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Code No. : 13314 S

**VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD**  
**B.E. (EEE: CBCS) III-Semester Supplementary Examinations, June-2019**  
**Electrical Machines-I**

Time: 3 hours

Max. Marks: 60

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

**Part-A (10 × 2 = 20 Marks)**

1. Write any two advantages of analyzing energy conversion devices by field energy concept.
2. Give the examples of doubly-excited electromechanical energy conversion devices.
3. A 4-pole, lap connected armature winding has 360 conductors and rotates at 1450 rpm. Calculate Induced EMF in Armature winding, if it has 0.027 wb flux per pole.
4. Write any two effects of armature reaction.
5. List the applications of DC Shunt Motor.
6. Draw the Speed-Torque characteristics of DC Series Motor.
7. Define an Ideal Transformer
8. A single phase 2200/250V, 50Hz transformer has maximum flux of 27mwb. Calculate the number of turns of primary
9. A 10kVA delta - delta connected transformer is reconnected in open-delta due to failure in one of the winding then the kVA rating of open-delta is \_\_\_\_\_.
10. Name suitable Three-Phase transformer Connection preferred for high voltage and low current requirements.

**Part-B (5 × 8 = 40 Marks)**

11. a) A toroid is excited by a single coil. Discuss the conditions under which this toroid can extract energy from the supply system. [3]  
b) Derive an expression for the torque in a doubly-excited magnetic system having salient pole type of stator as well as rotor. [5]
12. a) Describe the constructional details of 4-pole DC Machine with neat diagram. Label all its parts and mention the material used for each part. [5]  
b) Bring out the basic differences between simplex lap and wave winding with neat diagrams. [3]
13. a) Explain Swinburne's test to estimate the efficiency of DC Shunt Motor with neat diagram. [4]  
b) Discuss about 3-point starter of DC shunt motor with neat diagram. [4]
14. a) Draw the equivalent circuit and phasor diagram of a practical single-phase transformer on load. [3]  
b) A 20 kVA, 2500/250 V, 50 Hz, single phase transformer gave the following test results: [5]  
O.C test (on L.V .side): 250V, 1.4A, 105 Watts  
S.C test (on H.V. side):104V, 8A, 320 Watts  
Evaluate the equivalent circuit parameters referred to H.V side and its efficiency at half full load of 0.8 lagging power factor.
15. a) Explain scott connection with neat diagram and also prove that how 3-phase is converted to 2-phase. [5]  
b) Explain star-delta and delta-star three-phase transformer connections with neat diagrams [3]

16. a) Formulate the expression of mechanical work done by singly-excited electro-magnetic relay under transient movement [4]
- b) Derive the expression of average e.m.f induced in DC generator. [4]
17. Answer any *two* of the following:
- a) Explain speed control methods of DC shunt motor with neat diagrams. [4]
- b) Explain Sumpner's test with neat circuit diagram. [4]
- c) Explain about NO-Load tap changer with neat schematic diagram. [4]

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