

## TRANSFORMER

Q1.

Show that for a Single phase Transformer  $E_p = 4.44 \phi_m f N_p$  where the Symbol have their usual meaning.

### EMF EQUATION

Q2: A 200 kVA Transformer has 400 turns on the primary and 40 turn on the Secondary winding. The primary is Connected to 2kV, 50 Hz Supply. Find the full load primary and Secondary currents, Secondary emf and the maximum flux in the Core. Neglect leakage drop and no-load primary current.

Q3: A Single phase 50 Hz Core type Transformer core of cross-sectional area of 400 Sq cms. The permissible flux density is  $1 \text{ wb/m}^2$ . Calculate the number of turn on the high & low voltage Side for a 3000/220V ratio.

Q4: Explain what will happen to transformer if we give DC Supply to it.

Q5: Explain the working of a transformer on no-load.

Q6: Draw and explain the phasor diagram of a Single-phase Transformer under lagging P.f.

(or)

### EFFICIENCY:

Q7: prove that the efficiency of a transformer is maximum when iron loss = Copper loss.

Q8: Following test data were obtained on a 20kVA, 50Hz, 1 ph.  
2000/200 V for

No-load test = 200 V, 1A, 120 W

Short-circuit test = 60V, 10A, 300 W

Find (i) efficiency of the transformer at  $\frac{1}{2}$  of the full load and  
0.8 pf lagging

(ii) maximum efficiency and the load at which it occurs, pf = 0.8 lag.

Q9: Determine the full-load efficiency at unity pf for the 4kVA,  
200/400 V, 50 Hz Single phase Transformer of which the following  
are test figures.

O.C test :- 200V, 0.8 A, 70 W

S.C test :- 17.5 V, 9 A, 50 W

Q10: A 20kVA, 2000/200V, Single phase Transformer has a primary resistance  
of  $2.1 \Omega$  and secondary resistance of  $0.02 \Omega$ . If the total  
Iron loss equals 200W Find the efficiency on.

(i) Full load & pf of 0.5 lag

(ii) Half load & pf of 0.8 lag

Q11: The efficiency at unity of a 6600/381 V, 200 kVA, Single phase  
Transformer is 98% at full load and at  $\frac{1}{2}$  load. Calculate the  
full load cu loss and core loss.



## REFERRED VALUES

Q12 A 2200/250 volt transformer has primary resistance and reactance of  $5\Omega$  and  $6.2\Omega$  respectively. The secondary resistance and reactance values are  $0.03\Omega$  and  $0.06\Omega$ .

Calculate:

- equivalent resistance referred to primary side.
- equivalent resistance referred to secondary side.
- equivalent reactance referred to primary side.
- equivalent reactance referred to secondary side.

Q13 A 220/110 V Transformer is having no load current of  $0.9A$  at  $0.12 \text{ pf (lag)}$  and a secondary current of  $95A$  at  $0.27 \text{ pf (lag)}$ . Find the primary current.

Q14 Draw & explain the phasor diagram of a single phase transformer under loaded condition.

## Test:-

Q15 Why is the open circuit test on a transformer conducted at rated load.

Q16 The open-circuit & short circuit tests on a 4KVA, 200/400V, 50 Hz single phase transformer gave the following results:

OC test on the LV side: 200V, 1A, 100W.

SC test with the LV side :- 15V, 10A, 85W  
shorted

- Determine the parameter of the equivalent circuit.
- Draw the equivalent circuit referred to the LV side.