To join our WhatsApp Group contact:- 9508550281

Jharkhand University of Technology, Ranchi

Diploma 2nd Semester Examination, 2024 (NEP)

Subject : Transformer & Alternators **Subject Code : EEE201**

Time Allowed : 3 Hours **Full Marks : 70**

Answer in your own words.
Answer any five *questions.*
Question No. 1 *is compulsory, and from rest of the questions answer* any four *only.*
All questions carry equal marks.

1. Choose the correct answer: 2×7=14

(i) Transformer cores are laminated to reduce
(a) eddy-current loss. (b) hysteresis loss.
(c) both eddy-current loss and hysteresis loss. (d) ohmic loss.

(ii) The leakage flux in a transformer depends upon
(a) the applied voltage. (b) the frequency.
(c) the load current. (d) the mutual flux.

(iii) Time constant for an RL series circuit is given by
(a) R/L (b) 1/RL
(c) RL (d) L/R

(iv) A transformer secondary is connected to pure resistive load. The power factor on the primary side will be
(a) near about 0.95 lead. (b) near about 0.95 lag.
(c) zero. (d) unity.

(v) In 48 slot, 4-pole, 3-phase alternator, the coil-span is 10. Its distribution and pitch factors are respectively
(a) 0.9717, 0.966. (b) 0.9822, 0.9814.
(c) 0.9577, 0.9814. (d) 0.9577, 0.966.

(vi) A 3-phase star-delta transformer has primary to secondary turns ratio per phase of 5. For a primary line current of 10 A, the secondary line current would be
(a) 50 A (b) 86.6 A
(c) 3.464 A (d) 150 A

(vii) A single-phase transformer has a maximum efficiency of 90% at full load and unity power factor. Efficiency at half load at the same power factor is
(a) 86.7% (b) 88.26%
(c) 88.9% (d) 87.8%

Website:- Diplomawallah.in

To join our WhatsApp Group contact:- 9508550281

2. (a) Define a transformer. How is the energy transferred from one circuit to another? Distinguish between primary and secondary windings.

(b) Draw and explain the no-load phasor diagram for a single-phase transformer. Discuss how primary leakage is accounted for in a phasor diagram. 7+7

3. (a) Discuss briefly the various losses in a transformer and explain how each loss varies with the load current.

(b) Discuss how the parallel operation of two single-phase transformer is affected by

(i) unequal voltage ratios

(ii) unequal per-unit leakage impedance but same x_e/r_e ratio. 7+7

4. (a) Define energy efficiency and all-day efficiency.

(b) The daily variation of load on a 100 kVA transformer is as follows:

8.00 A.M to 1.00 P.M : 65 kW, 45 kVAr
1.00 P.M to 6.00 P.M : 80 kW, 50 kVAr
6.00 P.M to 1.00 A.M : 30 kW, 30 kVAr
1.00 A.M to 8.00 A.M : No load

This transformer has no-load core loss of 370 watts and a full-load ohmic loss of 1200 watts. Determine the all-day efficiency of the transformer. 4+10

5. (a) Why should the tap-changer be connected near the neutral? What about *delta-connected* transformers?

(b) Describe four possible ways of connections of 3-phase transformers with relevant relations amongst voltages and currents on both h.v. and l.v. sides. 7+7

6. (a) Discuss the advantages and disadvantages of an auto-transformer as compared to two-winding transformers.

(b) Explain why in testing large-transformers the open-circuit test is carried out with the high-voltage winding open and short-circuit test with the low-voltage winding sorted. +7

7. Write short notes on *any four* of the following: 3.5×4

(a) Voltage-regulation and efficiency of the transformer

(b) Construction of salient-pole and non-salient pole alternator

(c) Open-circuit test and short-circuit test

(d) Principle of DC Generator

(e) Armature winding

Website:- Diplomawallah.in