## TONTADARYA COLLEGE OF ENGINEERING
### Department of Electrical & Electronics Engineering
Internal Assessment – I (**18EE33**)

| Subject: **Transformers and Generators** | Date: 10/12/2021 |
|---|---|
| Semester: III | Time:9.30am to 11.00am |

Note: Answer one question from each part.
Assume missing data suitably.                                    Total Marks: 50

| | | **PART-A** | | CO |
|---|---|---|---|---|
| Q1. | a) | Explain the operation of a practical transformer under load condition and hence develop the phasor diagram of single phase transformer under load condition | 12M | 1 |
| | b) | A 5 KVA, 500/250V ,50Hz.1-Ø transformer gave the following readings:<br>    O.C. Test: 500V, I A, 50W (HV side).<br>    S.C. Test: 25V, 10A, 60W (LV side shorted)<br>Determine: i) Circuit constants<br>ii) The Efficiency on full load, 0.8 lagging p.f iii) The voltage regulation on full load, 0.8 leading p.f iv) Draw the equivalent circuit. | 13M | 1 |
| Q2. | a) | With a neat circuit diagram, discuss in detail how to perform OC and SC tests on single phase transformer. | 12M | 1 |
| | b) | Find the all day efficiency of a transformer having maximum efficiency of 98% at 15kVA at unity power factor  and loaded as follows:<br>12 Hr 2kW at 0.5 power factor<br>6 Hr 12kW at 0.8 power factor<br>6 Hr no load | 13M | 1 |
| | | PART-B | | |
| Q3. | a) | Explain with the help of connection and phasor diagram how Scott connections are used to obtain two phase supply from three –phase supply mains. | 12M | 1 |
| | b) | Explain with circuit diagram and phasor diagram how two transformers connected in open delta can supply the power successfully. | 13M | 1 |
| Q4. | a) | With the help of neat circuit diagram and phasor diagram explain the operation of 3-phase star –delta transformer. | 12M | 1 |
| | b) | A 3 phase, 1000 KVA, 6600/1100V, transformer is delta connected on the primary and star connected on the secondary, the primary resistance per phase I.8Ω and secondary resistance per phase is 0.025Ω. Determine the efficiency when the secondary is supplying full load at 0.8 p.f. and the iron loss is 15kW. | 13M | 1 |

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| Course Outcomes (COs), Students will be able to, | |
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| 1 | Analyze the voltage regulation, commercial and all day efficiency of single phase transformer. Explain the operation of 3-Phase transformers, on-load tap-changers and Autotransformer. |
| 2 | Analyze the performance of transformers by Sumpner's Test, phase conversion, 3-phase connections, and parallel operation |
| 3 | Analyze the effect of excitation of non-salient pole synchronous generator and determine the ATD, ATC in DC Generators. |
| 4 | Analyze the regulation of Synchronous Generator by Slip test, EMF, MMF, and ZPF Methods. |
| 5 | Analyze the performance of the salient pole Synchronous Generators on infinite bus and parallel operation. |

**RBT- Revised Blooms Taxonomy Learning Levels**
I. Remember, II. Understand, III. Apply, IV. Analyze, V. Evaluate, VI. Create