

Total No. of Questions : 6]

SEAT No. :

P5364

[5562]-221

[Total No. of Pages : 2

**M.E. (Electrical) (Power Systems)
POWER SYSTEM MODELING
(2017 Pattern) (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 or Q4, and Q5 or 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.*

$$[P] = \begin{bmatrix} k_d \cos \theta & k_q \sin \theta & k_0 \\ k_d \cos \left(\theta - \frac{2\pi}{3} \right) & k_q \sin \left(\theta - \frac{2\pi}{3} \right) & k_0 \\ k_d \cos \left(\theta + \frac{2\pi}{3} \right) & k_q \sin \left(\theta + \frac{2\pi}{3} \right) & k_0 \end{bmatrix}$$

(where, $K_d = K_q = \sqrt{2/3}$ and $K_0 = \sqrt{1/3}$)

Q1) State and explain various types of transformers used in power system. Also develop a mathematical model of ideal transformer. Write down assumptions involved in it. **[18]**

OR

Q2) Explain need of excitation system in power system. Define voltage response ratio and its significance. Explain working of the excitation system with the help of functional block diagram. **[18]**

Q3) Write down with the help of appropriate diagrams working of d.c. generator pilot excitation control scheme of alternator. Also compare differences in simple dc generator exciter with pilot exciter scheme. **[16]**

OR

P.T.O.

Q4) With the help of equivalent circuit diagram, develop the mathematical model of self excited dc exciter. Also, draw the block diagram to represent it clearly.

[16]

Q5) What the significance of load modeling in power system? Write down in details the various types of static load modeling represented in power system. Discuss about the assumptions and approximations involved in it. **[16]**

OR

Q6) 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]**

x x x