**Sheet # 1**

**\*\*Understanding E.M.F. Equation of a Transformer (E1=4.44 f N1Φm = 4.44 f N1BmA)**

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1. The maximum flux density in the core of a 250/3000-volts, 50-Hz single-phase transformer is 1.2 Wb/m2. If the e.m.f. per turn is 8 volt, determine:-
2. Primary and secondary turns (ii) area of the core.

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1. The core of 100 kVA, 11000/550 V, 50 Hz, 1-ph, core type transformer has a cross section of 20 cm x 20 cm.(i) Find the number of H.V and L.V turns per phase. (ii) The e.m.f per turn if the maximum core density is not exceeds 1.3 Tesla. Assume a stacking factor of 0.9.

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1. *A 25-kVA transformer has 500 turns on the primary and 50 turns on the secondary winding. The primary is connected to 3000-V, 50-Hz supply. Find the full-load primary and secondary currents, the secondary e.m.f. and the maximum flux in the core. Neglect leakage drops and no-load primary current.*

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1. *A single-phase, 50 Hz, core-type transformer has square cores of 20 cm side. Permissible maximum flux-density is 1 Wb/m2. Calculate the number of turns per Limb on the High and Low-voltage sides for a 3000/220 V ratio*. (hint: , there are two Limbs. Each Limb accommodates half-L.V. and half H.V. winding from the view-point of reducing leakage reactance.)

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**\*\*Impedance referring**

1. *A 100-kVA, 2400/240-V, 60-Hz step-down transformer (ideal) is used between a transmission line and a distribution system.*

*a- Determine turns ratio. b- What secondary load impedance will cause the transformer to be fully loaded, and what is the corresponding primary current? c- Find the load impedance referred to the primary.*

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*\*\* Pretend what can happen if (by mistake), some one replace the input and output voltages of the above transformer? (i.e. connecting an 2400 v input to the secondary winding)*

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**\*True or false:-**

1. - Magnetically coupled electric circuits in transformer is achieved by static flux, while in machine by changed flux.
2. - To convert a 100 V DC voltage level to 50 V level, you can use a step-down transformer having turns ratio of (2:1).
3. - Induced voltage **per turn** in primary is not equal to the induced in secondary.
4. - In ideal step-down transformer, the power delivered to the load is lower than the input power delivered to the primary winding.

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