

JAYPEE INSTITUTE OF INFORMATION TECHNOLOGY
Electronics and Communication Engineering
Electrical Science-I (15B11EC111)
Tutorial Sheet: 12

- 1.[CO4] The core of 5MVA 33kV/11kV, 50Hz single phase transformer has a core cross sectional area of 1m^2 . Find the primary and secondary turns of the coil, and emf per turn of the coil, if maximum flux density allowed can be 1.3 Tesla.
- 2.[CO4] The core of 5MVA 33kV/11kV, 50Hz single phase transformer has turns ratio as calculated in the above problem. Find the primary and secondary current. Consider an ideal transformer.
- 3.[CO4] The core of 5MVA 33kV/11kV, 50Hz single phase transformer has core loss of 6.5kW. It's no load primary current is 7.6A (5% of primary current). Find the working and magnetizing components of this no-load current. Investigate the components of currents at 0.2 p.f.
- 4.[CO4] The full load copper loss on the h.v side of a 100kVA, 11kV/415V, single phase transformer is 620W and on the l.v side is 480W. (i) find R_1 , R_2 and R_{total} . (ii) if total reactance of the transformer is 48.4Ω and the ratio of total resistance referred to the primary side divided by the secondary resistance referred to the primary is equal to the ratio of total reactance referred to primary divided by the secondary reactance referred to the primary (the resistance and reactance are in same proportion).
- 5.[CO4] A 50 KVA, 2300/230 V 50 Hz transformer has leakage impedance of $0.7 + j0.9\Omega$ in the high voltage winding and $0.007 + j0.0075\Omega$ in the low voltage winding. At rated voltage and frequency, the impedance of the shunt branch is $7 + j40\Omega$ when viewed from the low voltage side. Draw the equivalent circuit referred to
 - (a) The high voltage side and
 - (b) The low voltage side and label the impedances numerically.
- 6.[CO4] The equivalent circuit of an ideal transformer with an impedance $R_2 + jX_2 = 2 + j4\Omega$ connected in series with the secondary. The turns ratio $N_1/N_2 = 5:1$ (a) Draw an equivalent circuit with the series impedance referred to the primary side. (b) for a primary voltage of 120 V rms and short connected across the terminals A-B, calculate the primary current and the current in the short.
- 7.[CO4] For the transformer of 6th problem short circuit test is done at 50V , 20 A and the power is 600W. while performing open circuit test the data are 230 V, 5A and 160W. determine the efficiency at full load and half the load at 0.8 power factor lagging