Kafrelsheikh University
Faculty of Engineering
Department: Electrical Power and Machines
Year: 3rd (2007) /2018-2019
Subject: Electric Tests (2)
Name: Dr. Amlak Abaza

Date: 12-6-2019
Time Allowed: 3hrs
Full Mark: 60 Marks
Final Exam: 2nd Term.
No of pages: 2
Academic Code: EPM 3005.

This Exam measures the ILOs [a.1, a.5, b.5, b.14, c.5,and c.13]

Answer the following questions: In each question, draw the circuit diagram and necessary phasor diagrams and write the necessary equations to clarify your answer

Question One: (15 Mark) [measures the ILOs of a1.2, a.5.1, b.5., c.13.2, and c.13.4]

a) ***Show***, experimentally, how voltage regulation and transmission efficiency can be determined for medium lines using *T*- method.

b) ***Explain*** the relation between the receiving end power factor and the performance of transmission lines.

c) ***Illustrate*** the expected relation between sending end voltage and receiving end voltage at lightly and no load conditions of medium transmission lines

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Question (2): (15 Mark) [measures the ILOs of a1.2, , b.5, and c.13.4]

a) ***Define*** the voltage regulation. Under what load condition(s), a positive voltage regulation may be obtained? ***Verify*** your answer by the aid of phasor diagrams for a single-phase transformer.

b) ***Discuss*** two methods used to improve the poor voltage regulation.

c)A 15 KVA, 2400/240 V single-phase transformer has the following test results:

Test	Voltage (V)	Current (A)	Power (W)
Open-circuit	240	2.3	60
Short circuit	49	6.25	150

i. ***Illustrate*** the side at which the measuring instruments were located for both tests, ***according*** to the given table.

ii. ***Estimate*** the transformer equivalent circuit parameters referred to low voltage -side

iii. ***Determine*** the efficiency and voltage regulation if the transformer is operating at ***80% full load*** and a power factor of 0.9 lagging.

Question (3): (15 Mark) [measures the ILOs of a.5.3, b.14.1, and c.13.4]

a) **Define** the power factor. **What** are the measurements in the laboratory that necessary to get the power factor?

b) ***Draw*** the connection diagram to perform the power factor improvement ***identifying*** the reading of each meter and hence write the necessary equation to find the required KVAR for:-

i. Lagging power factor.

ii. Leading power factor.

c) A single- phase motor connected to a power supply at 380 V takes 33 A at 0.7 power factor lagging. It is desired to improve the power factor of the receiving end to 0.92 lagging value. ***Calculate*** the capacitance required in parallel with the motor to reach this value.

Question (4): (15 Mark) **[a1.2, b.5, and c.13.4**

a) **Explain** the difference between the auto-transformer and the conventional transformer.

b) ***Discuss*** what will happen in each of the following practical case:

i. the magnetic core of a transformer is replaced by non-magnetic core

ii. A 380 Volts 50 Hz supply is connected to the primary of a transformer rated at 50 Hz, 230/115 V

iii. Short-circuit test of a transformer is performed under 80 % of rated voltage

iv. The load of a medium transmission line is reduced to 20% of full load.

v. The bundled transmission lines is used at high voltage level

vi. One phase of the secondary winding of a Δ-Δ three-phase transformer is open

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Best wishes

Committee of corrections and Testers