Total No. of Questions : 4]

SEAT No. :

PA-10291

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[6008]-213
S.E. (Electrical Engineering) (In-Sem.)
ELECTRICAL MACHINES - I
(2019 Pattern) (Semester - II) (203146)

Time : 1 Hour] *[Max. Marks : 30*

Instructions to the candidates:

1) ***Solve Q1 or Q2, Q3 or Q4.***
2) ***Figures to the right indicate full marks.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Assume suitable data, if necessary.***
5) ***Use of non-programmable calculator is allowed.***

Q1) a) Write mathematical expression for the losses in case of transformer. State the condition for maximum efficiency of transformer. **[3]**

b) A 10 kVA single-phase transformer, rated for 2000/400 Volt has resistances and leakage reactances as follows. **[6]**
Primary winding : R_1 = 5.5 Ohm, X_1 = 12 Ohm.
Secondary winding : R_2 = 0.2 Ohm, X_2 = 0.45 Ohm.
Determine the full load voltage regulation 0.8 power-factor lagging

c) Give any 3 points of comparison between autotransformer and normal transformer. **[6]**

OR

Q2) a) State the expression of voltage regulation of transformer in terms of all voltage drops. State any two factors affecting voltage regulation of transformer. **[3]**

b) A 100-kVA distribution transformer supplying light and fan loads has full-load copper-loss 1.5 kW and core-loss 2 kW. During 24 h in a day the transformer is loaded as follows : **[6]**
6 AM to 10 AM (4 hrs) Half-load
10 AM to 6 PM (8 hrs) One-fourth load
6 PM to 10 PM (4 hrs) Full-load
10 PM to 6 AM (8 h) Negligible load
Calculate the all-day efficiency of the transformer.

c) Draw phasor diagram of transformer for leading power factor condition. Mark all parameters in the phasor diagram. **[6]**

P.T.O.

Q3) a) State one application of each for following connections of transformer - i) Y-Y Connection ii) Y - Delta connection iii) Delta –Y Connection. **[3]**

b) With suitable circuit diagram and phasor diagram explain Scott connection of transformer. **[6]**

c) State the necessity of polarity test for transformer. Draw circuit diagram of polarity test on single phase transformer. **[6]**

OR

Q4) a) State any three advantages of V-V Connection. **[3]**

b) Two 1-Phase transformers have equal turns. Their impedances are **(0.5+j3) Ohm** and **(0.6+j10) Ohm** with respect to the secondary. If they operate in parallel, determine how they will share a total load of 100 kW at p.f. 0.8 lagging? **[6]**

c) Explain parallel operation of two 1 phase transformers for following condition-Same kVA rating and unequal impedance. **[6]**

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