Code No. : 15302 O

# VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD
### B.E. (EEE) III Year I-Semester Old Examinations, May/June-2019
## Electrical Machinery-II

Time: 3 hours
Max. Marks: 70

*Note: Answer ALL questions in Part-A and any FIVE from Part-B*

### Part-A (10 × 2 = 20 Marks)

1. What are the causes of deterioration of transformers?
2. What are the conditions to be satisfied for the parallel operation of 1- phase transformers?
3. What are the advantages of single 3-φ transformer over bank of three 1-φ transformers?
4. Give the significance of Auto transformers.
5. What is the relation between maximum torque, stating torque of a 3-φ Induction motor?
6. What is the necessity of starter in 3-φ Induction Motor?
7. List the various slip power recovery schemes of 3-φ Induction motor.
8. Draw the slip-torque characteristics of 3-φ Induction motor showing braking, motoring & generating modes.
9. Discuss the adverse effects of unbalanced operation of 3-φ Induction motor.
10. List the merits of Delta/Star transformer connection.

### Part-B (5 × 10 = 50 Marks)

11. a) Explain cooling arrangement in Transformers. [4]

    b) Two transformers X and Y of ratings 500kVA and 300kVA are supplying a load of 750kVA [6] at 0.8p.f. lagging at 400V. Their open circuit voltages are 405V and 410V respectively. Transformer X has 1% resistance and 5% reactance and transformer Y has 1.5% resistance and 4% reactance. Find the load sharing by each transformer.

12. a) Explain open-delta connection of 3-φ transformer with neat connection diagram. [5]

    b) In a Scott connection, calculate the values of line currents on the 3-φ side, if the loads on [5] the 2-φ side are 300 KW and 450 KW both at 100 V and 0.707 p.f. (lag) and the 3-φ line voltage is 3300 V. The 300 KW load is on the leading phase on the 2-φ side. Neglect transformer losses.

13. a) Describe the principle of operation of 3- φ induction motor. Explain why the rotor is forced [3] to rotate in the direction of rotating magnetic field.

    b) A 15kW, 400V, 4-pole, 50Hz, 3- φ star connected induction motor gave the following test [7] data results:

    |              | No-load test | Blocked rotor test |
    |--------------|--------------|--------------------|
    | Line voltage | 400V         | 200V               |
    | Line current | 9A           | 50A                |
    | Power input  | 1310 W       | 7100 W             |

    Find full-load current, slip, powerfactor, maximum torque.

14. a) Explain constant torque Kramer drive with neat schematic diagram. [5]

    b) Explain star-delta starting of 3- φ squirrel cage induction motor with neat diagram. Also [5] derive the relation between starting & full-load torque.

15. a) Explain about unbalanced operation of 3-φ Induction motor. [5]

    b) Explain single phasing in 3-phase transformers. [5]

16. a) Explain about the maintenance of transformers. [5]

    b) Write the merits and demerits of Auto-transformer over the 2-Winding transformer. [5]

17. Answer any *two* of the following:

    a) Differentiate squirrel cage and wound rotor of a 3-φ Induction motor. [5]

    b) Induction generator. [5]

    c) Single phase load on 3-ph Transformers. [5]

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