

EE0202-ELECTRICAL MACHINES II

DETAILED SESSION PLAN

UNIT-I:-THREEPHASEINDUCTIONMOTOR

Construction and principle of operation of three phase induction motor – Equivalent circuit – Torque & Power equations – Slip – Torque characteristics – No load & blocked rotor tests – Separation of core loss – circle diagram.

Session No.	Topics to be covered	Text book	Chap.no & Page No.	Testing Methods	Instructional Objective	Program Outcome
1	Introduction	Book1: Theraja.B.L., “ <i>Electrical Technology Vol.II AC/DC Machines</i> ” Book2: K .Murugesh Kumar, “ <i>Induction and Synchronous Machines</i> ”, Vikas Publication Pvt. Ltd., 2003	Book2- 34 & 1244	Cycle test 1	Ability to understand the principle of operation, construction and characteristics of three phase induction motor and its application.	a).An ability to apply knowledge of mathematics, science, and engineering. b) An ability to design and conduct experiments, as well as to analyze and interpret results. e).An ability to identify, formulate, and solve engineering problems
2	Construction and principle of operation of three phase induction motor		Book2- 34 & 1245	Oral discussion		
3	Equivalent circuit		Book2- 34 & 1302	Cycle test 1		
4	Torque & Power equations		Book 2 -34 & 1257,1282	Surprise test		
5	Slip – Torque characteristics		Book 2- 34 & 1264	Cycle test 1		
6	No load & blocked rotor tests – Separation of core loss – circle diagram		Book 2-35 & 1314	Cycle test 2		

STARTING AND SPEED CONTROL OF INDUCTION MACHINES

Starting methods of three phase induction motor – Cogging & Crawling – Speed control – Voltage control – Rotor resistance control – Pole changing – Frequency control – Slip – energy recovery scheme – Double cage rotor – Induction generator – Synchronous induction motor.

Session No.	Topics to be covered	Text book	Chapter. no & Page No.	Testing Methods	Instructional Objective	Program Outcome
7	Starting methods of three phase induction motor	Book1: K.Murugesh Kumar, “ <i>Induction and Synchronous Machines</i> ”, Vikas Publication Pvt. Ltd., 2003	35 & 1329	Cycle test 2	Ability to understand the principle of operation, construction and characteristics of three phase induction motor and its application.	a).An ability to apply knowledge of mathematics, science, and engineering. b). An ability to design and conduct experiments, as well as to analyze and interpret results. e).An ability to identify, formulate, and solve engineering problems
8	Cogging & Crawling		35 & 1342	Cycle test 2		
9	Speed control – Voltage control – Rotor resistance control – Pole changing – Frequency control		35 & 1349	Oral viva test		
10	Slip – energy recovery scheme.		35 & 1355	Cycle test 2		
11	Double cage rotor		Book2: Theraja.B.L., “ <i>Electrical Technology Vol.II</i> ”	35 & 1344		

12	Induction generator	AC/DC Machines	34 & 1275	Oral test		
13	Synchronous induction motor			Cycle test 2		

SINGLE PHASE MOTORS

Single phase induction motors – Double revolving field theory – Torque – Speed characteristics – Equivalent circuit – No load and Blocked rotor test - Performance analysis – Starting methods of Single phase motors – Special motors: shaded pole motor, reluctance motor, repulsion motor.

Session No.	Topics to be covered	Text book	Chap.no & Page No.	Testing Methods	Instructional Objective	Program Outcome
14	Single phase induction motors – Double revolving field theory	Book1: K.Murugesh Kumar, “ <i>Induction and Synchronous Machines</i> ”, Vikas Publication Pvt. Ltd., 2003 Book2: Theraja.B.L., “ <i>Electrical Technology Vol.II AC/DC Machines</i> ”	Book2 -36 &1368	Cycle test2	Ability to understand the construction and characteristics of single phase induction motor and its applications. Understand the concepts of equivalent circuit	a)An ability to apply knowledge of mathematics, science, and engineering. b) An ability to design and conduct experiments, as well as to analyze and interpret results.
15	Torque – Speed characteristics		Book2- 36 &1370	Cycle test2		
16	Equivalent circuit		Book2- 36 &1373,74	Cycle test2		
17	No load and Blocked rotor test - Performance analysis			Cycle test2		
18	Starting methods of Single phase motors		Book1- 8 &192	Cycle test2, viva		
19	Special motors: shaded pole motor, reluctance motor, repulsion motor.		Book2- 36 &1383-1396	Seminar		

SYNCHRONOUS GENERATORS

Types and construction features of alternators – e.m.f equation armature reaction – Synchronous reactance – determination of voltage regulation using e.m.f, m.m.f, Potier reactance and ASA methods – Synchronizing to infinite bus bars – parallel operation of synchronous generators – Salient pole synchronous machine – two reaction theory – slip test.

Session No.	Topics to be covered	Text book	Chap.no & Page No.	Testing Methods	Instructional Objective	Program Outcome
30	Types and construction features of alternators	Book1: K.Murugesh Kumar, “ <i>Induction and Synchronous Machines</i> ”, Vikas Publication Pvt. Ltd., 2003 Book2: Theraja.B.L., “ <i>Electrical Technology Vol.II AC/DC Machines</i> ”	Book2-37, 1402-1405	Model exam	Describe the methods to analyze the construction and performance of synchronous machines and its applications	a).An ability to apply knowledge of mathematics, science, and engineering. b). An ability to design and conduct experiments, as well as to analyze and interpret results. e).An ability to identify, formulate, and solve engineering problems
31	e.m.f equation armature reaction, Synchronous reactance		Book1-9 & 224 Book1-37& 1423	Model exam		
32	of voltage regulation using e.m.f, m.m.f, Potier reactance and ASA methods.		Book2- 37 & 1427-1445	Model exam		
33	Synchronizing to infinite bus bars – parallel operation of synchronous generators		Book1-12 &300	Model exam		
34	Salient pole synchronous machine – two reaction theory – slip test.		Book1-17 & 413-415	Assignment		

Session No.	Topics to be covered	Text book	Chap.no & Page No.	Testing Methods	Instructional Objective	Program Outcome
SYNCHRONOUS MOTOR						
Constructional features and principle of operation of synchronous motor – torque and power relations – V curves and inverted V curves – Hunting and suppression methods – Short circuit transient – Starting methods – Synchronous condenser.						
35	Constructional features and principle of operation of synchronous motor	Book1: K.Murugesh Kumar, “ <i>Induction and Synchronous Machines</i> ”, Vikas Publication Pvt. Ltd., 2003 Book2: Theraja.B.L., “ <i>Electrical Technology Vol.II AC/DC Machines</i> ”	Book1 – 14, 357,58	Model exam, oral test	Describe the methods to analyze the construction and performance of synchronous machines and its applications	a).An ability to apply knowledge of mathematics, science, and engineering. b). An ability to design and conduct experiments, as well as to analyze and interpret results. e).An ability to identify, formulate, and solve engineering problems
36	torque and power relations		Book2- 38, & 1502	Model exam		
37	V curves and inverted V curves		Book1- 14 & 381-383	Model exam		
38	Hunting and suppression methods – Short circuit transient		Book1- 15 &393,394	Model exam		
39	Starting methods, Synchronous condenser		Book1 -14 &358-61	Model exam		