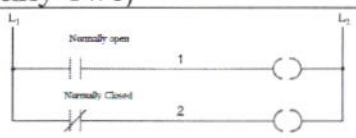
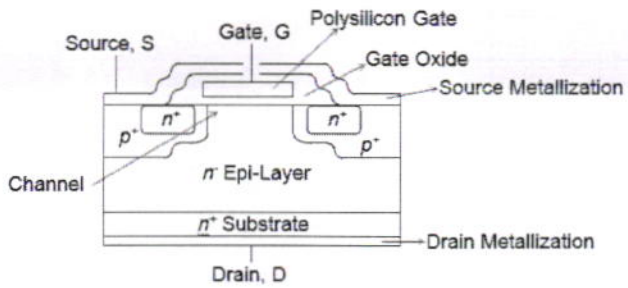
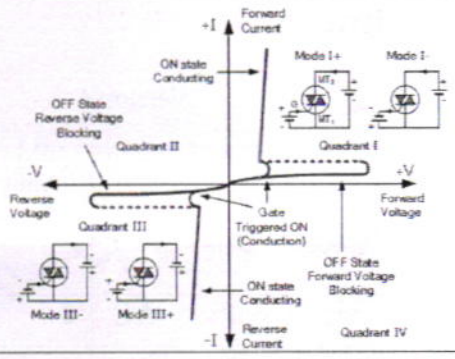
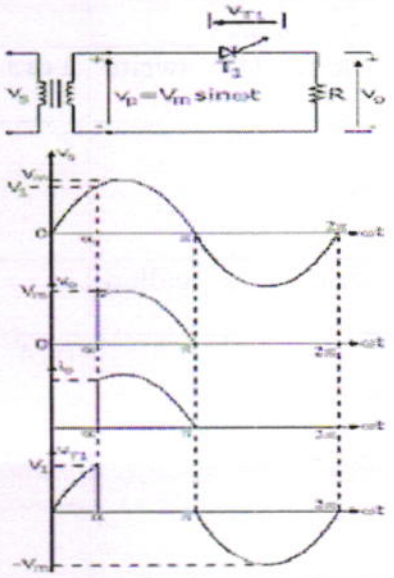
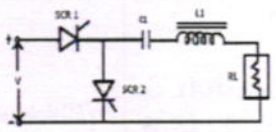
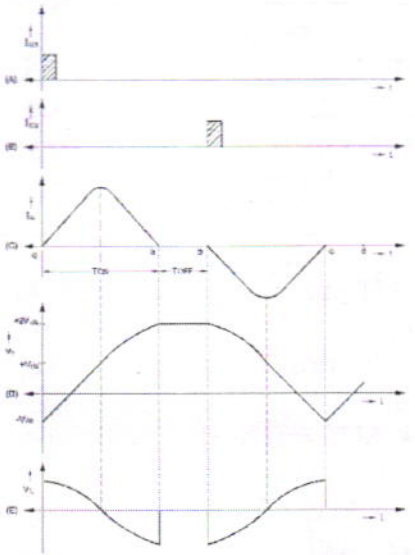
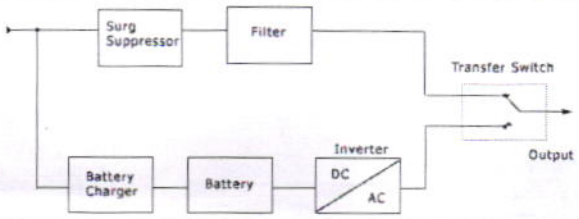
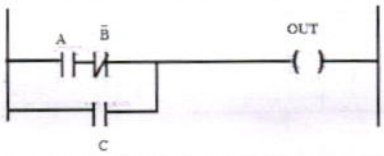
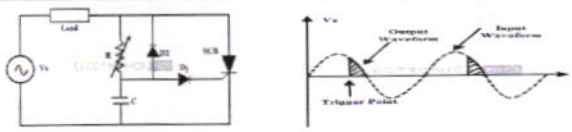
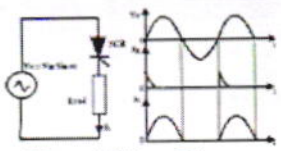
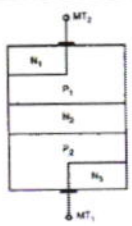
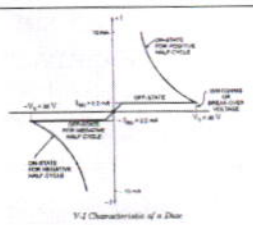
D 7

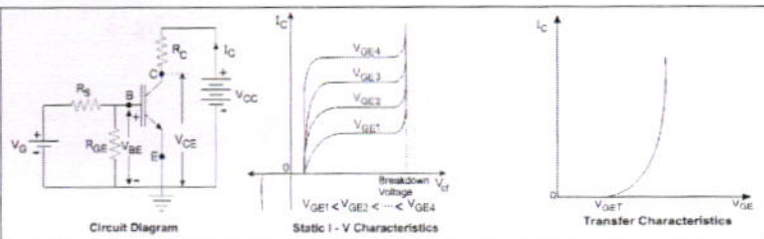
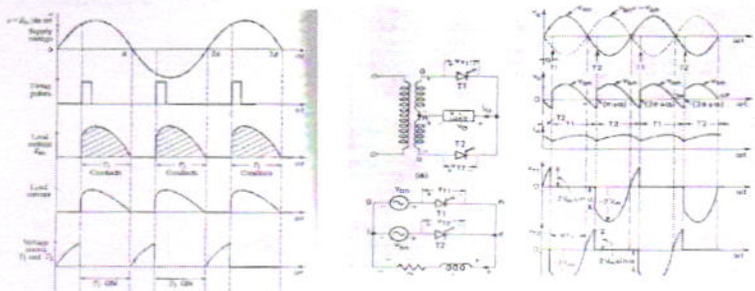
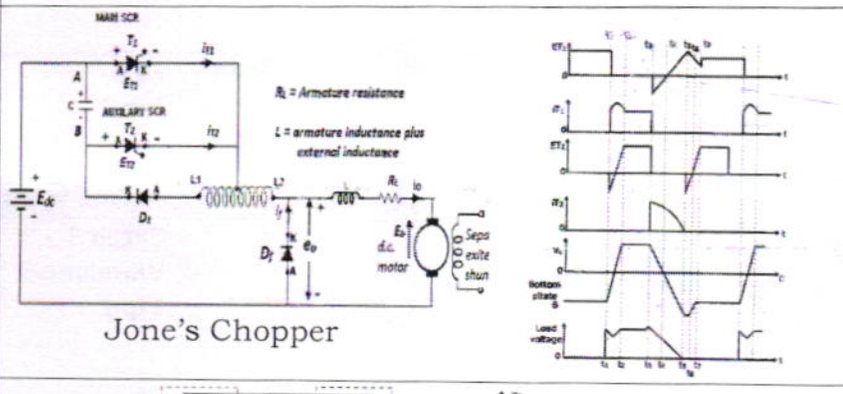
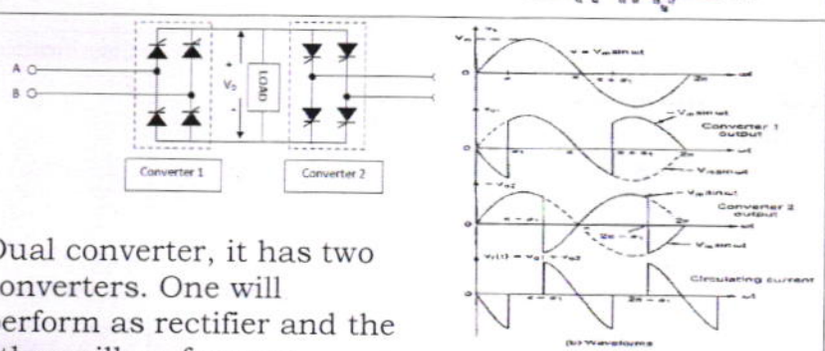
Scoring indicators

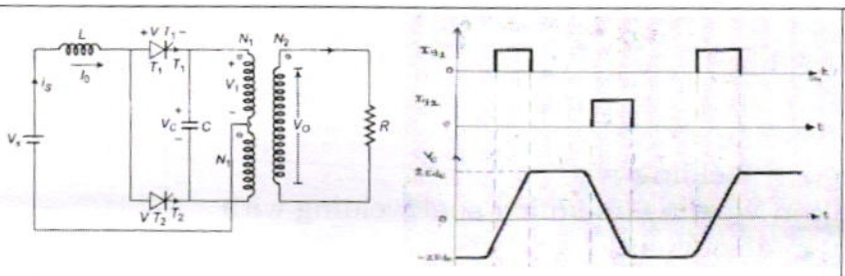
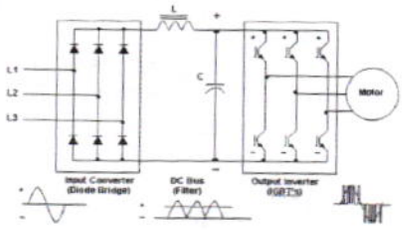
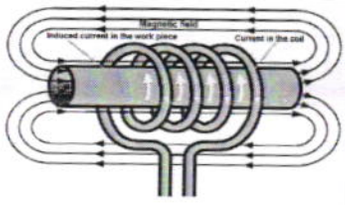
Code: TED (15) 5042 Version A

Qn No	Scoring Indicators	Split Score	Total Score
I.1	Turning on process of an SCR by applying a gate signal is called triggering	2	2
I.2	It is the converter for converting a constant voltage AC into adjustable voltage adjustable frequency AC power without an intermediate DC conversion	2	2
I.3	On-line UPS, Off-line UPS, Line interactive UPS (write any Two)	1 each	2
I.4		2	2
I.5	The turning off process of an SCR is called Commutation	2	2
II.1	 Advantages : 1. Uni-polar device, 2. High isolation & input impedance, 3. Voltage controlled device, 4. Low switching loss, 5.On resistance is very low 6. Can be connected in parallel without breakdown (Answer any 4)	Fig-4 Write any 4 advantages: 2 Marks	6
II.2	Four modes of operations I + Mode = MT_2 current positive (+ve), Gate current positive (+ve) I – Mode = MT_2 current positive (+ve), Gate current negative (-ve) III + Mode = MT_2 current negative (-ve), Gate current positive (+ve) III – Mode = MT_2 current negative (-ve), Gate current negative (-ve)	For each mode give 1.5 marks (draw the fig)	6

			
II.3		Circuit-2 Waveform-2 Exp-2	6
II.4	 Series inverer 	Circuit – 2 Wave form-2 Exp-2	6

II.5		Fig -3 Exp-3	6
II.6	DC Drives • Rrequire more maintenance. • Power circuits and control circuits are easy or simple and less expensive. • Used for DC motors. • It have chopping circuit and only converter. • Used in limited applications/locations only. • Power and Weight ratio is small. • Breaking when applying resistance at rotor. AC Drives • AC Drives require less maintenance. • In AC Drives Power circuits and control circuits are difficult and complex • Used for AC motors. • AC drives have converter & inverter. • It can be used in all locations. • Power and Weight ratio is large • Breaking and accelerating when changing the frequency of the supply.	Compare any 6 points	6
II.7	 Explain Normally on and off switches	Fig 4 Exp-2	6
III.a	RC Trigering 	Circuit-3 Waveform-3 Exp-2	8
III.b	Classification 1) Natural commutation (F) 2) Forced commutation • Class A, B, C, D, E  Natural (Class F)	Classification-2 Circuit-2 Waveform -2 Exp-1	7
IV.a	 	Structure-2 Exp-3 VI graph-3	8

IV.b		Circuit & exp-3 VI chara-2 Transfer chra-2	7
V.a	With R load With RL Load 	Wavefrm & exp-4 Waveform & exp-4	8
V.b	 Jone's Chopper	Circuit & exp-5 Graph-2	7
VI.a	 Dual converter, it has two converters. One will perform as rectifier and the other will perform as inverter The source of this type of converter will be single-phase supply. The input is given to the converter 1 which converts the AC to DC by the method of rectification. It is then given to the load after filtering. Then, this DC is provided to the converter 2 as input. This converter performs as inverter and converts this DC to AC. Thus, we get AC as output	Circuit-3 Exp-3 Graph-2	8

VI.b		Circuit & exp 5 Graph-2	7
VII.a	The synchronous speed Ns $N_s = \frac{120f}{p}$ Since the number of pole is constant the speed Ns can be varied by continuously changing frequency. It has two stages-rectifier and inverter. Control algorithm with keep a constant V/F ratio. 	Eq-2 Circuit-3 Exp-3	8
VII.b	Induction heating is the process of heating an electrically conducting object by electromagnetic induction, through heat generated in the object by eddy currents. An induction heater consists of an electromagnet, and an electronic oscillator that passes a high-frequency alternating current (AC) through the electromagnet. The rapidly alternating magnetic field penetrates the object, generating eddy currents. The eddy currents flowing through the resistance of the material heat it by Joule heating. The frequency of current used depends on the object size, material type, coupling (between the work coil and the object to be heated) and the penetration depth.  Disadvantages 1. Low efficiency due to frequency conversion 2. The system is costlier with a number of complex stages 3. Complex to maintain the system	Def and exp-5 Dis adv-2	7