



**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)**

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QUESTION BANK (DESCRIPTIVE)

Subject with Code : MODELING AND ANALYSIS OF ELECTRICAL MACHINES(18EE2102)

Course & Branch: M.Tech – PE

Year & Sem: I M.Tech & I-Sem

Regulation: R18

UNIT –I

- 1 Derive the expressions for electromagnetic force in the case of a singly excited system. [10M]
- 2 Derive the electromagnetic torque equation for Singly Excited Rotating Actuator. [10M]
Explain the function of magnetic coupling field in an electromechanical energy
- 3 conversion device. [10M]
Derive the expressions for stored magnetic energy and electromagnetic torque in the
- 4 case of a doubly excited system. [10M]
- 5 Calculate the induced emf in the excitation coil for a linear actuator and sketch $L(x)$. [10M]
6. Derive the electromagnetic torque equation for Doubly Excited Rotating Actuator. [10M]
- 7 Derive the state equations for Doubly Excited Rotating Actuator [10M]
- 8 Derive the energy balance equation in an electromechanical energy conversion device [10M]
- 9 Derive the electromagnetic torque equation for Singly Excited Rotating Actuator. [10M]
Explain the function of magnetic coupling field in an electromechanical energy
- 10 conversion device. [10M]

UNIT –II

- Derive the expressions for stored magnetic energy and electromagnetic torque in the
- 1 case of a doubly excited system.
 - 2 Derive the expressions for mechanical work done in the case of a singly excited system [10M]
 - 3 Calculate the reluctance force acting on the plunger of a linear actuator. [10M]
 - 4 Explain the mmf space wave for concentrated coil in the rotating machines. [10M]
For a 2 pole 3 phase wye connected salient pole machine derive the expressions for
 - 5 per phase winding inductances. [10M]
For a 2-pole, 3-phase Y-connected symmetrical synchronous machine, derive torque
 6. equations in machine variables [10M]
Derive an expression for the air-gap MMF in a 2-pole, 3-phase, Y-connected salient
 - 7 pole synchronous machine [10M]
 - 8 Derive the torque equations in machine variables for a synchronous machine. [10M]
For a 2-pole, 3-phase Y-connected symmetrical synchronous machine, derive torque
 - 9 equations in machine variables [10M]
Derive an expression for the air-gap MMF in a 2-pole, 3-phase, Y-connected salient
 - 10 pole synchronous machine. [10M]

UNIT –III

- 1 Explain the transformation from three phase to two phase and vice versa in detail?
- 2 Explain the transformation from rotating axes to stationary axes and vice versa in detail? [10M]
- 3 Explain the physical concept of Park's transformation? [10M]
- 4 Explain the mathematical model of Induction machine? [10M]
- 5 Explain the steady state analysis of Induction machine? [10M]
- 6 Discuss about the dynamic simulation of induction machine [10M]
- 7 Explain the d-q model of induction machine in Stator reference Frame? [10M]
- 8 Explain the d-q model of induction machine in Rotor reference Frame? [10M]
Explain the d-q model of induction machine in Synchronously Rotating reference Frame? [10M]
- 9 [10M]
- 10 Explain the signal flow graph of the induction machine per unit model? [10M]

UNIT –IV

- 1 Write the Comparison between single phase and poly -phase induction motor? [10M]
- 2 Explain the Cross field theory of single-phase induction machine? [10M]
- 3 Explain the steady state analysis of single-phase induction machine using Cross field theory [10M]
- 4 Explain the steady state torque of single-phase induction machine? [10M]
- 5 Explain the steady state torque and steady state analysis of single-phase induction machine using Cross field theory? [10M]
- 6 Explain the phase Co-ordinate model of synchronous Machine? [10M]
- 7 For a 2-phase unsymmetrical induction machine, derive the voltage equation in machine variables [10M]
- 8 Explain the Steady state operation of synchronous Machine? [10M]
- 9 Explain the dynamic modelling of two phase asymmetrical induction machine [10M]
- 10 Write the importance of synchronous machine inductances? [10M]

UNIT –V

- 1 Explain the Operating principle of Switched Reluctance Motor? [10M]
- 2 Explain the Construction and functional Aspects of Switched Reluctance Motor? [10M]
- 3 Derive the Average torque and Energy Conversion Ratio of Switched Reluctance Motor? [10M]
- 4 Write the Mathematical model of Switched Reluctance Motor? [10M]
- 5 Explain the Operating principle of Permanent Magnet Brushless DC Motor? [10M]
- 6 Write the Mathematical model of Permanent Magnet Brushless DC Motor? [10M]
- 7 Explain the Permanent Magnet Brushless DC Motor Drive Scheme? [10M]
- 8 Explain the Operating principle and Mathematical model of Permanent Magnet Brushless DCMotor? [10M]
- 9 Explain the commutation windings and SRM modeling with suitable circuit diagrams? [10M]
- 10 Explain the importance of flux current position curve fitting? [10M]

