DHANALAKSHMI SRINIVASAN INSTITUTE OF TECHNOLOGY
SAMAYAPURAM
BE8452-BASICS OF ELECTRICAL ENGINEERING
QUESTION BANK

UNIT I ELECTRICAL CIRCUITS AND ANALYSIS

PART-A(2 MARKS)

1. **What is meant by charge?**

   Charge is an electrical property of the atomic particles which matter consists. The charge of an electron is so small. Charge in motion represents current. The unit of charge is coulomb.

2. **What is meant by Current?**

   The flow of free electrons in a conductor is called current. Unit is ampere (A). I =Q/t

3. **What is meant by Voltage?**

   The poterntial difference between two points is called as voltage. Unit is Volts (V). V=W/Q , W=work done in joules & Q = charge in coulombs

4. **State Ohm's Law.**

   The potential difference across any two ends of a conductor is directly proportional to the current flowing between the two ends provided the temperature of the conductor remains constant.

5. **State Krichoff's Voltage Law**

   KVL states that the algebraic sum of voltages in a closed path is zero.

6. **State Krichoff's current Law.**

   KCL states that the algebraic sum of currents in a node is zero.

7. **Give short notes on resistor.**

   It is a property of a substance3 which opposes the flow of electrons. It is denoted by R and its unit is Ohm

8. Distinguish between a Branch and a node of a circuit.

A pair of network which connects the various points of the network is called branch A point at which two or more elements are joined together is called node.

9. Distinguish between a mesh and a loop of a circuit.

A mesh is a loop that does not contain other loops. All meshes are loop, but all loops are not meshes. A loop is any closed path of branches

10. Write down the formula for a star connected network is converted into a delta network?

RA=(R1 R2)/(R1 +R2+ R3) RB=(R1 R3)/(R1 +R2+ R3) RC=(R2 R3)/(R1 +R2+ R3)

11. Write down the formula for a delta connected network is converted into a star network?

R1=(RARB+RBRC+RCRA)/RC R2=(RARB+RBRC+RCRA)/RB R3=(RARB+RBRC+RCRA)/RA

12. Define line currents and phase currents?

The currents flowing in the lines are called as line currents The currents flowing through phase are called phase currents

13. Define line voltage and phase voltage?

The voltage across one phase and neutral is called line voltage & the voltage between two lines is called phase voltage

14. Give the phase value & Line value of a star connected system.

$$VL= 3Vph$$

15. Give the phase value and line valued of a delta connected system.

$$IL= 3Iph$$

16. What is the power equation for a star connected system?

$$P= 3I\ V\ \cos\Phi\ L\ L\ W$$

17. What is the power equation for a delta connected system?

$$P= 3I\ V\ \cos\Phi\ L\ L\ W$$

18. What is meant by Real power?

Real power means the useful power transfer from source to load. Unit is watts.

19. What is meant by apparent power?

Apparent power is the product of voltage and current and it is not true power. Unit is VA

20. What is reactive power?

If we consider the circuit as purely inductive the output power is reactive power. Its unit is VAR.

21.State Thevenin's theorem.[NOV/DEC'07] [MAY/JUNE'07][NOV/DEC'04](JUN-09)[MAY-11]

Any complex network consisting of linear, bilateral and umped elements can be replaced by a simple circuit consisting of single voltage source in series with resistance.

It is also called as **Helmholtz's theorem**.

22.State Norton's theorem.[DEC-10]

Any complex network consisting of linear, bilateral and lumped elements can be replaced by a simple circuit consisting of single current source in parallel with resistance.

23.State Superposition theorem.[NOV/DEC'04] [MAY/JUNE'O7][APR-08][JUN-10]

In a linear, bilateral and lumped circuit elements that is energized by two or more sources, the response(current through or voltage across) in any resistor is equal to individual responses in it, when sources acts separately.

24.State Maximum power transfer theorem.[NOV/DEC'07] [NOV/DEC'06][APR08][JUN-12]

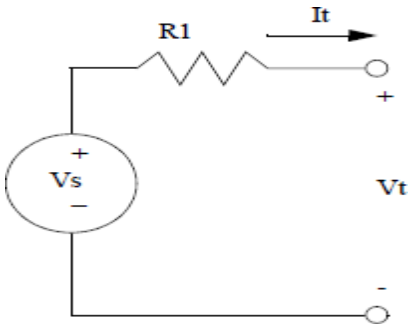
It states that the maximum power transferred to the load occurs when the load resistance is equal to the source resistance

(equivalent resistance).

Condition for maximum power transfer $R_L = R_{TH}$

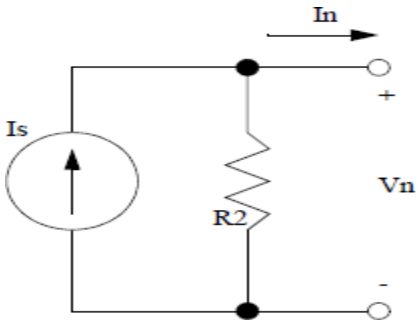
25.State Reciprocity theorem. [NOV/DEC'07]

It states that in a linear, bilateral, single source circuit, the ratio of excitation to response is constant when the position of excitation and response are interchanged.



26.Draw the Thevenin's equivalent circuit.

27.Draw the Norton's equivalent circuit



28.What are the applications of Thevenin's theorem?

To find the particular branch current in an electrical network while the resistance of that branch is varied with all other elements of the network remaining unchanged.

Used in sensitivity analysis.

29.What are the advantages of Thevenin's theorem?

1. Applicable to circuits containing any type of load – linear or non linear or time varying.
2. Applicable to circuits with load containing sources.
3. Applicable to circuits with load having

initial conditions on passive elements.

30.What are the limitations of Thevenin's theorem?

Load should be connected to network containing linear elements only.There should be no controlled source or magnetic coupling with the elements of load.

31.What are the applications of Maximum power transfer theorem? (AU-MAY08)

It is used for impedance matching. It is used in communication circuits, where the power or circuit currents are low.

32.What are the limitations of Reciprocity theorem?

Only one source is present in the network.Initial conditions should be zero. The network is linear.Impedance matrix is symmetric.
Dependent sources present in the network, even if they are linear, are excluded.

33.under what conditions, the super position theorem may be applied to the circuit. (JUN-09)

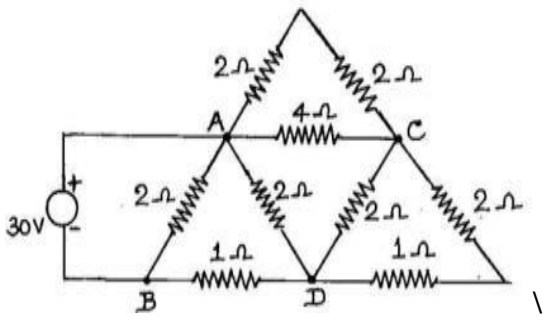
It is applicable to all time variant linear networks. It holds good for all possible locations, types and waveforms of the independent systems. The theorem applies both in time domain and frequency domain.

34.Write short notes about superposition theorem.

It is valid only for linear circuits. It is not valid for power responses. When the superposition theorem is applied to any circuit. the dependent voltage source in the circuit is always active.

PART B

1.Interpret the current delivered by the source shown in the circuit below. **(13 marks)**



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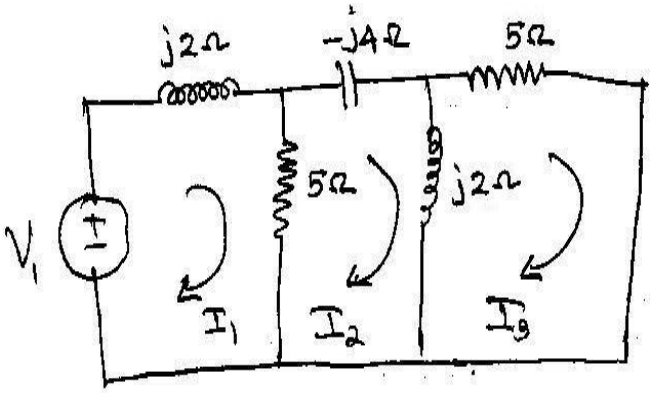
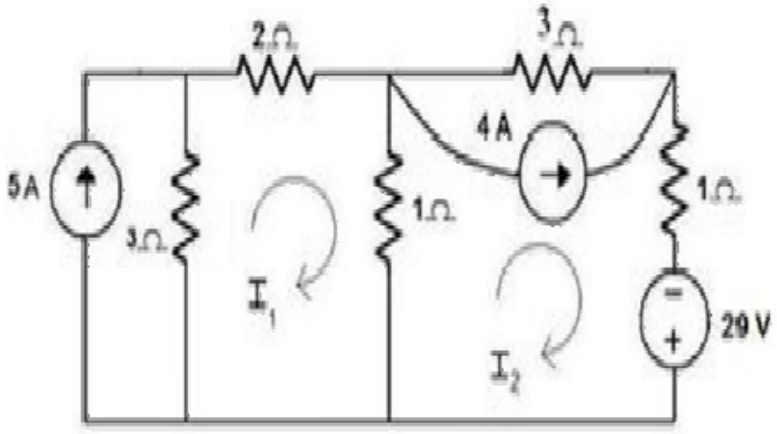
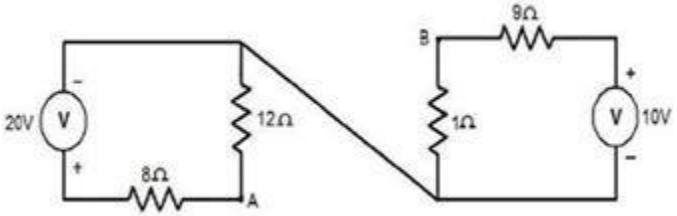
2.For the network shown below, label the current ratio (I_1/I_3) by applying mesh analysis. **(13 marks)**



3. Analyze the mesh currents I_1 and I_2 for the given circuit shown below. **(13 marks)**



4.Give Thevenin's equivalent across the terminals AB for the circuit shown in figure below. **(13 marks)**



5. Derive and list the expressions for resistors in series and parallel **(6 marks)**

Quote the Kirchhoff's current law and prove it by using the definition of current **(7 marks)**

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UNIT II ELECTRICAL MACHINES
PART-A

1. What is an electric generator?

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

2. What is an electric motor?

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

3. What is meant by magnetic flux?

The magnetic lines of force existing around a magnet is called magnetic flux. It's unit is Weber.

4. State faraday's law of electromagnetic induction.

Whenever a conductor cuts the magnetic lines of force an emf is induced in it.

5. State Fleming's Right hand rule.

If three fingers of right hand, namely thumb, index finger and middle finger are outstretched so that everyone of them is at right angles with the remaining two, and the index finger is made to point in the direction of lines of flux, thumb in the direction of the relative motion of the conductor and the middle finger gives the direction of the induced emf in the conductor.

6.What is the use of commutator?

A device is used in a dc generator to convert the alternating emf into unidirectional emf is called commutator.

7.What is the function yoke?

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

It provides mechanical support to the poles.

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

1.Yoke 2.pole 3.Field winding 4.Armature winding

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 aluminium or copper.

4. **Armatuer winding**:

It is made up of cast iron or cast steel.

9.What is the function of brush?

To collect current from commutator and make it available to the stationary external circuit.

$$E = (\phi NZ / 60)(P/A) \quad V$$

10.Write down the emf equation for d.c generator.

Where

P = number of poles
Z = Total number of conductors A =
number of parallel paths
Φ = flux per pole N
= speed in rpm

11.What are all the two types of excitation? **i. Separate excitation**

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

ii. Self excitation

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

12.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.

13.Give the types of DC generator.

1.Self excited generator

Series Generator

Shunt Generator Compound Generator

Long shunt compound generator Short shunt compound generator

Cumulative and differential compound Generator 2. Separately excited generator

14.List out the applications of various types of generators.

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.

15.what is the principle of DC motor?

Whenever a current carrying conductor placed in a magnetic field, it experiences a mechanical force.

16.State that the Fleming's left hand rule.

The rules states that outstretch the three fingers of the left hand namely the first finger, middle finger and thumb such that they are mutually perpendicular to each other. Now point the first finger in the direction of magnetic field and the middle finger in the direction of the current then the thumb gives the direction of the force experienced by the conductor.

17.What is Lenz's law?

Lenz's law states the direction of induced emf is always so as to oppose the cause producing it.

18.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

19.List the different types of DC motor.

DC series motor
DC Shunt motor
DC Compound motor
Long shunt compound motor
Short shunt compound motor

20.List out the characteristics of DC motor.

i. Torque-Armature current characteristics (T VS Ia)
ii. Speed-Armature current characteristics (N VS Ia)

21.What are all the applications of DC motor? 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

Punches
Shears
Heavy planers
Elevators

22. How is voltage generated in rotating machines?

In rotating machines voltage is generated in windings or group of coils by rotating them through a magnetic field or by mechanically rotating a magnetic field past the winding or by designing the magnetic circuit so that the reluctance varies with rotation of the rotor.

23.What is the basic principle of dc motor?

A machine that converts dc power into mechanical power is known as a dc motor its operation is based on the principle that when a current carrying conductor is placed in a magnetic field, the conductor experiences a mechanical force. The direction of force is given by Fleming's left hand rule and magnitude is given by

F= BIL netwons.

Basically there is no constructional difference between a dc motor and dc generator. The same dc machine can be run as a generator (or) motor.

24. What is back emf in d.c motors?

As the motor armature rotates, the system of conductor come across alternate North and South pole magnetic fields causing an emf induced in the conductors. The direction of the emf induced in the conductors. The direction of the emf induced is in the direction opposite to the current .As this emf always opposes the flow of current in motor operation it is called back emf.

25. Mention the different parts of a d.c generator.

The different parts of dc generator are

(i) Magnetic frame (or) yoke.
(ii) pole core and pole shoes
(iii) pole coil or field coils (iv)armature

windings or conductors
(v) armature coils
(vi)commutator
(vii)Brushes and bearing.

26.What are the characteristics of DC generator?

The characteristics of DC generator are

i) no load or saturation characteristics(Ea/ If)
ii) internal characteristics(E/If)
iii) external characteristics(V/If)

27.Write the various losses occurring in DC generator

Copper loss Iron
loss Mechanical
loss

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

In core type, the windings surround the core considerably and in shell type the core surround the winding.

29. What is the purpose of laminating the core in a transformer?

The purpose of laminating the core in a transformer is to reduce eddy current loss.

PART-B

1. Explain with the help of a sketch, the constructional features of a dc machine and briefly describe the functions of armature core,commutator and brushes.
2. Briefly explain about the principle of operation of DC generator.(6)
3. Arrive at an Emf equation of DC generator. (**7**)
4. A six-pole, lap-connected generator is driven at 600rpm. It has 100 slots with 24 conductors per slot. What is the magnitude of the generated emf? If the number of conductors per slot is changed to 20.At what speed should the generator be run for the same voltage to be generated? The flux per pole is 0.02Wb.(13
5. Explain with sketches the constructional features of a synchronous machine. (13)
6. State the various parts of a transformer and their function.
7. Explain the working principle of a single phase transformer(**7**) (ii)Define all-day efficiency of a transformer and explain itssignificance.(**6**)

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UNIT III BASIC ELECTRICAL INSTRUMENTATION

PART - A

1. What is meant by Q-factor?

Q-factor is known as the quality factor. It is used to measure the quality factor of the coils such as inductors, Capacitors etc..

2. What is meant by Q-meter?

Q-meter is generally used to measure the Q-factor of the coil.

3. What are the various types of storage oscilloscopes?

The various types of storage oscilloscopes are

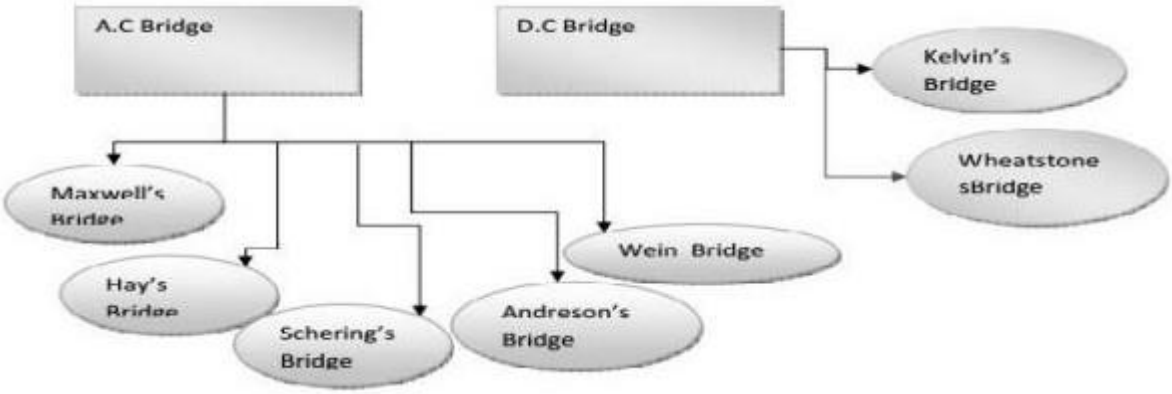
- Analog storage oscilloscope
- Mesh storage oscilloscope
- Bistable phosphor storage oscilloscope
- Digital storage oscilloscope

4. What is the DSO?

DSO is known as digital storage oscilloscope, it is used for storing the waveform in a digital form. It consists of a sample and hold circuit, control logic and an A/D converter the waveform can be stored in a buffer amplifier.

5. What are the various types o f Bridges?

Different types of bridges are sh own below.



6. How low resistance is measured?

(a) De Sauty'sbridge

(b) Maxwell's bridge
(c) Kelvin's double bridge

(d) Wien bridge

7. What are the different types DVM?

(a) Ramp type DVM

(b) Dual slope type integrating ty pe (voltage to time)

(c) Integrating type DVM (volta ge to frequency)

(d) Successive approximation ty pe (SAR)

8. What short notes on DVM?

DVM are measuring instrumen ts that convert analog voltage to signals in to digital or numeric readout.

9. Write the working principle of Q-meter.

The principle of Q-meter is ba sed on series resonance. The voltage drop across the inductor or capacitor is Q times the applied voltage.

10. What are the advantages of digital instruments?

- Readings speed is very hiigh due to digital display.

They can be programmed and well suited for computerized control.

11.Define Instrument.

Instrument is defined as a device for determining the value or magnitude of a quantity or variable.

12.Mention the two main differences between an ammeter and a voltmeter.

Ammeter	Voltmeter
It is a current measuring device	it is a voltage measuring device
Always connected in series with circuit	Always connected in parallel with circuit.
The resistance is very small	The resistance is very high

13.Mention the errors in Moving iron instruments.

Hysteresis error Temperature error

Stray magnetic field error Frequency error

Eddy current error

14.Mention any two precautions to be taken while using an Ammeter.

It should never be connected across any source. The polarity must be observed correctly.First use the highest range and then decrease the voltage range until the sufficient deflection is obtained.

15.Define Form factor and Crest factor.

Form factor= RMS value / Average Value Crest(peak)

factor=Maximum Value / RMS value

16.Which type of instrument is called as universal instrument?

The moving iron instrument are known as universal instruments, because these instruments can be used for AC and DC.

17.What are the applications of MI instruments?

i) Used as multirange ammeters and voltmeters.

ii) Used as in expensive indicators such as charging and discharging current indicators in automobiles.

iii)Extensively used in industries for measurement of AC voltage and current where errors of the order of 5% to 10% are accepetable.

18.What is meant by eddy current damping?

When the conductor moves in a magnetic field an emf is induced in it and if a closed path is provided ,a current flows known as eddy current. This current intersect with the magnetic field to produce an electromagnetic torque , which opposes the deflecting torque.

19.How is electrical power measured?

iv) Using Voltmeter-ammeter method for DC circuits. ii)Using Watt meters for AC circuits.

20.What do you mean by compensation coil in a wattmeter?

By connecting a compensating coil in series with a pressure coil, The error caused by the pressure coil flowing in the current coil can be neutralized.

21.What are the three types of power used in a a.c circuit?

i) Real power or active power P=EI cos
ii) Reactive power Q=EI sin
iii) Apparent power,S=EI

22 .Define average value.

The average value of an alternating current is that value of steady direct current which transfers the same charge as the alternating current flowing for the same time.

23.Define RMS value.

The effective value of an alternating current is that value of steady ,direct current which produces the same heat as that produced by the alternating current when passed which produces the same heat as that produced by the alternating current when passed through the same resistance for the same interval of time.

24.Define reactive power.

The power consumed by a pure reactance (XL or Xc) in a a.c circuit is called reactive power.

PART B

1. Describe briefly the working of moving iron instrument with a neat diagram. (13
2. Describe briefly the working of moving coil permanent magnet
3. instrument with a neat diagram. (13)
4. Describe briefly the working of moving coil Dynamometer instrument with a neat diagram.
5. Explain in detail the different types of instruments used for
6. measurement of electrical energy? (13)

UNIT-IV-ELECTRICALWIRING AND SAFETY

PART-A

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

Emf induced in primary coil E1 = 4.44 fΦ mN1 volt Emf induced in secondary coil E2 = 4.44fΦ mN2 volt

Where f is the frequency of AC input Φ m is the maximum value of flux in the core N1, N2 are the number of primary and secondary turns.

2. Define voltage regulation of a transformer

When a transformer is loaded with a constant primary voltage, the secondary voltage decreases for lagging Power factor load, and increases for leading pf load because of its internal resistance and leakage reactance. The change in secondary terminal voltage from no load to full load expressed as a percentage of no loads or full load voltage is termed as regulation.

% regulation down = (0V2 -V2) x 100/0V2

% regulation up = (0V2 -V2) x 100/V2

3. Why transformers are rated in kVA?

Copper loss of a transformer depends on current and iron loss on voltage. Hence total losses depend on Volt- Ampere and not on the power factor. That is why the rating of transformers is in kVA and not in kW.

4. What are the typical uses of auto **transformer?**

(i) To give small boost to a distribution cable to correct for the voltage drop.

(ii) As induction motor starters.

(iii) As furnace transformers

(iv) As interconnecting transformers

In control equipment for single phase and 3 phase elective locomotives.

5.When will a Bucholz relay operate in a transformer?

Bucholz rely is a protective device in a transformer**.**

If the temperature of the coil exceeds its limit, Bucholz relay operates and gives an alarm**.**

6. Why are breathers used in transformers?

Breathers are used to entrap the atmospheric moisture and thereby not allowing it to pass on to the transformer oil.

Also to permit the oil inside the tank to expand and contract as its temperature increases and decreases.

7. What is the function of transformer oil in a transformer?

Nowadays instead of natural mineral oil, synthetic oils known as ASKRELS (trade name) are used. They are Noninflammable; under an electric arc do not decompose to produce inflammable gases. PYROCOLOR oil possesses high dielectric strength.

Hence it can be said that transformer oil provides,

good insulation and cooling.

8. An 1100/400 V, 50 Hz single phase transformer has 100 turns on the secondary winding. Calculate the number of turns on its primary.

We know V1 / V2 = k = N2 / N1 Substituting 400/1100 = 100/N1 N1 = 100/400 x 1100 = 275 turns.

9. What are the functions of no-load current in a transformer?

No-load current produces flux and supplies iron loss and copper loss on no-load.

10.What is meant by a transformer?

The transformer is a static piece of apparatus by means of which electrical power is transformed from one alternating current circuit to another with desired change in voltage and current. Without any change in the frequency. It works on the principle of mutual induction .

11.What are the advantages of a transformer?

i) Less I2R loss in the transmission line

ii) Less voltage drop in the line

iii) Efficiency of the transmission line is increased

iv) Volume of the conductor required is less.

12.What are the properties of ideal transformer?

It has no loss

i) Its winding have zero resistance.

ii) Leakage flux is zero i.e 100% flux produced by primary links with the secondary Permeability of core is so high that negligible current is required to establish the fluesis it.

13.What are the important parts of a transformer?

Transformer consists of winding and magnetic core. The core is square or rectangle shape. It consists of limb and yoke core is made up of lamination which is used to reduce eddy current losses.

14Define voltage transformation ratio?

The ratio of secondary induced emf to primary induced emf is called as voltage regulation ratio devoted by K.

$$\frac{E_2}{E_1} = \frac{N_2}{N_1} = K$$

15 Write the expression for equivalent resistance and reactance of transformer referred to primary.

Equivalent resistance Ro1 = R1 + R21 = R1 + R2/K2

Equivalent reactance Xo1 = X1 + X11 = X1 + X2/K2

16. Define voltage regulations of a transformer.

The decrease in secondary terminal voltage expressed as a fraction of the no load secondary terminal voltage is called voltage regulation of a transformer.

17. What are the losses occurring in a transformer?

i) Core losses

ii) Copper losses

18. What is meant by core or iron losses?

Core or iron losses are caused as the core gets subjected to an alternating flux.

PART B

1. Write a detailed note on electricity tariffs for domestic consumers

2. Show with the help of labeled diagrams the essential features of (i) pipe (8) and (ii) plate earthing

3. Write a detailed note on Fuse and circuit breaker.

UNIT-V-ELECTRICAL POWER SYSTEM AND ITS APPLICATION

PART-A

1. Define Power Co-efficient.

The fraction of the free-flow wind power that can be ectracted by a rotor is a called the power co-efficient. Thus

Power Coefficient = Power of wind rotor / Power available in the wind
Where, power available is calculated from the air density, rotor diameter and free wind speed as discussed earlier. The maximum theoretical power coefficient is equal to 16/27 or 0.593. This value cannot be exceeded by a rotor in free-flow wind-stream.

2. What are the advantage o selecting sites with annual mean wind speeds and building larger rather than smaller wind generator?

i . The power available in the wind increases as cube o the wind speed; doubling the wind speed increases the power available by eight old and

ii. Doubling the diameter of the turbine's rotor quadruples the swept area and hence the power output from the device. (This law only applies to horizontal axis machines, for vertical axis machines the changes in power output with diameter will be determined by the geometry of the rotor).

3. Write the general Energy Equation for Steady State Flow.

The general energy for steady state flow for unit mass (for a control volume) is:

$$z_1 + \frac{v_1^2}{2g} + u_1 + P_1 v_1 + \Delta q = z_2 + \frac{v_2^2}{2g} + u_2 + P_2 v_2 + \Delta W_{sf}$$

where,

- z → Potential energy
- $\frac{v^2}{2g}$ → Internal energy
- P_v → Flow energy
- Δq → Net heat added
- ΔW_{sf} → Net steady flow mechanical work done of the system

Note: Subcript 1 & 2 denote the inlet and outlet respectively.

4. Write the energy flow equation interms of wind energy conversion.

Considering the incoming air between 'i' and 'a' as a thermodynamic system, and

assuming that the air density remains constant (since changes in pressure and temperature are very small compared to ambient), that the potential energy is zero, and no heat or work are added or removed between ‘i’ and ’a’, the general energy equation reduces to the kinetic and low energy-terms. Thus,

$$P_i v + \frac{V_i^2}{2g_c} = P_a v + \frac{V_a^2}{2g_c}$$

5. Write down the condition for maximum power generation in wind conversion system.

The condition for maximum power generation from wind conversion system is given by,

$$\frac{dP}{dV_e} = 0 \qquad \text{where, } P = \frac{1}{4g_c}\rho A (V_i + V_e)(V_i^2 - V_e^2)$$

$$\frac{dP}{dV_e} = 0 \Rightarrow 3V_e^2 + 2V_i V_e - V_i = 0$$

Solving above expression, we get $V_e = V_i$ and $V_e = \frac{1}{3}V_i$, only second solution is physically acceptable.

Thus, $V_{e,opt} = \frac{1}{3}V_i$

6. Write down the expression or maximum power generated from an ideal wind turbine with horizontal axis.

$$P_{max} = \frac{8}{27 g_c}\rho A V_i^3 \quad \& \quad P_{max} = 0.595\, P_{total}$$

where, $P_{total} = \frac{1}{2}\frac{\rho V A_i^3}{g_c}$

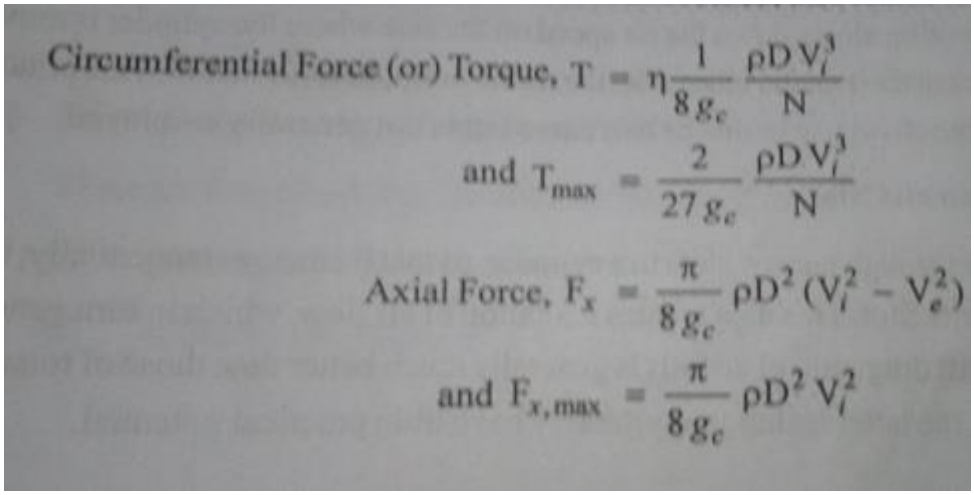
7. What are the different types o forces acting on propeller type wind turbine.

There are two types of forces which are acting on the blades. They are

(1) Circumferential force acting in the direction of wheel rotation that provides the torque, and

(2) Axial force acting in the wind stream that provides an axial thrust that must be countered by proper mechanical design.

8. Write down the expression for Circumferential and Axial Thrust Force.



9. What is the function of back-up in small producers?

For small producers, back-up can take the form of

(1) Battery storage

(2) Connection with the local electricity distribution systems, or

(3) A stand by generator powered by liquid or gaseous

fuels Drag force

10. What are the mechanisms for producing forces from wind?

There are two primary mechanism for producing forces from the winds. They are

i. Lift force, and

ii. Drag force

When life force

11. Define Airfoil

Lift forces are produced by changing the velocity of the air stream flowing over either side of the lifting surface. Speeding up the air flow causes the pressure to drop, while slowing the air stream down leads to increase in pressure.

This pressure difference produces a force that begins to act on the high pressure side and moves towards the low pressure side of the lifting surface which is called an **airfoil**.

12. Define Magnus Effect

Magnus Effect, caused by spinning a cylinder in an air stream at a high-speed of rotation. The spinnings slows down the air speed on the side where the cylinder is moving into wind and increases it on the other side; the result is similar to an airfoil. This principle has been put to practical use in one or two cases but is not generally employed.

13. Define Thwaits Slot

To blow air through narrow slots in a cylinder, so that it emerges tangentially; this is known as a **Thwaits Slot**.

Thwaits Slots also creates a rotation (or circulation) of airflow, which in turn generate lift. Because the lift drag ratio of airfoils is generally much better than those of rotating or slotted cylinders, the latter techniques probably have little practical potential.

14. Define Stalling.

When lift decreases and the drag increases quite substantially; this phenomenon is known as **Stalling**. For efficient operation, a wind turbine blade needs to function with as much lift and as little drag as possible because drag dissipates

PART B

1. What is ElectricalTariff ? Explain various types of tariffs with suitable examples.
2. Explain Power Gweneration, transmission and Distribution by drawing a single line diagram.
3. Discuss about SMPS , &UPS.
4. Discuss about Smart Grid.
5. Describe the construction and working of a lead acid battery. (13)
6. Describe the construction and working of a Li ion battery
7. Describe the construction and working of a lead acid battery.
8. Describe the construction and working of a NiCd battery. (13)