 Reg. No: ……..

Name: …….……..

**M.TECH DEGREE EXAMINATION**

**Model Question Paper - II**

**First Semester**

**Branch: Electrical and Electronics Engineering**

**Specialization: 1. Power Electronics and Power Systems**
**2. Energy Systems**

**MEEPP 104 / MEEES 106-1 ADVANCED POWER SYSTEM STABILITY**

(2013 admission onwards)

Time: Three Hours Maximum: 100 Marks

All questions carry equal marks

I (a) Explain in detail the power system stability problems. (10 Marks)

(b) From the fundamentals develop the flux linkage equations of the synchronous machine and draw its equivalent circuits? (15 Marks)

**OR**

II (a) Draw and explain the model of a detailed excitation control system. What are the different IEEE models for use in transient and small signal stability studies? (13 Marks)

(b) Explain the two axis model for a cylindrical rotor machine? (12 Marks)

III (a) What is power angle diagram? Explain clearly the equal area criterion for studying the transient stability of a power system. (10 Marks)

(b) A 50Hz, 4-poloe turbo generator rated 20MVA, 13.2KV has an inertia constant of H=9.0KW-Sec/KVA. Determine the K.E. stored in the rotor at synchronous speed. Determine the acceleration if the input less the rotational losses is 25000HP and the for a electric power developed is 15000KW. If the acceleration computed for the generator is constant period of 15 cycles, determine the change in torque angle in that period and the rpm at the end of 15 cycles. Assume that the generator is synchronized with a large power system and has no accelerating torque before the 15 cycle period begins. (10 Marks)

(c) Write note on transient energy function approach. (5 Marks)

**OR**

IV (a) Explain the numerical methods used for the analysis of transient stability. (15 Marks)

(b) Explain the factors influencing transient stability. (10 Marks)

V (a) What are the causes of voltage instability? Explain the various system design and operating measures to prevent voltage collapse. (10 Marks)

(b) Discuss the various methods of improving small signal stability. (10 Marks)

(c) Write note on continuation power-flow analysis. (5 Marks)

**OR**

VI (a) Sketch the block diagram representation of the small signal performance of the system. Represent the dynamic characteristics of system in terms of K constants. Derive the expression for K constants. (20 Marks)

(b) Write notes on small signal stability on multi-machine system. (5 Marks)

VII (a) Explain in detail high speed fault clearing, dynamic breaking, reactor switching, independent pole operation of circuit breakers. How these methods achieve the transient stability objectives. (20 Marks)

(b) Write short note on fast valving technique for steam turbines. (5 Marks)

**OR**

VIII (a) Explain in detail small signal stability enhancement. (10 Marks)

(b) Explain in detail voltage stability enhancement. (10 Marks)

(c) Write note on high speed excitation systems. (5 Marks)