

**B.Tech. - VIEP - ELECTRICAL ENGINEERING
(BTELVI)**

Term-End Examination

June, 2018

00313

**BIEE-016 : ELECTRO-MECHANICAL ENERGY
CONVERSION - III**

Time : 3 hours

Maximum Marks : 70

Note : Attempt any seven questions. Each question carries equal marks. Use of scientific calculator is allowed.

1. Write the voltage equations for Kron's primitive machine in matrix form. What observations are made from the impedance matrix of this machine ? 10

2. Explain how a rotating commutator winding can be represented by a pseudo-stationary coil on the moving element. Enumerate the properties possessed by this coil. 10

3. A separately excited dc generator running at $4500/\pi$ rpm has the following parameters :

Field resistance $r_f = 80 \Omega$

Field inductance $L_f = 40 \text{ H}$

Armature resistance $r_a = 0.1 \Omega$

Armature inductance $L_a = 0.3 \text{ mH}$

Motional inductance $M_d = 0.8$

Generated emf constant $K_g = M_d \omega_r = 120 \text{ volts/}$
field amp

The field is unexcited, and the armature is open.

Find the armature voltage as a function of time and sketch it, if a constant voltage of 160 V is suddenly impressed across the field terminals. 10

4. Obtain the transfer function model of a separately excited motor on on-load operation. 10
5. What are the various basic parameters of a synchronous machine as applied to a generalized model ? Explain each parameter with their significance. 10
6. For the generalized model of a synchronous machine, derive expression for armature to field mutual inductances and armature self-inductance. 10

7. Explain the method of speed control of induction motors using variable frequency technique. Also write the merits and demerits of change in frequency. 10
8. Discuss the constructional features and working principle of linear induction motor. 10
9. Write short notes on any *two* of the following : $2 \times 5 = 10$
- (a) AC Servomotor
 - (b) Stepper Motor
 - (c) Hysteresis Motor
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