

2054

B.E. (Electronics and Communication Engineering)

Sixth Semester

EC-625: Power Electronics ✓

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Section.

x-x-x

- Q.1a) Define the term pinch off voltage of MOSFET. (2×5)
- b) What is the difference between half controlled and fully controlled bridge rectifier.
- c) Define the term holding current and latching current.
- d) What is the difference between ON-OFF control and phase control?
- e) Discuss the disadvantages of the harmonics present in the inverter system.

**Section A**

- Q.2a) List any two advantages of TRIAC over SCR. Enlist the limitations of high (5)  
frequency operation of a power electronic device.
- b) Design the switching model, equivalent circuit and switching waveforms and times (5)  
of MOSFET.
- Q.3a) Describe the principle of step-up chopper. Derive an expression for the average (7)  
output voltage in terms of input dc voltage & duty cycle.
- b) What are the advantages of 'RC' triggering over 'R' triggering. (3)
- Q.4a) What is a dc chopper? What is meant by PWM control in dc chopper? (5)
- b) For step down chopper dc source voltage is 230 V, load resistance is 10Ω. The (5)  
voltage drop across chopper when it is in ON is 2V. For a duty cycle of 0.4.  
Calculate the chopper efficiency.

**Section B**

- Q.5a) A two pulse converter is fed with a 230V, 50 Hz supply. The load on the converter (7)  
is a pure resistance of  $R=10\ \Omega$ . Obtain the average output voltage for a firing angle  
of  $\alpha = 135^\circ$
- b) Why thyristors are not preferred for Inverter? (3)
- Q.6a) Describe in detail, the various types of PWM methods available for voltage control (5)  
employed in an inverter.
- b) What is the need of resonant converters? Define soft switching. (5)
- Q.7a) A single phase voltage controller is employed for controlling the power flow from (6)  
230V, 50Hz source into a load circuit consisting of  $R=3\ \Omega$  and  $L=4\ \Omega$ . Calculate:  
(i) the maximum value of rms load current (ii) the maximum power and power  
factor.
- b) Discuss the application of inverter in Induction heating and UPS. (4)

x-x-x