[5462] - 621

M.E. (Electrical) (Power Systems)
POWER SYSTEM MODELING
(2017 Course) (Semester - I) (503203)

Time : 3 Hours]   *[Max. Marks :50*

Instructions to the candidates:

1) *Solve Total Three questions. Answer 1 question from Q1 and Q2, Q3 and Q4 and Q5 and Q6 each.*

2) *Assume suitable data, if necessary.*

3) *Write down all the assumptions made.*

4) *Given $F^{abc} = [P] F^{dq0}$, where Park's transformation*

$$[P] = \begin{bmatrix} k_d \cos\theta & k_q \sin\theta & k_o \\ k_d \cos\left(\theta - \dfrac{2\pi}{3}\right) & k_q \sin\left(\theta - \dfrac{2\pi}{3}\right) & k_o \\ k_d \cos\left(\theta + \dfrac{2\pi}{3}\right) & k_q \sin\left(\theta + \dfrac{2\pi}{3}\right) & k_o \end{bmatrix}$$

(where, $k_d = k_q = \sqrt{2/3}$ and $k_o = \sqrt{1/3}$)

Q1) Derive the mathematical model of hydraulic turbine and state assumptions involve in it clearly. **[18]**

OR

Q2) Explain need and types modelling used in power system. Derive the mathematical model of hydraulic turbine and state assumptions involve in it clearly. **[18]**

Q3) Write down a working of stationary diode excitation control scheme of alternator. Draw appropriate diagram. Discuss difference between static and rotating diode type excitation control scheme. **[16]**

OR

Q4) Discuss the significance of voltage regulator in power system. Explain with the help of suitable block diagram, the working of solid state voltage regulators. **[16]**

Q5) With the help of the model of synchronous machine, develop the model of an induction motor. Discuss about the assumptions and approximations involved in it. **[16]**

OR

Q6) What is the use of Park's transformation in power system modeling? State Clarke's transformation and Kron's transformation and write about their applications in power system. Also write down the relationship of these transformations with Park's transformation. **[16]**

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