

Topics As per JNTU	Modules / Sub Modules /Topics to be covered	Lecture No.	Text Book/ Reference books	Remarks
Overview	This course is an extension of Power electronics subject.	L1	T1: CH1.1(1) T2: CH12.1(794) R1: CH12.1(794) R4:CH1.1 (1)	GATE/IES
Applications & Extensions	This subject may find many applications in various allied disciplines such as Electrical based Industrial applications.	L2		
Necessary Background	Power Electronics	L3		
UNIT – I				
Single converter control of D.C. separately excited	Single converter control of D.C. separately excited (i)Semi converter control,	L4	T1: CH 5.1.2() T2: CH 12.5() R1: CH12.5(805)	GATE/IES
i)Semi converter control, speed - torque characteristics, equation for speed	- torque characteristics, equation for speed	L5	T2: CH 12.5() T1: CH 5.1.2() R1: CH12.5(805) R4: CH3.3(39)	GATE/IES
(ii) Fully control converter, ,equation for speed	(ii) Fully control converter,	L6	T2: CH 12.5() T1: CH 5.1.2() R1: CH12.3.3(469) R4: CH3.3(39)	GATE/IES
speed- torque characteristics	speed- torque characteristics ,equation for speed	L7	T2: CH 12.5() T1: CH 5.1.2() R1: CH12.3.3(469) R4: CH3.3(39)	GATE/IES
Problems related to Single converter control of D.C. separately excited Semi converter control,	converter control of D.C. separately excited Fully control converter, Problems	L8	T2: CH 12.5() T1: CH 5.1.2() R1: CH12.3.3(469)	GATE/IES

1 phase converter control of D.C. series motor using (i) 1phase semi converter control, speed torque characteristic, expressions for speed	1 phase converter control of D.C. series motor using (i), 1phase semi converter control, speed torque characteristic	L9	T1: CH 5.1.2() T2: CH 12.6() R1: CH12.7(818) R4: CH3.4(62)	GATE/IES
(ii) 1 phase fully controller converter control torque speed characteristics, expression for speed	1phase full converter control, speed torque characteristic	L10	T1: CH 5.1.2() T2: CH 12.6() R1: CH12.3.4(473)	GATE/IES
Problems	Numerical problems	L11	T1: CH 5.1.2() T2: CH 12.6() R4: CH3.4(62)	GATE/IES
Problems	Numerical problems		T1: CH 5.1.2() T2: CH 12.6() R4: CH3.4(62)	GATE/IES
UNIT II				
3phase converter control of D.C. separately excited (ii) Semi converter control, speed- torque characteristics ,equation for speed	3phase converter control of D.C. separately excited (iii) Semi converter control, speed- torque characteristics ,equation for speed	L12	T1: CH 5.12, CH 5.13(111) T2: CH 12.9(839) R1: CH12.4.3(474)	GATE/IES
(ii) 3phase converter control of D.C. separately excited Fully control converter, speed torque characteristics, equation for speed	(ii) 3phase converter control of D.C. separately excited Fully control onverter, speed torque characteristics, equation for speed	L13	T1: CH 5.12, CH 5.13(111) T2: CH 12.9(839) R1: CH12.4.4(479)	GATE/IES
Problems on 3phase converter control of D.C. separately excited Semi converter motors (i)	Problems on 3phase converter control of D.C. separately excited motors	L14	T1: CH 5.12, CH 5.13(111) T2: CH 12.9(839) R1: CH12.4.3(474)	GATE/IES
Problems on 3phase converter control of D.C. separately excited fully converter motors (i)	Problems on 3phase converter control of D.C. separately excited motors	L15	T1: CH 5.13(113) T2: CH 12.9(842) R1: CH12.4.4(479)	GATE/IES
3 phase converter control of D.C. series	3 phase converter control of D.C.	L16	T1: CH 5.13(113) T2: CH 12.9(842)	GATE/IES

motor using (i) 3phase semi converter control, speed torque characteristic ,expressions for speed	series motor using (i) 3phase semi converter control, speed torque characteristic ,expressions for speed		R1: CH12.3.4(473)	
(ii) 3 phase fully controller converter control torque speed characteristics ,expression for speed	(ii) 3 phase fully controller converter control torque speed characteristics ,expression for speed	L17	T1: CH 5.13(113) T2: CH 12.9(842) R1: CH12.4.3(479)	GATE/IES
Problems	Problems	L18	T1: CH 5.12, CH 5.13(111) T2: CH 12.9(839) R1: CH12.4.3(474)	GATE/IES
UNIT III				
Introduction to four quadrant operation	How a D.C machine operation changes with reversal of either output voltage current or both	L18	T1: CH 5.3(68) R1: CH 12.5(495) R4:5.1(90)	GATE/IES
<u>Electric braking</u> Dynamic	How to halt a D.C motor effectively and efficiently	L19	T1: CH 5.3(68) T2: CH 12.3(798) R1: CH 12.5.2(492) R4:5.1(92)	GATE/IES
plugging	How to halt a D.C motor effectively and efficiently	L20	T1: CH 5.3(68) T2: CH 12.3(798) R1: CH 12.5.2(492) R4:CH6.1(108)	GATE/IES
regenerator	How to halt a D.C motor effectively and efficiently	L21	T1: CH 5.3(68) T2: CH 12.3(798) R1: CH 12.5.2(492) R4:CH6.1(108)	GATE/IES
Problems on braking	Problems on braking	L22	T1: CH 5.3(68) T2: CH 12.3(798) R1: CH 12.5.2(492) R4:5.1(92)	GATE/IES
Problems on plugging	Problems on plugging	L23	T1: CH 5.3(68) T2: CH 12.3(798) R1: CH 12.5.2(492) R4:CH6.1(108)	GATE/IES
Four quadrant operation of D.C motor by dual converter (i)	How to control the firing angle of conv-1, conv-2 of	L24	T1: CH 5.14.2(115) R1: CH 12.5.4(495)	GATE/IES

	dual converter in N.C.C modes to obtain 4 quadrant operator (i)			
Four quadrant operation of D.C motor by dual converter (ii)	How to control the firing angle of conv-1, conv-2 of dual converter in N.C.C modes to obtain 4 quadrant operator (ii)	L25	T1: CH 5.14.2(115) R1: CH 12.5.4(495)	GATE/IES
Closed loop control of D.C. motors	Speed and torque control of d.c. motor by using outer speed control loop inner armature control loop	L26	T1: CH 3.3(35) T2: CH 12.11(850)	GATE/IES
Problems			T1: CH 3.3(35) T2: CH 12.11(850)	GATE/IES
UNIT-IV				
Single quadrant operation of DC separately excited motors employing choppers in continuous conduction mode	Current limit control of choppers, calculation of limiting current values, torque speed relationships, characteristics	L27	T1: CH 5.18(121) T2: CH12.10.2(845) R1: CH 12.5.1(487) R4:CH8.1.2(169)	GATE/IES
Two quadrant operation of DC separately excited motors	Introduction to two quadrant operation	L28	T1: CH 5.19(121) T2: CH12.10.2(845) R1: CH 12.5.3(492)	GATE/IES
Two quadrant operation of DC separately excited motors employing choppers in continuous conduction mode	Current limit control of choppers, calculation of limiting current values, torque speed relationships, characteristics	L29	T1: CH 5.19(121) T2: CH12.10.2(845) R1: CH 12.5.3(492)	GATE/IES
Four quadrant operation of DC separately excited motors	Introduction to Four quadrant operation	L30	T1: CH 5.20() T2: CH12.10.2(845) R1: CH 12.5.4(495)	GATE/IES
Four quadrant operation of DC separately excited motors employing choppers in continuous conduction mode	Current limit control of choppers, calculation of limiting current values, torque speed relationships,	L31	T1: CH 5.20() T2: CH12.10.2(845) R1: CH 12.5.4(495)	GATE/IES
Problems	Problems on choppers	L32	T1: CH 5.19(121) T2: CH12.10.2(845)	GATE/IES

			R1: CH 12.5.3(492)	
Closed loop operation	Closed loop operation	L33	T1: CH 5.22(133) T2: CH 12.11.2(850)	GATE/IES
UNIT-V				
Variable voltage characteristic of induction motor	How the torque – speed characteristic of Induction motor change with voltage(i)	L34	T1: CH 6.1(140) T2: CH13.1, (884)	GATE/IES
Variable voltage characteristic of induction motor	How the torque – speed characteristic of Induction motor change with voltage(ii)	L35	T1: CH 6.1(183) T2: CH13.1 - 13.3(886)	GATE/IES
Control of induction motor by A.C. voltage controller	How to control speed of induction motor using A.C. voltage controller its advantages and drawbacks(i)	L36	T1: CH 6.11(183) T2: CH 13.5.1(894) R1:CH12.8.1(500)	GATE/IES
Control of induction motor by A.C. voltage controller	How to control speed of induction motor using A.C. voltage controller its advantages and drawbacks(ii)	L37	T1: CH 6.11(185) T2: CH 13.5.1(896) R1:CH12.8.1(500)	GATE/IES
Its speed- torque characteristic	Suitability of this drive for different application(iii)	L38	T1: CH 13.5.1(897) T2: CH 6.11(186) R1:CH12.8.1(502)	GATE/IES
Problems	Problems on induction motor	L39	T1: CH 13.5.1(897) T2: CH 6.11(186)	GATE/IES
UNIT- VI				
Variable frequency characteristic	How the torque – speed characteristics of Induction motor change with frequency	L40	T1: CH 6.12(187) T2 : CH 13.6(898) R1:CH12.8.2(502)	GATE/IES
Variable frequency control of Induction motor by VSI employing PWM control Comparison of VSI based Induction motor drive	To observe how speeds above and below rated speed can be obtained Advantages and disadvantages of VSI,	L41	T1: CH 6.13, CH 6.17(191) T2: CH 13.6.1, CH 13.6.2(899)	GATE/IES
Variable frequency control of Induction motor by CSI employing PWM control	To observe how speeds above and below rated speed can be obtained	L42	T1: CH 6.13, CH 6.17(191) T2: CH 13.6.1, CH 13.6.2(899)	GATE/IES

Comparison of CSI based Induction motor drum	Advantages and disadvantages of CSI.		R1:12.8.3(505)	
Tutorial		L43		
variable frequency control of Induction motor using cycloconverter	limitation of it due to complicated in design of firing ckt	L44	T1: CH 6.14(197) T2: CH 13.6.3(900)	GATE/IES
Numerical problems	Numerical problems	L45	T1: CH 6.12(187) T2 : CH 13.6(898) R1:CH12.8.2(502)	GATE/IES
UNIT-VII				
Static rotor resistance control	How to control a slip ring Induction motor using external rotor resistance and its drawbacks(i)	L46	T1: CH 6.20(214) T2: CH 13.7(924) R1:CH12.8.5(516) R4: CH4.1(73)	GATE/IES
Static rotor resistance control	How to control a slip ring Induction motor using external rotor resistance and its drawbacks(ii)	L47	T1: CH 6.20(214) T2: CH 13.7(924) R1:CH12.8.5(516) R4: CH4.1(73)	GATE/IES
Slip power recovery static scherbibus drive	How to feed back the power used for control so that efficient speed control is possible(i)	L48	T1: CH 6.21.1(219) T2: CH 13.8.1(931) R1:CH12.8.5(528)	GATE/IES
Slip power recovery static scherbibus drive	How to feed back the power used for control so that efficient speed control is possible(ii)	L49	T1: CH 6.21.1(219) T2: CH 13.8.1(931) R1:CH12.8.5(528)	GATE/IES
Slip power recovery static kramers drive	How to feed back the power used for control so that efficient speed control is possible(ii)	L50	T1: CH 6.21.2(221) T2: CH 13.8.3(935) R1:CH12.8.6.1(521)	GATE/IES
Slip power recovery static kramers drive	How to feed back the power used for control so that efficient speed control is possible(ii)	L51	T1: CH 6.21.2(221) T2: CH 13.8.3(935) R1:CH12.8.6.1(521)	GATE/IES
Problems		L52	T1: CH 6.21.1(219) T2: CH 13.8.1(931)	GATE/IES

			R1:CH12.8.5(528)	
UNIT-VIII				
Separate and self control of synchronous motor	Speed control synchronous motor	L53	T1: CH 7.5, CH 7.6, CH 7.7(260) T2 : CH 13.9.6(942)	GATE/IES
Operation of self controller synchronous motors by VSI (i)	To obtain torque speed characteristics of I.M motor employing VSI	L54	T1: CH 7.9.1(269) T2: CH 13.9.6(945) R4: CH4.2(82)	GATE/IES
Operation of self controller synchronous motors by VSI (ii)	To obtain torque speed characteristics of I.M motor employing VSI	L55	T1: CH 7.9.1(269) T2: CH 13.9.6(945) R4: CH4.2(82)	GATE/IES
Operation of self controller synchronous motors by CSI	To obtain torque speed characteristics of I.M motor employing CSI drives	L56	T1: CH 7.9.1(269) T2: CH 13.9.6(945) R4: CH4.2(82)	GATE/IES
Operation of self controller synchronous motors by CSI	To obtain torque speed characteristics of I.M motor employing CSI drives	L57	T1: CH 7.9.1(269) T2: CH 13.9.6(945) R4: CH4.2(82)	GATE/IES
Operation for self control synchronous motor by cyclociverer	Significance of self controller drives over other drives it Advantages and future scope	L58	T1: CH 7.3, CH 7.4, CH 7.5(256) T2: CH 13. CH 10.2(958)	GATE/IES
Load communicated CSI fed synchronous motor	Self control drive fed from CSI, commutated using load	L59	T1: CH 7.5(260) R1: CH 12.5.4(495)	GATE/IES
Application and advantages of each method	Advantages and relative area of application of each method	L60	T1:CH 7.10(206) R4:CH 5.4(120)	GATE/IES
Closed loops control operation of synchronous motor drive	Realization of outer speed control and inner current control loops	L61	R1: CH 12.5.4(495) T2:CH13.10.2(952)	GATE/IES
Numerical problems	Numerical problems	L62	T1: CH 7.3, CH 7.4, CH 7.5(256) T2: CH 13. CH 10.2(958)	GATE/IES

