



Subject Code: R16MEE101

M.Tech - I Semester Regular and Supplementary Examinations, Dec – 2018.

ELECTRICAL MACHINE MODELLING AND ANALYSIS

(Common to PEED and PID)

Time: 3 hours

Max Marks: 60

Answer any FIVE questions.  
All questions carry EQUAL marks

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1. (a) Draw the basic two pole machine diagram and primitive machine diagram for the following machines  
(i) DC Compound machine (ii) Polyphase Induction machine [2+2+2]  
(iii) Synchronous machine with amortisseurs  
(b) Write the voltage equations for Kron's primitive machine in matrix form. What observations are made from the impedance matrix of the machine? [6]
2. (a) Obtain the mathematical model of DC compound motor in state variable form. [6]  
(b) Derive the transfer function of the separately excited DC motor. [6]
3. (a) Derive the mathematical model of d.c series motor and obtain its steady state torque analysis [6]  
(b) Explain Phase transformation and Active transformation used in a.c machines. [6]
4. (a) What do you understand by the term 'Linear Transformation' as used in electrical machines? [6]  
(b) Obtain identical transformations for currents and voltage from a rotating balanced 3-phase (a,b,c) winding to a rotating balanced 2-phase( $\alpha,\beta$ ) winding. Show that power invariance is maintained under this transformation. [6]
5. Obtain the expressions for a 3-phase induction motor (Voltage and current) in state variable form in (i) stator reference frame and (ii) synchronously rotating frame [6+6]
6. (a) Explain the steady state analysis of a single phase induction motor. [6]  
(b) Explain the comparison between single phase and poly phase induction motors [6]
7. (a) Derive the voltage equations in rotor reference frame variables of three phase synchronous machines. [6]  
(b) Obtain the mathematical Model of a PM Synchronous Motor [6]
8. (a) Obtain the mathematical Model of a Switched Reluctance Motor [6]  
(b) Explain the Operating Principle of Permanent Magnet Brushless DC Motor [6]

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**Subject Code: R16MPI102**

**M.Tech - I Semester Regular and Supplementary Examinations, Dec -2018.**

**DISTRIBUTED GENERATION AND ITS IMPACTS  
(P&ID)**

**Time: 3 hours**

**Max Marks: 60**

**Answer any FIVE questions.  
All questions carry EQUAL marks**

1. (a) Explain about Demand side Management Options  
(b) Discuss different types of wind turbines used to extract wind energy
2. (a) Explain different types of solar cells and their characteristics  
(b) Write a short note on photovoltaic power generation and also discuss applications of PV system
3. (a) Discuss about constructional features and operating characteristics of the fuel cell  
(b) Describe a solid electrolyte fuel cell with a suitable diagram.
4. Describe how the following energy storage schemes work (i) compressed air (ii) Magnetic energy storage scheme
5. (a) Explain the advantages and disadvantages of fuel cells  
(b) Explain about aspects of Hydrogen as Fuel.
6. Describe the main features of various types of renewable energy resources.
7. Explain interconnection examples for alternative energy sources
8. Explain the impact of distributed generation on voltage profile

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Subject Code: R16MEE103

M.Tech - I Semester Regular & Supplementary Examinations, Dec - 2018

ELECTRIC DRIVES - I  
(Common to PEED and PID)

Time: 3 hours

Max Marks: 60

Answer any FIVE questions.  
All questions carry EQUAL marks

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1. (a) What is a drive? Depict the block diagram of an electric drive and explain its components.  
(b) Detail about four quadrant operation of dual convertor drive. (4+8)
2. Brief the four quadrant operation of a DC drive using three phase dual convertor and its modes of operation. (12)
3. Design a speed controlled DC motor drive maintaining the field flux constant. The motor parameters and ratings are as follows:  
220 V, 8.3 A, 1470 rpm,  $R_a=4 \Omega$ ,  $J=0.0607 \text{ kg-m}^2$ ,  $L_a = 0.072 \text{ H}$ ,  $B_t = 0.0869 \text{ N-m/ rad/sec.}$ ,  
 $K_b = 1.26 \text{ V/rad/sec.}$   
The converter is supplied from 230 V, 3 phase AC at 60 Hz. The converter is linear and its maximum control input voltage is  $\pm 10 \text{ V}$ . The tachogenerator has the transfer function  
$$G_{\omega}(s) = \frac{0.065}{(1+0.002s)}$$
. The speed reference voltage has a maximum of 10 V. The maximum current permitted in the motor is 20A. (12)
4. (a) Describe about Speed and Current controller. (4+4+4)  
(b) Depict the flow chart for the simulation of a single quadrant phase controlled DC motor drive.  
(c) Sixth Harmonic torque analysis in Discontinuous current conduction mode.
5. (a) Obtain the steady state performance of the Chopper controlled DC motor drive.  
(b) Write about the existence of Pulsating torque in Chopper fed drive. (8+4)
6. Enumerate the operation of four quadrant Chopper drive with relevant sketch and characteristics. (12)
7. Write a note on the following (4+4+4)  
(a) PWM Current controllers  
(b) Hysteresis Current controllers  
(c) Modelling of controllers
8. (a) Detail about creation of dynamic equations, building of a model and testing of a model under simulation.  
(b) Narrate the features of closed loop speed and position control of DC motor. (6+6)

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Subject Code: R16MEE104

M.Tech - I Semester Regular and Supplementary Examinations, Dec – 2018.

FLEXIBLE AC TRANSMISSION SYSTEMS

(Common to PEED and PID)

Time: 3 hours

Max Marks: 60

Answer any FIVE questions.  
All questions carry EQUAL marks

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1. (a) Explain how power flow in an AC parallel system can be controlled with the help of FACTS devices.  
(b) Explain the factors which are affecting the loading capacity of transmission systems.
2. (a) With the help of circuit diagram and waveforms explain the principle of operation of single phase full wave voltage sourced bridge converter.  
(b) Explain about Pulse width modulation converter.
3. (a) Prove that in a two bus system, an ideal mid point shunt compensation doubles the maximum transmittable power.  
(b) Explain the effect of shunt compensation at the end of a radial line on voltage stability.
4. (a) Describe the operation of thyristor switched capacitor(TSC) with necessary diagrams.  
(b) Explain about hybrid var generators
5. (a) How to improve the transient stability by using static series compensators.  
(b) Explain how series compensation improves steady state power limit.
6. (a) Describe the operation of thyristor switched series capacitor with necessary diagrams.  
(b) Describe the operation of thyristor controllable series capacitor with necessary diagrams.
7. Explain the Steady state model of static voltage regulator.
8. (a) With the help of a block diagram explain the basic UPFC scheme. Discuss on the functional control modes of UPFC.  
(b) Explain about interline power flow controller

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Subject Code: R16MEE105

M.Tech - I Semester Regular & Supplementary Examinations, Dec/- 18 Jan - 19

POWER SEMICONDUCTOR DEVICES AND PROTECTION

(Common to PEED and PID)

Time: 3 hours

Max Marks: 60

Answer any FIVE questions.

All questions carry EQUAL marks

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1. (a) Explain in detail about the characteristics of an ideal switch.  
(b) Give the classification of power semi conducting switching devices. [7+5]
2. (a) Explain about fast recovery diodes.  
(b) Explain about Schottky diodes. [6+6]
3. (a) Explain in detail about three regions of operation of BJT.  
(b) What are the switching limits of BJT? Explain. [8+4]
4. (a) What are the differences between BJT and MOSFET?  
(b) Explain ON/ OFF transition loss of MOSFET. [6+6]
5. (a) Give the detailed construction of IGBT.  
(b) Draw and explain i-v characteristics of IGBT. [6+6]
6. (a) Explain in detail about design of snubber circuit for power devices.  
(b) Write short notes on device protection against over voltages and currents. [6+6]
7. (a) Explain about sizing of heat sink.  
(b) Explain in detail about electrical equivalent circuit of thermal model. [6+6]
8. (a) Explain in detail about hysteresis loss in magnetic cores.  
(b) Explain the design of high frequency inductors. [4+8]

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Subject Code: R16MEE106

M.Tech - I Semester Regular and Supplementary Examinations, Dec – 2018.

SPECIAL MACHINES AND CONTROL

(Common to PEED and PID)

Time: 3 hours

Max Marks: 60

Answer any FIVE questions.

All questions carry EQUAL marks

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1. Brief about the operation of
  - a) Permanent Magnet stepping motors
  - b) Variable reluctance stepping motors
  - c) Hybrid stepping motors(4+4+4)
  
2. (a) Detail the static and dynamic characterises of stepping motors. (6+6)  
(b) Write about micro stepping.
  
3. (a) Explain the closed loop control of SRM using sensor less operation. (6+6)  
(b) Discuss about Hard and Soft switching converters.
  
4. (a) Derive the EMF and torque equations of BLDC motor. (6+6)  
(b) Mention the features of circle diagram and its uses.
  
5. (a) Enumerate the performance of BLPM with phasor diagram. (6+6)  
(b) Write a note on Vector control of BLDC motor.
  
6. Elaborate the features of following
  - (a) Servo motors
  - (b) AC tachometers.(6+6)
  
7. Discuss the following in PMSM
  - (a) Armature reaction MMF
  - (b) Synchronous reactance(6+6)
  
8. (a) Explain about Transverse edge effect in double sided limb and in single sided limb. (8+4)  
(b) List the merits and demerits of Linear Motors.

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