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**[5559]-156**

**S.E. Electrical (II Semester) EXAMINATION, 2019**

**ELECTRICAL MACHINES—I**

**(2015 PATTERN)**

**Time : Three Hours**

**Maximum Marks : 50**

**N.B. :—** (i) Attempt *all* questions.

(ii) Figures to the right indicate full marks.

1. (a) Draw equivalent circuit of transformer referred to primary side. Explain all the parameters involved in the equivalent circuit. [6]
- (b) With suitable diagram explain constructional details of welding transformer. [7]

*Or*

2. (a) Draw circuit diagram and phasor diagram of 3-phase star-star connected transformer. Explain it in brief. [6]
- (b) A transformer rated 150 kVA has full load copper loss of 2.25 kW and iron loss of 2.25 kW. It is loaded as follows :

Number of Hrs. in a day	Loading	Power Factor
3	100%	Unity
4	50%	Unity
17	0%	—

Determine all day efficiency.

[7]

P.T.O.

3. (a) Compare Lap winding with wave winding (Minimum *six* points of comparison expected). [6]
- (b) Why is starter needed for DC Motor ? State the types of starter used in DC motors. [6]

Or

4. (a) Derive torque equation of DC motor with usual notations. [6]
- (b) Explain flux control method for controlling speed of DC shunt motor. State *two* advantages of this method. [6]
5. (a) Draw and explain torque-slip characteristics of 3-phase induction motor. Clearly mark all critical points in the characteristics. [7]
- (b) Derive the condition for maximum starting torque for 3-phase induction motor with usual notations. [6]

Or

6. (a) Draw power flow diagram of 3-phase induction motor and explain each stage. [7]
- (b) Compare squirrel cage induction motor with slipring induction motor (Minimum *six* points expected). [6]

7. (a) Why is 3-phase induction motor called generalised transformer ? State any *three* points of similarities between transformer and 3-phase induction motor. [6]
- (b) With suitable diagram explain working of DOL starter. [6]

*Or*

8. (a) Draw circle diagram of 3-phase induction motor. State the steps involved in drawing circle diagram. [6]
- (b) Draw exact equivalent circuit of 3-phase induction motor and explain each parameter in it. [6]