PEA 3400 - LISTA DE EXERCÍCIOS PARA A P1 - 2017

Extraída de "Electric Machinery Fundamentals" – S. Chapman – 2ª Edição – Capítulo 2

2-7. A three-phase transformer bank is to handle 500 kVA and have a 34.5/13.8-kV voltage ratio. Find the rating of each individual transformer in the bank (high voltage, low voltage, turns ratio, and apparent power) if the transformer bank is connected (*a*) Y-Y, (*b*) Y-Δ, (*c*) Δ-Y, (*d*) Δ-Δ, (*e*) open-Δ,

2-8. A Y-Δ-connected bank of three identical 200-kVA 7967/480-V transformers is supplied with power directly from a large constant-voltage bus. In the short-circuit test, the recorded values on the high-voltage side for one of these transformers are

$$V_{SC} = 560 \text{ V} \qquad I_{SC} = 25.1 \text{ A} \qquad P_{SC} = 3400 \text{ W}$$

(*a*) If this bank delivers a rated load at 0.9 PF lagging and rated voltage, what is the line-to-line voltage on the primary of the transformer bank?
(*b*) What is the voltage regulation under these conditions?

2-9. A 100,000-kVA 230/115-kV Δ-Δ three-phase power transformer has a per-unit resistance of 0.02 pu and a per-unit reactance of 0.055 pu. The excitation branch elements are $R_C = 120$ pu and $X_M = 18$ pu.
(*a*) If this transformer supplies a load of 80 MVA at 0.85 PF lagging, draw the phasor diagram of one phase of the transformer.
(*b*) What is the voltage regulation of the transformer bank under these conditions?
(*c*) Sketch the equivalent circuit referred to the low-voltage side of one phase of this transformer. Calculate all the transformer impedances referred to the low-voltage side.

Extraída de "Magnetic circuits and transformers" - M.I.T. Staff - Capítulos 14; 19

3. Ratings and short-circuit data for a group of single-phase transformers are:

Transformer	*Rating*	*Voltage*	*Short-circuit data*		
			Voltage	*Current*	*Power*
A	100 kva	2,300 : 230 v	119 v	45.0 amp	1,000 w
B	100	2,300 : 230	154	40.0	1,300
C	200	2,300 : 230	106	80.0	1,580
D	300	2,300 : 230	132	125.0	3,100

(a) Which two of these transformers would operate most successfully in parallel?
(b) If the load to be supplied at 230 v were 400 kva at unity power factor and all the above transformers were available to be used in a parallel bank to supply the load, which transformers would you recommend using? Why? What additional data would be needed to determine the choice completely?

5. A 1,000-kva 60 ~ 66,000 : 11,000-v transformer has an equivalent impedance of $1.0 + j4.9$ ohms, referred to the low-voltage side, and a no-load loss of 5,500 w at rated terminal voltage.
(a) When this transformer is operated at rated frequency and rated secondary voltage, at what kva output is the efficiency a maximum?
(b) What is the value of the maximum efficiency?
(c) If the transformer delivers its rated kva at rated voltage to a load of variable power factor, for what load power factor is the voltage regulation zero?

6. The transformer for which data are given in Prob. 5 operates at rated secondary voltage on a load cycle represented by the following typical values:

Hours	*Per cent kva load*	*Power factor*
1	125	0.80
2	100	0.84
1	50	0.90
5	12	0.98
15	0	—

(a) What is the energy efficiency of the transformer?
(b) What would be the energy efficiency if the equivalent resistance were 150% of the value given in Prob. 5?