1232

Code : 15EE41T

Register Number

IV Semester Diploma Examination, Nov./Dec. 2017

TRANSFORMERS & A.C. MOTORS

Time : 3 Hours]   **[Max. Marks : 100**

Note :   (i)   Answer any **six** questions from Part – A, **5** marks for each question.

    (ii)   Answer any **seven** questions from Part – B. Each question carries **10** marks.

PART – A

1. (a) Write short note on breather of a transformer.   2

   (b) What are the factors to be considered while selecting shell type or core type transformers (any **three**) ?   3

2. Draw the vector diagram of the transformer on 'R' load and explain. (R-Resistive).   5

3. Explain the construction of 3 phase transformer.   5

4. Explain with sketch the construction and working of 3 phase slip ring induction motor.   5

5. Explain and derive torque produced in the rotor of 3 phase squirrel cage induction motor.   5

6. Explain how the speed is controlled in a 3 phase slip ring induction motor by pole changing method.   5

7. Explain why the synchronous motor is not self-starting.   5

8. Explain the effect of change in excitation at constant load on synchronous motor.   5

9. Explain the principle of operation of single phase capacitor start-capacitor run induction motor.   5

PART – B

10. (a) Derive an equation for emf induced in single phase transformer.   4

   (b) A 25 kVA, single phase transformer has 250 turns on primary and 40 turns on secondary winding. The primary is connected to 1500 volt, 50 Hz mains.
Calculate :

    (1) Primary and secondary currents on full load

    (2) Secondary emf

    (3) Maximum flux in the core   6

11. (a) Explain with circuit diagram how Short Circuit (SC) and Open Circuit (OC) tests are conducted on single phase transformer.   **6**

    (b) Derive the condition for maximum efficiency of the transformer.   **4**

12. (a) Explain the necessity and conditions for parallel operation of two single phase transformer.   **6**

    (b) Find the effective resistances of the transformer as referred to primary and referred to secondary.   **4**

13. (a) Draw the four different ways of connecting the primary and secondary windings of 3 phase transformers and write the relationship between phase voltage and line voltage and phase current and line current.   **8**

    (b) Compare auto-transformer with 2 winding transformer.   **2**

14. (a) Explain how the rotating magnetic field is produced in the stator of 3 phase induction motor.   **6**

    (b) Derive the equation for starting torque of an induction motor.   **4**

15. (a) Define slip and frequency of the rotor current.   **4**

    (b) A 6 pole slip ring induction motor runs at 900 rpm at full load when connected to 3 phase, 50 Hz, ac supply.   **6**

    Determine :

    (1) Synchronous speed (N_S)

    (2) Slip (S)

    (3) Frequency of rotor current (f')

16. (a) Draw and explain the speed-torque characteristics curve.   **5**

    (b) Write the relationship between rotor power input, rotor copper loss, mechanical power developed and slip of an induction motor.   **5**

17. (a) Explain with sketch the construction and working of star-delta starter.   **5**

    (b) Explain the speed control of 3ϕ induction motor by variable frequency method. **5**

18. (a) Explain the effect of excitation on power factor of synchronous motor.   **5**

    (b) Explain hunting and how it is prevented ?   **5**

19. (a) Explain magnetic levitation.   **5**

    (b) Draw the sketch of resistance split induction motor and explain the operation. **5**

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