

Total No. of Questions : 4]

SEAT No. :

PD14

[Total No. of Pages : 2

[6409]-207

**S.E. (Electrical Engineering) (Insem)**  
**ELECTRICAL MACHINES - I**  
**(2019 Pattern) (Semester - IV) (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 additional data, if necessary.
- 5) Use of a non-programmable calculator is allowed.

**Q1) a)** State an importance of open and short circuit test on transformer over direct load test on transformer to find out efficiency and regulation of it. Explain the reasoning behind, how wattmeter reading in open circuit test and in short circuit test is taken as iron loss and copper loss of transformer respectively? [8]

b) Open and short Circuit test is performed on single phase transformer having voltage and power rating as 250/500 volts, 25KVA. The test results are as below: [7]

Open Circuit Test: (with HV winding open)

250 volts    5A    200 watts

Short Circuit Test: (with HV winding shorted)

6 volts    100A    180 watts

Draw an equivalent circuit diagram of transformer referred to LV winding and write the values of respective parameters in equivalent circuit as calculated from the tests

OR

**Q2) a)** Derive an expression for “Copper Saving” in step-down Single Phase Auto-Transformer in comparison with Two Winding Single Phase Transformer. State any Two disadvantages of autotransformer. [8]

b) State the names of losses taking place in single or three phase transformers. Explain in brief about factors affecting on these losses.

Write only formula for “All Day Efficiency” for transformer. [7]

P.T.O.

- Q3) a)** What is the necessity of parallel operation of transformers? State the necessary and desirable conditions for satisfactory parallel operation of single phase transformers. [7]
- b) Two single phase transformers with equal voltage ratios have impedances of  $(0.82 + j 2.51)$  ohms and  $(0.8 + j 2.31)$  ohms with respect to the secondary. If they operate in parallel, how they will share a total load of 2000 KW at power factor 0.8 lagging? [8]

OR

- Q4) a)** With the neat sketch and phasor diagram explain Open Delta or V-V Connection of the transformer. [8]
- b) Explain in brief an importance of 'Polarity Test' on transformer in practice. Draw the relevant circuit diagrams for any single phase transformer to obtain resultant voltage from 'additive polarity' and 'subtractive polarity' connection. [7]