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BIEE-016

B.Tech. – VIEP – ELECTRICAL ENGINEERING (BTELVI)

Term-End Examination

December, 2017

00262

BIEE-016 : ELECTRO-MECHANICAL ENERGY CONVERSION – III

Time : 3 hours *Maximum Marks : 70*

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

1. What is Kron's Primitive Machine, a type of Rotating electrical machine ? How are the various windings of a machine represented by a primitive machine ? *10*

2. What do you understand by the term 'Linear Transformation' as used in electrical machines ? Illustrate your answer with suitable examples. *10*

3. Derive the transfer functions of a separately excited DC generator for (a) no load operation, and (b) on load operation. *10*

4. (a) Why are d-axis parameters used for balanced 3-phase short-circuit analysis ? *5*

(b) Just after short circuit, the induced field current and increased armature current decay with the same time constant. Explain. *5*

5. Draw the equivalent circuit for a polyphase induction motor and state what is represented by the various parameters involved in this circuit. *10*

6. Give the constructional features, working and applications of single-phase reluctance motors. *10*

7. Starting from the impedance matrix of a 3-phase salient pole synchronous machine, derive the phasor voltage equation under balanced steady state operation. *10*

8. A 3-phase star-connected 50 Hz synchronous generator has direct-axis synchronous reactance of 0·65 pu and quadrature axis synchronous reactance of 0·5 pu. The generator delivers rated kVA at rated voltage. Draw the phasor diagram at full-load 0·8 lagging power factor and hence calculate the open-circuit voltage and voltage regulation. Resistance drop at full-load is 0·02 pu. *10*

9. Write short notes on any ***two*** of the following : *10*

(a) Schrage Motors

(b) Transient Analysis of 3-phase Induction Motors by using Generalised Theory

(c) Park's and Inverse Park's Transformations and their Physical Significance