



SHREE DATTA SHETAKARI SAHAKARI SAKHAR KARKHANA LTD. CHARITABLE TRUST'S

SHREE DATTA POLYTECHNIC COLLEGE, DATTANAGAR

CLASS TEST-1

Name Of Subject&code: Fundamental of electrical engg(17214)

Marks-25

Course Code:EE2G

Date: 25-01-2014

Institute Code:1512

Time: 01 hr

Q.1 Attempt any Three Of The Following.

9 Marks

a) Define Node & Loop

ANS-

Node: A point in electrical circuit at which different branches meet.

Loop: A loop is a set of branches, forming a closed path in a network.

b) Define resistance State factor affecting on resistance

ANS-

Resistance: It is defined as the opposition to flow of current. Its unit is ohm

Factors affecting resistance: Temperature, Length of conductor, area of cross section & type and nature of material.

$$R = \rho l / a.$$

c) Define Temperature coefficient of resistance State its unit

ANS-

The Temperature coefficient of resistance is

defined as change in resistance of material per degree Celsius to its resistance at to C.

Therefore $RTC \text{ at } t_0C = \Delta R \text{ per } oC / R t .$

Unit- per degree Celsius $(/ ^\circ C)$

d) State the reasons for using sinusoidal AC

ANS-

Reasons for using sinusoidal AC:

- 1) Use of transformer is possible to change the voltage level.
- 2) Distribution of AC voltage is more efficient.
- 3) The construction of AC motors & AC generators is simple.
- 4) It is possible to obtain a DC voltage from AC by means of rectification

Q.2 Attempt any Two Of The Following.

8 Marks

a). State any two effects of electric current. Give one application for each.

ANS-

Effects of electric current:

i) Heating effect : -

When an electric current flows through a conductor, the flow of e- is opposed by the resistance of conductor and heat is produced.

$H \propto I^2Rt$. (Joules)

Used in electric irons, water heaters, Hot plates, electric lamps etc.

ii) The chemical effect of electric current:

Whenever a DC is passed through a chemical solution, the solution is decomposed into its constituent substances. It is utilized in the electrolytic processes, in production of different chemicals, for refining of metals.

iii) Magnetic effects:

Whenever an electric current passes through a conductor or coil a magnetic field gets developed across it, and coil starts acting as electromagnet. The electromagnet loses its magnetic properties as soon as current passing through the coil reduces to zero.

- When a magnetic compass is placed around / under a current carrying conductor it is deflected.
- This shows there is some relation between current and magnetism.
- Thus, the current carrying conductor doesn't become a magnet but produces a magnetic field.

It is used in electric bells, motors, fans, electrical measuring instruments etc.

b) A certain winding has resistance of 16.5 ohm at 20°C & 18 ohm at 55°C calculate

1. Temperature coefficient at 0°C

2. Resistance at 0°C

ANS-

$$R_{20} = 16.5 \text{ ohm} \text{ \& } R_{55} = 18 \text{ ohm}$$

$$R_{55} = R_{20} [1 + \alpha_{20} (55 - 20)]$$

$$\text{Therefore } \alpha_{20} = 2.6 \times 10^{-3} / ^\circ\text{C}$$

$$R_0 = R_{20} [1 + \alpha_{20} (0 - 20)] = 16.5 [1 + 2.6 \times 10^{-3} (-20)] = 15.64$$

$$\alpha_0 = [(R_{20} - R_0) / (20 - 0)] / R_0 = 2.74 \times 10^{-3} / ^\circ\text{C}.$$

c) Calculate the resistance of 100 m length of wire having a uniform cross sectional area of 0.01 mm² & having resistivity of 50 micro-ohm-cm

ANS –

$$l = 100 \text{ m, } a = 0.01 \text{ mm}^2 = 0.01 \times 10^{-6} \text{ m}^2, \rho = 50 \mu\Omega\text{-cm} = 50 \times 10^{-6} \times 10^{-2} \Omega\text{-m}$$

$$R = \rho l / a = 50 \times 10^{-6} \times 10^{-2} \times 100 / 0.01 \times 10^{-6}$$

$$R = 5000 \Omega$$

Q.3 Attempt any Two Of The Following.

8 Marks

1. Compare ac & dc

ANS-

Parameter	AC Supply	DC Supply
Definition	It is supply system in	It is supply system in

	which AC current flows	which DC current flows
2. Use of transformer	Possible	Not possible
3. Distribution efficiency	High	Low
4. Design of machine	easy	Not easy
5. Generation	Easy	Not easy
6. Applications	Ac motors, domestic & industrial loads	DC machines, HVDC

b) State difference between terminal voltage & supply voltage

ANS-

Sr.no	Terminal Voltage:	Supply Voltage:
1.	The voltage available at the terminals of sources which is less than EMF	The constant voltage available from electricity supply agencies for connecting to different loads.
2.	For battery $V_T = E - I r$.	Supply voltage is specified constant. (230 V, 50 Hz AC).
3.	The terminal voltage changes With the load	It is does not change appreciably with the load.

C) A furence takes a current of 10 ampere from a 200v D.c. supply for 8 hours. Calculate energy consumption in KWH.

ANS-

$$P = V * I = 200 * 10 = 2000W = 2 \text{ kw}$$

$$E = P * t = 2 \text{ kw} * 8 \text{ h} = 16 \text{ kwh}$$

