

Roll No.....

Total No. of Printed Pages: [1]

Total No. of Questions: [09]

B. Tech. (EE) (Semester – 3rd)

TRANSFORMERS

Subject Code: BELE1301

Paper ID: [111502]

Time: 03 Hours

Maximum Marks: 60

Instruction for candidates:

1. Section A is compulsory. It consists of 10 parts of two marks each.
2. Section B consist of 5 questions of 5 marks each. The student has to attempt any 4 questions out of it.
3. Section C consist of 3 questions of 10 marks each. The student has to attempt any 2 questions.

Section – A

(2 marks each)

Q1. Attempt the following:

- a) Write the e.m.f. equation of a transformer. Explain different terms used in it.
- b) What is meaning of equivalent circuit of a transformer?
- c) Define Voltage regulation. Write the formula and explain it.
- d) Derive the condition for maximum efficiency of transformer.
- e) List the applications of an auto-transformer.
- f) Discuss the necessary and sufficient conditions of parallel operation of a three-phase transformer
- g) What is inrush phenomenon in a transformer?
- h) Explain why the cooling methods are used in a transformer.
- i) Write the names of cooling methods in a transformer.
- j) What are the materials suitable for construction of transformer core?

Section – B

(5 marks each)

- Q2. State the various losses which take place in a transformer. On what factors do they depend? Explain the steps taken to minimize these losses.
- Q3. Discuss the construction, working and applications of a Variac transformer. Also give schematic diagrams of a single-phase variac transformer.
- Q4. Explain why the wave shape of magnetizing current of a transformer is non-sinusoidal? Explain its phenomenon of inrush of magnetizing current.
- Q5. State the necessary conditions for parallel operation of 1-phase as well as 3-phase transformers.
- Q6. Discuss the various cooling techniques preferably for the cooling of a transformer. Discuss their applications and Power as well as voltage ratings suitability of these methods for a transformer.

Section – C

(10 marks each)

- Q7. Discuss the voltage regulation of a transformer. Deduce the expression for the voltage regulation and determine the conditions for zero voltage regulation and maximum voltage regulation.
- Q8. Discuss various types of connections of three-phase transformer with suitable diagrams. Give the applications of each type of connection.
- Q9. Draw and explain three-phase to two-phase Scott Connection of a transformer. Explain its operation and give its applications.