Ref No.Ex/PG/EE /T/113A/14/2017

MASTR OF ELECTRICAL ENGINEERING 1ST SEMESTER EXAM.2017

SUBJECT : STATIC CONVERTERS IN ELECTRIC DRIVES

Time: Three Hours

Full Marks: 100

Question No.		Marks
	Answer any FIVE questions.	
1.(i)	Sketch the structure of an IGBT and explain the working principle of it. What are the advantages of IGBT over BJT?	10
(ii)	Explain why negative base drive is used in BJT and how is it implemented?	5
(iii)	State the characteristics of a power MOSFET. Explain why MOSFET is not suitable for high power converter circuit.	5
2.(a)	Explain the following converter system with necessary block schematics in case of D.C. Drive when the input is A.C.and state it's advantages and disadvantages:	5+5
i)	Diode rectifier +Chopper	
ii)	PWM rectifier +Chopper	
(b)	Explain the following converter system with necessary block schematics in case of A.C. Drive when the input is A.C. and state it's advantages and disadvantages:	5+5
(i)	Diode rectifier+ PWM inverter	
(ii)	PWM rectifier+ PWM inverter	
3.(i)	What is slip power in induction motor? Explain how this slip power can be utilized by using static Scherbius system?	12
(ii)	Explain how NOLA and slip controller save the energy during the starting of 3-phase induction motor?	8
4.	Explain what are the effects of harmonics introduced by non-linear loads into the utility supply system.	20
5.i)	Explain how the tuned filter reduces the harmonics at the consumer ends. Also show that the tuned filter improves the system power factor.	12

ii)	Explain why Interphase Transformer (IPT) is used at the output of multipulse diode rectifier when outputs are connected in parallel?	**8**
6.	Draw the control and power circuit and explain the working principle of the following protection schemes in drive systems (any four):	**4x5**
i)	Thermal Protection.	
ii)	Input under voltage Protection.	
iii)	Over current Protection.	
iv)	Protection against single phasing.	
v)	Protection of individual power electronics device.	