

Lecture-34

Tutorial

Lecture delivered by:



Objectives

At the end of this lecture, student will be able to:

- Solve the problems on the transformer principle of operation
- Solve the problems on the no-load phasor diagram



Problem 1:

4500 V/225 V, 50 Hz single-phase transformer is to have an approximate e.m.f. per turn of 15 V and operate with a maximum flux of 1.4 T. Calculate (a) the number of primary and secondary turns and (b) the cross-sectional area of the core.

Problem 2:

A 2400 V/400 V single-phase transformer takes a no load current of 0.5 A and the core loss is 400 W. Determine the values of the magnetizing and core loss components of the no load current. Draw to scale the no-load phasor diagram for the transformer.



Problem 3:

The number of turns on the primary and secondary windings of a transformer are 1000 and 2000 respectively. When the load current on the secondary is 100A at 0.8 power factor lagging, the primary current is 30A at 0.707 power factor lagging. Determine the no-load current of the transformer and its phase with respect to the voltage.

Problem 4:

A 500/250V, 50Hz, single-phase transformer is to be worked at a maximum flux density of 1.2T in the core. The effective cross-sectional area of the core is 90cm². Calculate the primary and secondary turns.



Problem 5:

A 2400 V/400V single-phase transformer takes a no-load current of 0.5A and the core loss is 400 W. Determine the values of the magnetising and core loss components of the no-load current. Draw to scale the no-load phasor diagram for the transformer.

Problem 6:

A transformer takes a current of 0.8A when its primary is connected to a 240 volt, 50 Hz supply, the secondary being on open circuit. If the power absorbed is 72 watts, determine the

- (a) iron loss current
- (b) power factor on no-load and
- (c) magnetising current.



Problem 7:

A 500 V/100 V, single-phase transformer takes a full load primary current of 4A. Neglecting losses, determine the

- (a) full load secondary current and
- (b) rating of the transformer.

Problem 8:

A 3300 V/440 V, single-phase transformer takes a no-load current of 0.8A and the iron loss is 500 W. Draw the no-load phasor diagram and determine the values of the magnetising and core loss components of the no-load current.

