

**DIPLOMA IN MECHANICAL ENGINEERING  
(DME)**

**Term-End Examination**

**June, 2019**

00652

**BEE-031 : ELECTRICAL TECHNOLOGY**

*Time : 2 hours*

*Maximum Marks : 70*

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*Note : Question no. 1 is compulsory. Attempt five questions in all. All questions carry equal marks. Use of scientific calculator is permitted.*

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1. State *True* or *False* for the following statements :  $7 \times 2 = 14$
- (a) For same physical size, three-phase AC generator's power output is 50% to 60% more than a single-phase generator.
  - (b) Superposition theorem can be applied in linear network only.
  - (c) Material of yoke in DC machines possess low permeability.
  - (d) Eddy current losses mainly depend on thickness of material.
  - (e) Efficiency of transformer is maximum when iron loss is 1.5 times of copper loss.
  - (f) Rotor emf frequency =  $S \times$  frequency of applied voltage to stator.
  - (g) Synchronous motor can operate for lagging power factor only.

2. (a) Explain the following : 7
- (i) Kirchhoff's Voltage Law (KVL)
  - (ii) Kirchhoff's Current Law (KCL)
- (b) Explain the advantages of three-phase system over single-phase system. 7
3. (a) Explain the need of starter in DC motor. 7
- (b) Derive an expression for generation of electromotive force (EMF) or voltage in DC generator. 7
4. (a) A single-phase 100/200 V, 1 kVA transformer has copper losses in high voltage side at 5 amp equal to 80 W and iron losses as 60 W. Find the efficiency of transformer at full load unity power factor and half load unity power factor. 10
- (b) Differentiate between core type and shell type transformer. 4
5. (a) Explain construction and working of three-phase induction motor. 10
- (b) Name the different methods of speed control of three-phase induction motor. 4

6. (a) Why is a synchronous motor not 'self-starting'? Explain. 7
- (b) Draw and explain V-curve of synchronous motor. 7
7. Write short notes on any *two* of the following :  $2 \times 7 = 14$
- (a) Norton's Theorem
- (b) Auto-Transformer
- (c) DC Compound Motor
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