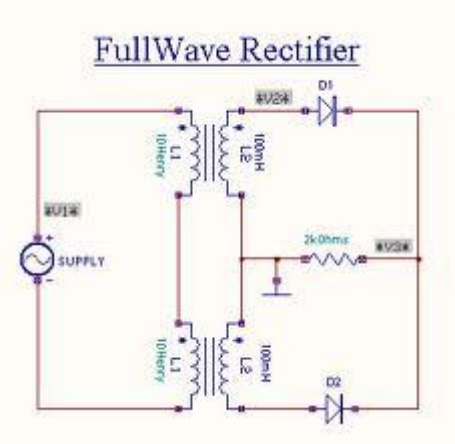
18. What is meant by Zener effect? (AU NOV 2012) (AU NOV 2014)

The Zener effect is a type of electrical breakdown in a reverse biased p-n diode in which the electric field enables tunneling of electrons from the valence to the conduction band of a semiconductor, leading to a large number of free minority carriers, which suddenly increase the reverse current.

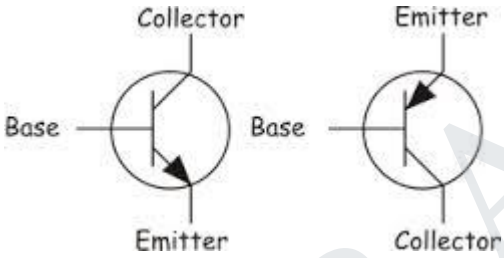
19. State what 'Early effect' in transistors is. (AU NOV 2012) (AU MAY-2011)

The Early effect is the variation in the width of the base in a bipolar junction transistor (BJT) due to a variation in the applied base-to-collector voltage.

20. Draw the circuit of full wave rectifier.



21. Give the symbol for NPN and PNP transistors.



NPN Transistor **PNP Transistor**

22. Define peak inverse voltage of a PN junction diode. (AU NOV 2011)

Peak reverse voltage (PRV) is the maximum value of reverse voltage which occurs at the peak of the input cycle when the diode is reverse-biased.

23. State the advantages of bridge rectifier. (AU MAY 2011)

1. The rectification efficiency of full-wave rectifier is double of that of a half-wave rectifier.

2. Higher output voltage, higher output power and higher Transformer Utilization Factor (TUF) in case of a full-wave rectifier.

3. No centre tap is required in the transformer secondary so in case of a bridge rectifier the transformer required is simpler

4. The PIV is one half that of centre-tap rectifier. Hence bridge rectifier is highly suited for high voltage applications.

24. Write the difference between the PN junction diode and Zener diode. (AU MAY 2012)

1. Diode can conduct current only in one direction, whereas zener diode allows the conduction in both directions.

2. A normal diode will be permanently damaged for a large reverse current, but a zener diode will not.

3. Amount of doping for P and N semiconductor layers are different in the two devices.

4. Diodes are normally used for rectification, whereas zener diodes are used for voltage regulation.

25. What is avalanche breakdown?

Avalanche breakdown is a form of electric current multiplication that can allow very large currents within materials. The avalanche process occurs when the carriers in the transition region are accelerated by the electric field to energies sufficient to free electron-hole pairs via collisions with bound electrons.

26. Give the application of Zener diode.(AU NOV 2013)

1. It acts as a voltage regulator.
2. It acts as a peak clipper s and it can be used for reshaping waveforms.

27. What are the different modes of transistor operation? (AU NOV 2013)

1. Saturation mode
2. Cut off mode
3. Active mode

28. Give the biasing condition for the transistor to operate as an amplifier.(AU MAY 2012)

Emitter base as forward biasing and collector base as reverse biasing.

29. Define the two breakdown conditions in Zener diode.(AU MAY 2014)

The junction breakdown mechanism is of two types. i. Zener Breakdown

ii. Avalanche Breakdown

In zener breakdown when reverse biasing a diode a very strong electric field exists across the depletion region which breakdown the covalent bonds and increase new electron hole pairs which increases the reverse current.

In Avalanche breakdown, the reverse voltage applied imparts high kinetic energy to the minority carriers which disrupt the covalent bond in the crystal thus releasing the valance electron. This process is like a cumulative one and hence named as avalanche breakdown.

30. Find the value of I_C, I_B and β. Transistor values are α = 0.95, I_E = 1mA. (AU MAY 2014, NOV 2015,MAY 2015)

Wkt

$I_E = I_C + I_B$

Therefore, $I_B = I_E + I_C$

$I_C = 0.95*1mA$

$I_C = 0.95mA.$

$\beta = \alpha / 1- \alpha$

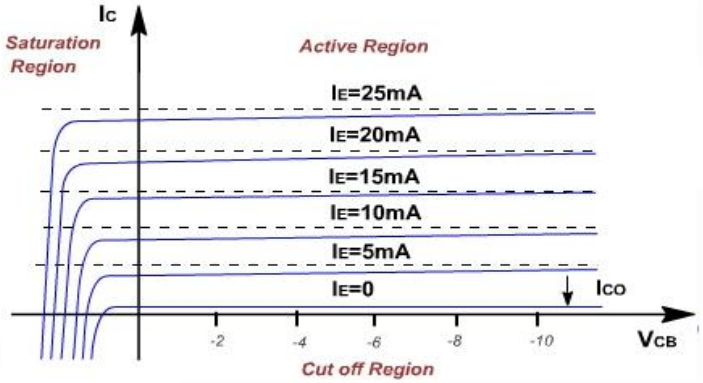
$= 0.95/ (1-0.95)$

$\alpha = I_C / I_E$ $I_B = I_E - I_C = (1 - 0.95)mA$ $\beta = 19$

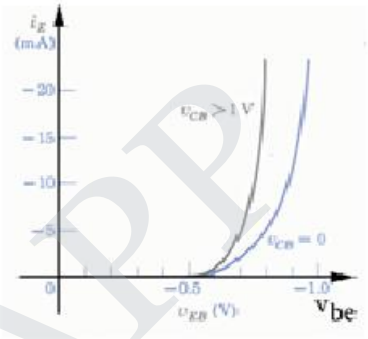
Therefore, $I_C = \alpha I_E$ $I_B = 0.05mA$

$\beta = \alpha / 1 - \alpha$

31. Draw the input and output characteristics of CB Bipolar Junction transistor. (AU NOV 2014)



Output Charactersitcs

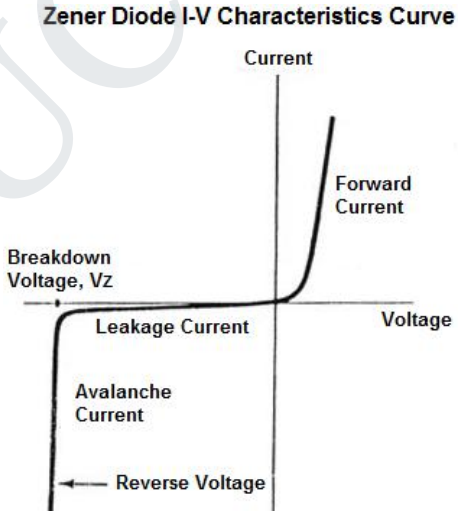


Input Characteristics

32. What is the total current at the junction of pn junction diode(AU NOV 2015)

The total current at the junction of pn junction diode is zero.

33. Draw the characteristics of zener diode(AU MAY 2015)



Descriptive Type Questions

1. Explain various characteristics of BJT in common emitter configurationwith neat diagram. **[16 Marks] (AU NOV 2013)**

2. With neat diagrams explain how a voltage regulator circuit regulates the output voltage under the

following conditions:

(1) Load resistance increases **[4 Marks] (AU MAY 2013)**

(2) Input voltage decreases **[4 Marks] (AU MAY 2013)**

3. (i) Using the two diode analogy explain why the base-emitter junction has to be forward biased to provide collector current.(ii) Sketch a common emitter amplifier circuit with an NPN transistor. **[8 Marks] (AU MAY 2013)**

4. Explain the avalanche effect that accounts for the reverse breakdown voltage (PIV of a diode). **[4 Marks] (AU MAY 2013)**

5. What is the effect on capacitance of a PN junction diode as forward and reverse bias are applied? **[4 Marks] (AU MAY 2013)**

6. Explain the amplifying action of a transistor. **[6 Marks] (AU MAY 2013)**

7. In a CE, I_B changes from 100μA to 150μA which causes a change in I_c from 5mA to 7.5mA. If V_{CE} is held constant at 10V,find β_{ac} (h_{fe}) **[2 Marks] (AU MAY 2013)**

8. Explain the mechanism of avalanche breakdown and Zener breakdown. **[8 Marks] (AU MAY 2012)**

9. Draw a simple transistor amplifier circuit and explain its operation. **(AU NOV 2011)**

10. With the help of sketches of circuits and waveforms, explain the working of half-wave rectifier and full-wave bridge rectifier.**[12 Marks] (AU NOV 2011)**

11. Obtain the expressions for DC output voltage for half wave and fullwave rectifiers. **[6 Marks] (AU NOV 2011)**

12. With the help of V-I characteristics describe the working principle of zener diode. What is its symbol? Mention also the special properties of zener diode when compared to ordinary diode**.** **[8 Marks] (AU NOV 2012)(AU MAY 2011)**

13. What is the half-wave rectifier? Sketch its circuit. Discuss the operation of half-wave rectifier with the help of necessary waveforms. **[8 Marks](AU NOV 2012) (AU MAY 2011)**

14. Explain in brief the input and output characteristics of CE configuration of a NPN transistor. **[10 Marks] (AU NOV 2012) (AU MAY 2011)**

15.Compare the performance of a transistor in three different configurations.**[6 Marks](AU NOV 2012)**

16. Draw the three configurations of a bipolar junction transistor.**[6 Marks](AU NOV 2011)**

17. Describe the operation and current components of PNP transistor in CB configuration. **(AU NOV 2011)**

18.Describe the working of PN junction diode in forward and reverse bias condition.**[10 marks]**

(AU MAY 2014, NOV 2015)

19. Explain the operation of PNP and NPN transistor. **[6 marks](AU MAY 2014)**

20. Let V_{BB} = 10V, R_B = 1MΩ, β = 100, V_{CC} = 15V, R_L = 10Ω in the transistor circuit. Find

i. I_C

ii. I_B

iii. I_E

iv. V_{CE}. Neglect V_{BE}. **[8 marks](AU MAY 2014,NOV 2015)**

21.Explain the working of Zener diode and its applications. **[8 marks](AU MAY 2014)**

22. Explain the working principle of Half Wave and Full Wave rectifier with neat diagram. **[16 Marks] (AU NOV2013)**

23. With the help of relevant circuit and V-I characteristics, show how a zener diode is used as a oltage regulator. **[8 Marks] (AU MAY 2012)**

24. Explain the operation of PNP transistor. **[6 Marks] (AU MAY 2012)**

25. With neat sketch explain the input and output characteristics of a transistor in CB configuration. Draw also the necessary circuit. **[10 Marks] (AU MAY 2012)**

26. For a transistor connected in common emitter configuration, sketch the typical output and input Characteristics and explain the shape of the characteristics. **[8 Marks] (AU NOV 2011)**

27 Sketch the circuit of a simple transistor amplifier and explain the function of the components. **[8 Marks] (AU NOV 2011)**

28. Draw and explain working and characteristics of PN junction diode. **[16 Marks] (AU NOV 2014,2015)**

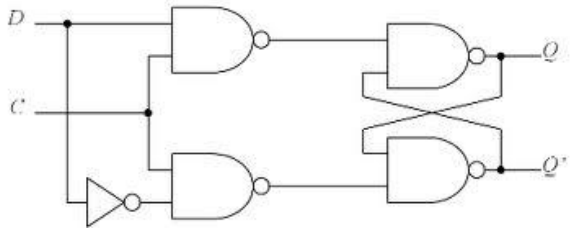
29. Draw an explain input and output characteristics of CE-Bipolar Junction Transistor. **[16 Marks] (AU NOV 2014)**

30. Draw an explain of CB configuration of BJT. **(AU NOV 2015)**

UNIT – IV DIGITAL ELECTRONICS

TWO MARKS

1. Realize D flip-flop using NAND gates?



2. Write the truth table of an ex-or gate? (AUNOV 2012)

INPUT		OUTPUT
A	B	Z
0	0	0
0	1	1
1	0	1
1	1	0

3. Name four different flip flops commonly available?(AU MAY 2011)

1.S-R flip flop

2.J-K flip flop

3.Delay or D- flip flop

4. Toggle or T- flip flop

4. What is a decade counter? (AU MAY 2011)

A decade counter is one that counts from 0 to 9 and then resets to zero. The counter output can be set to zero by pulsing the reset line low. The count then increments on each clock pulse until it reaches 1001.

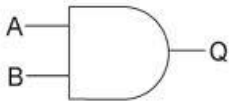
5. Draw the symbol of AND gate and write its trurh table. (AU NOV 2011) describe AND gate operation with Boolean algerbra.(AU NOV 2015)

Z= A.B

Truth table

INPUT		OUTPUT
A	B	Z
0	0	0
0	1	0
1	0	0
1	1	1

Symbol



6. What are the universal gates? Explain. (AU NOV 2011)(AU MAY 2015)

NAND gate and NOR gate are called universal gates. By using the universal gates other logic gates can be constructed.

7. Mention two types of D/A converter. (AU NOV 2012)

1. Binary weighted resistors DAC
2. R-2R ladder

8. Find the following binary difference 1011010-0101110. (AU MAY 2013)

101100

9. An active high SR latch as a '1' on the S-input and '0' on the R input. What state is the Latch in? (AU MAY 2013)

Set state

10. Convert (634) 8 to binary(AU nov 2015)

6 3 4

110 011 100

Ans = 110011100

11. Convert (9B2 - 1A) H to its decimal equivalent.

N = 9 x 16 2 + B x 16 1 + 2 x 16 0 + 1 x 16 -1 + A (10) x 16 -2

= 2304 + 176 + 2 + 0.0625 + 0.039

= 2482.1 10

12. What is meant by bit?

A binary digit is called bit

13. Define byte?

Group of 8 bits.

14. List the different number systems?

1) Decimal Number system

2) Binary Number system

3) Octal Number system

4) Hexa decimal Number system

15. What are basic properties of Boolean algebra?(AU NOV 2013)

The basic properties of Boolean algebra are commutative property, associative property and istributive property.

16. State the associative property of boolean algebra.

The associative property of Boolean algebra states that the OR ing of several variables results in the same regardless of the grouping of the variables. The associative property is stated as follows:

A+ (B+C) = (A+B) +C

17. State the commutative property of Boolean algebra.

The commutative property states that the order in which the variables are OR ed makes nodifference. The commutative property is: A+B=B+A

18. State the distributive property of Boolean algebra.

The distributive property states that AND ing several variables and OR ing the result with a single variable is equivalent to OR ing the single variable with each of the the several variables and then AND ing the sums. The distributive property is: A+BC= (A+B) (A+C)

19. State De Morgan's theorem.

De Morgan suggested two theorems that form important part of Boolean algebra. They are,

1) The complement of a product is equal to the sum of the complements.

(AB)' = A' + B'

2) The complement of a sum term is equal to the product of the complements.

(A + B)' = A'B'

20. What is a Logic gate?

Logic gates are the basic elements that make up a digital system. The electronic gate is acircuit that is able to operate on a number of binary inputs in order to perform aparticular logical function.

21. Which gates are called as the universal gates? What are its advantages?(AU MAY 2012) (AU MAY 2015)

The NAND and NOR gates are called as the universal gates. These gates are used toperform any type of logic application.

22. Define combinational logic

When logic gates are connected together to produce a specified output for certainspecified combinations of input variables, with no storage involved, the resulting circuit is called combinational logic.

23. Define Half adder and full adder

The logic circuit that performs the addition of two bits is a half adder. The circuit thatperforms the addition of three bits is a full adder.

24. Short note on counter.(AU NOV 2013)

A counter is a sequential circuit making use of no. of flipflops which undergo a sequence of states and application of clock pulses at its input and is most useful and versatile subsystem in a digital subsystem.

25. What is a shift register? How is it classified?(AU MAY 2012)

Shift register is a cascade of flip flops, sharing the same clock, in which the output of each flip-flop is connected to the "data" input of the next flip-flop in the chain, resulting in a circuit that shifts by one position the "bit array" stored in it.

1.Serial in serial out

2.Serial in parallel out

3.Parallel in parallel out

4.Parallel in serial out

26.Define the logic operation of AND gate with Boolean equation. (AU MAY 2014)

It has one or more input and only one output. If the output is high it means all the inputs are high and if any one inputs are low the output is low.Its Boolean equation are Y = A.B

27. Prove the following Boolean identity.A+AB = A+B.(AU MAY 2014)

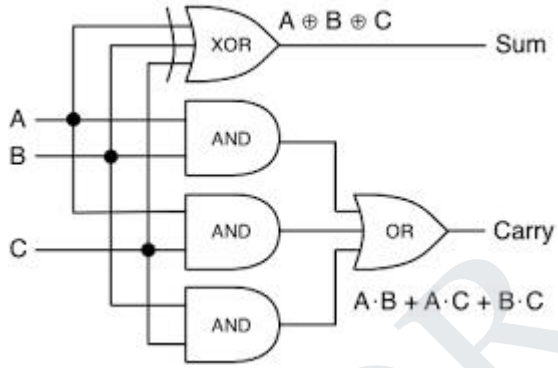
$A+ (A .B) = (A + \overline{A}) . (A + B)$

Since $A + \overline{A} = 1$

$A+AB = 1 . (A+B)$

$= A+ B$

28. Draw circuit for full adder. (AU NOV 2014)



Full adder circuit with three inputs and two outputs

29. What is octal number system? (AU NOV 2014)

This number system is widely used in computer techniques. It has symbols from 0 to 7. Any number can be expressed by combination of this 8 symbols ie., $8 = 2^3$

Descriptive Type Questions

1. Write notes on the following

(i) Counter (ii) Register (iii) Half Adder **(AU NOV 2011)**

2. Explain the operation of R-S Flip-Flop and clocked RS flip flop. **[8 Marks] (AU NOV 2011)**

3. Draw a simple ring counter and briefly describe its counting action. **(AU MAY 2013)**

4. Design a full adder, construct the truth table, simplify the output equations and draw the logic diagram. **(AU MAY 2013)**

5. Give a brief explanation of an A/D conversion and the need for the A/D conversion. **(AU NOV 2011) (AU MAY 2013)**

6. Reduce the following Expressions using Boolean algebra postulates:

a'b'c' + a'b'c + ab'c' + abc

[(A+B)'+C']'.**[4 Marks] (AU MAY 2013)**

7. Design a full adder, construct the truth table, simplify the output equations and draw the logic diagram. **[4 Marks] (AU MAY 2013)**

8. Draw the logic diagram for a four bit parallel input parallel output register. Indicate inputs, outputs and anegative edge triggered clock. **[4 Marks] (AU MAY 2013)**

9.Draw a simple ring counter and briefly describes its counting action**[4 Marks] (AU MAY 2013)**

10. Give a brief explanation of an A/D conversion and the need for the A/D conversions.**[4 Marks] (AU MAY 2013)**

11. Design a logic diagram for 4-bit binary ripple counter and explain its working. **[8 Marks] (AU NOV 2012) (AU MAY 2011 DEC, MAY 2015)**

12. Explain the working of JK – Flip flop, T-flipflop & D-flipflop. [**16 Marks] (AU NOV 2012) (AU NOV 2013)**

13. Explain with neat sketch the working of binary ladder network for a digital to analog conversion network. **[8 Marks] (AU NOV 2012)(AU MAY 2011)**

14. Simplify the Boolean expression

(i) XY+X' Z + YZ

(ii) (A'+ B + C') (A+ B + C) (C + D + E) **[8 Marks](AU NOV 2012)**

15. Explain the working principle of D/A and A/D conversion.[**16 Marks] (AU NOV 2013)**

16.Draw the logic symbol of OR, AND, NOT& NAND gate and explain its logic operation. **[8 marks] (AU MAY 2014) (AU MAY 2011 DEC 2015)**

17 Draw a half adder using logic gates. Explain with truth table with expression of sum and carry. **[8 marks] (AU MAY 2014) (AU MAY 2011)**

18. Explain the operation and draw the following flip –flops,

i. RS flip flop using NOR gate.

ii. D flip flop using NAND gate.

iii. JK flip flops. **[3*4 =12 marks] (AU MAY 2014) (AU NOV,MAY 2015)**

19.Explain the operation of synchronous counters. **[4 marks] (AU MAY 2014)**

20. Realize the given expression using only NAND gates and inverters: xyz + x'y'z' **[4 marks] (AU MAY 2013)**

21. Convert 95.0625_{10} to binary. **[4 Marks] (AU MAY 2013)**

22. Explain the working of clocked master save JK flip flop with its logic diagram. **[8 Marks] (AU MAY 2012)**

23. Show that NAND and NOR gates are universal building blocks. **[8 Marks] (AU MAY 2012)**

24. Explain Successive-Approximation A/D conversion. **[8 Marks] (AU MAY 2012)**

25. Explain the operation of asynchronous counter. **[8 Marks] (AU MAY 2012)(AU NOV 2011)**

26. Draw a full adder circuit using logic gates. Explain with truth table. Give also the expressions for sum and carry. **[8 Marks] (AU NOV 2011)**

27. Explain the working of binary weighted register type D/A convertor. **[8 Marks] (AU NOV 2011)**

28. With circuit and truth table explain working of JK Flip-Flop. **[16 Marks] (AU NOV 2014)**

29. With circuit and timing diagram working of 4-bit asynchronous down counter. **[16 Marks] (AU NOV 2014)**

UNIT-V FUNDAMENTALS OF COMMUNICATION ENGINEERING

TWO MARKS

1. What is communication?

Transfer of information from one place to another is called communication.

2. What are the types of signals?

1. Analog signals
2. Digital signals

3. Give few examples of Analog signals?

1. Telephone signal
2. Radio broadcast signal
3. T.V signal

4. Give few examples of Digital signals?

1. Telegraph signal
2. Radar signal
3. Tele printer signal

5. What is meant by modulation? (AU NOV 2013)

Modulation is the process of changing some parameters of a high frequency carrier signal in according with the instantaneous variation of the message signal

6. Whatis the process involved in analog to digital conversion?

1. Sampling
2. Quantization
3. Encoding

7. Mention two advantages of modulation when compared to transmission of un-modulated Signal. (AU NOV 2011)

(i)Modulated wave has a large frequency, thus the energy associated with it will also be

large.

(ii) If all audio frequencies are send continuously from different sources, they would all getmixed up and cause erroneous interference air. If modulation is done, each signal will occupy different frequency levels and can be transmitted simultaneously without any error.

8. Based on the modulation index classify AM modulator?

1. under modulation
2. Critical modulation
3. over modulation

9. Define angle modulation.

Angle modulation is the process by which the angle of the carrier signal is varied in accordance with the amplitude variation of the message signal.

10. Classify angle modulation.

1. Frequency modulation
2. Plane modulation.

11. What is Radio communication?

Radio communication is transmission of speech,music,entertainmentprogrammer.These information's are transmitted as radio waves.

12. Classify Radio receivers.

1. TRF-Tuned radio frequency receiver
2. SHR-Super heterodyne receiver.

13. What is the basic function of communication satellite? (AU NOV 2011)

1) Used in long distance communications such as in television,fax,internet etc
2) Used in television and radio broadcasting etc
3) Weather forcasting (i.e) in prediction of rainfall, snowfall, storm etc
4) Agricultural monitoring (i.e) crop disease, crop failure.
5) Collecting information about other planets, stars and other celestial bodies

14. What is facsimile?

In facsimile process the effective transmission and exact reproduction of still Photographs, documents and other maps have to be done.

15. What is microwave?

Electromagnetic waves in the frequency range of 1GHz to 50 GHz are referred as microwaves.

16. List few advantages of microwave communication.

1. Microwave communication offers wide bandwidth hence more number of channelscan be obtained.

2. Line of sight propagation is move reliable when compared to softwarecommunication.
3. Improved directivity with an aerial array.
4. Low power requirements in the order of mill watts and microwaves.

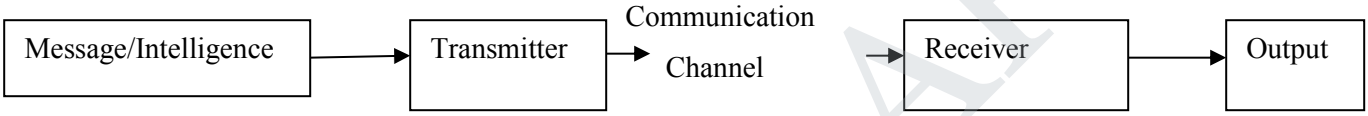
17. List few applications of microwaves communication. (AU MAY 2015)

1. Terrestrial microwave links are used to carry telephony, data and T.V signals.
2. Satellite communication uses microwave frequencies for their operations.
3. Microwave radiation has also found some medical applications for heating tumors.
4. Microwave can be used for material cutting.

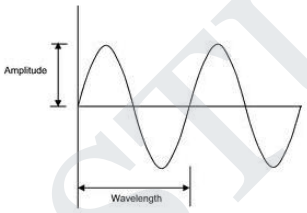
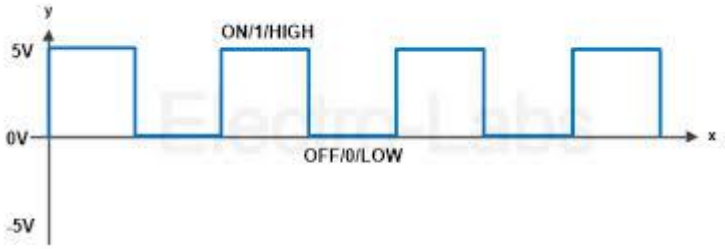
18. Define the term Demodulation. (AU MAY 2011)

The modulating signal is transmitted from one place to other. In the receiver side, we receive this signal and retrieve the message in it. This process is called as demodulation.

19. Sketch the block diagram of basic communication system. (AU MAY 2011)



20. State any two differences between analog and digital signals. (AU NOV/DEC 2012,2015)

S No	Analog Signal	Digital Signal
1	Analog signal is a continuous signal which represents physical measurements.	Digital signals are discrete time signals generated by digital modulation.
2	Denoted by sine waves 	Denoted by square waves 

21. State the function of satellite transponder. (AU NOV 2012)

A transponder is a repeater that implements a wide band communication channels which can vary many simultaneous communication transmissions. Modern communication satellites contain at least 12 transponders. The transponders share a common antenna subsystem for both reception and transmission.

22. As related to amplitude modulation, what is over-modulation, undermodulationand 100% modulation? (AU MAY 2013)

Overmodulation is the condition that prevails in telecommunication when the instantaneous level of the modulatingsignal exceeds the value necessary to produce 100% modulation of the carrier.

Under modulation means to reproduce a sound or signal at below the optimal output level in a recording or broadcasting system, causing it to be distorted. To use a transmission device less than optimally possible.

Exact modulation is when the sound or signal is exactly the way it should be and there is no distortion.

23. Why are digital signals said to be noise immune? (AU MAY 2013)

Digital signals can gather information with noise because the information components are determined whether its presence or absence a data bit. Digital signal can processed by digital circuit components as they are cheaper and can be created in many components on a signal chip.

24. What are the advantages of optical fiber communication?(AU NOV/DEC 2013,2015)

1. Light weight
2. Large information carrying capacity
3. Less space and easy installation

25. State the basic characteristics of analog signal with an example.(AU MAY 2012)

1. Amplitude
2. Frequency
3. Phase
4. Period. Example is human speech, electrical signal from the audio tape.

26. Give typical values of uplink frequency and downlink frequency in satellite communications.(AU MAY 2012)

Uplink ranges-5.925 to 6.425 GHz
Downlink ranges-3.72 to 4.2 GHz

27. Compare analog and digital signals. (AU MAY 2014).

S.No	Analog Signals	Digital Signals
1	Analog signal is a continuous signal which represents physical measurements.	Digital signals are discrete time signals generated by digital modulation.
2	Denoted by sine waves	Denoted by square waves
3	Uses continuous range of values to represent information	Uses discrete or discontinuous values to represent information
4	Human voice in air, analog	Computers, CDs, DVDs, and other

	electronic devices.	digital electronic devices.

28. What are the advantages of optical fiber communication? (AU MAY 2014).

i. Light weight.

ii. Larger information carrying capacity.

iii. Less space and easy information.

iv. Immunity to interference.

v. Resistivity to temperature and environmental changes.

29. Define digital signals. (AU NOV 2014)

A digital signal is a physical signal that is a representation of a sequence of discrete values quantified discrete-time signal), for example of an arbitrary bit stream, or of digitized (sampled and analog-to-digital converted) analog signal.

30. What is the use of satellite? (AU NOV 2014)

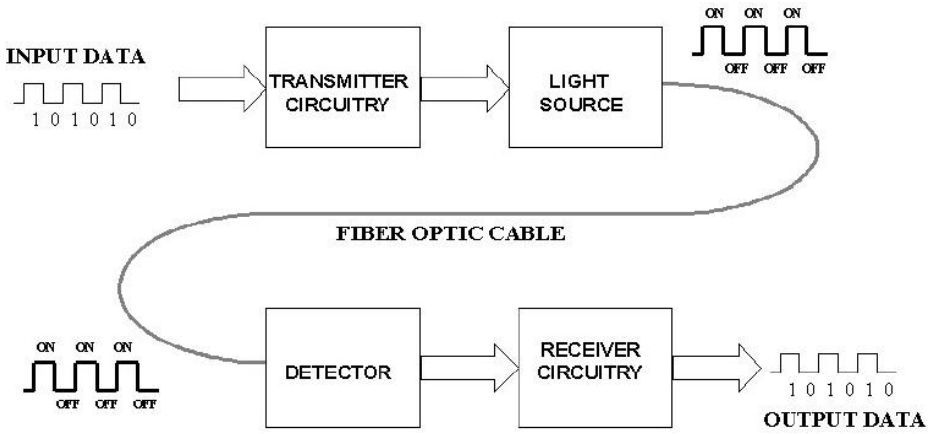
Communication purposes.

Surveillance or observation (monitoring Purpose)

One of the newest and most useful satellite systems is the Global positioning systems (GPS) whose primary application is navigation system for military.

TV signals can be transmitted through satellite.

31. Draw the block diagram of optical fibre communication? (AU MAY 2015)



Descriptive Type Questions

1. A 10MHz sinusoidal carrier wave of amplitude 10mV is modulated by a 5KHz sinusoidal audio signal wave of amplitude 6mV. Find the frequency components of the resultant modulated wave and their amplitudes.

2. Explain briefly the principle of modulating a carrier signal by amplitude modulation and also obtainthe expression for power. **[8 Marks] (AU MAY 2012)**

3. With a neat block diagram, explain the principle of operation of microwave communication. **[8 Marks] (AU MAY 2012)**

4.With the help of a block diagram describe the working of a monochrome (Black and White) TV transmitter.**[12 Marks] (AU NOV 2011)**

5.What is meant by modulation and demodulation? **[4 Marks] (AU MAY 2012)**

6. Explainthe configuration of satellite communication with neat diagram. Give its merits and demerits.**[16 Marks] (AU NOV 2013)**

7. Explain briefly the need for modulation. What difficulties will be faced if un-modulated signals are transmitted? How modulation overcomes them? **[8 Marks] (AU MAY 2011**)

8.Sketch the circuit of a simple transistor AM modulator and explain its working.**[8 Marks] (AU MAY2011)**

9. With the help of block diagram describe the working of

(i) a typical TV transmitter**[8 Marks]**

(ii) a typical TV receiver **[8 Marks](AU MAY 2011)(AU NOV 2012) AU NOV 2014)**

10. Explain frequency modulation. Obtain the mathematical representation of frequency modulatedwave.**[8 Marks] (AU NOV 2013)(AU NOV 2012)**

11. What is mean by Amplitude modulation? Explain also the connected terms 'Modulation Index' 'Wave equation' and 'Spectrum'**[8 Marks] (AU NOV 2012)**

12. (i) Draw a Typical television video signal. Explain how this converted to an image on a TV

screen.**[6 Marks] (AUMAY 2013)**

13. What is the need for modulation? Explain the principles behind amplitude modulation and frequency modulation. Compare and contrast the two types of modulation.**[10 Marks] (AU MAY 2013)**

14 .With neat diagrams explain any one method of amplitude modulation and its corresponding demodulation.**[8 Marks] (AU MAY 2013)**

15. Write short notes on the following modes of communication.

(1) Microwave. **[4 Marks]**

(2) Optical fiber.**[4 Marks] (AU MAY 2013)**

16.Describe the principle of modulation and its needs. Short note on amplitude modulation and frequency modulation. **[12 marks](AU MAY 2014, DEC 2015)**

17.Give some advantages of FM over AM. **[4 marks](AU MAY 2014)**

18.With help of neat diagram describe the working of a satellite (earth station transmitter) communication and its short note on earth station receiver. **[12 marks](AU MAY 2014)**

19.Explain the operation of monochrome TV transmitter. **[4 marks](AU MAY 2014)**

20. Explain the principles of amplitude modulation and frequency modulation. **[16 Marks] (AU NOV 2013 MAY 2015)**

21. Draw the block diagram arrangement of an AM transmitter and explain its operation. **[8 Marks] (AU NOV 2011)**

22. Explain the operation of FM transmitter. **[8 Marks] (AU NOV 2011)**

23. Give some applications of optical fiber communication. **[4 Marks] (AU NOV 2011)**

24. Describe principle of operation of FAX system. [16 **Marks] (AU NOV 2014)**

25. Explain the operation of monochrome TV transmitter and receiver with a neat sketch **(AU DEC. MAY 2015)**