

Total No. of Questions : 4]

SEAT No. :

**PA-10059**

[Total No. of Pages : 2

[6009] 346

**T.E. (E &TC Engineering) (Insem)**  
**POWER DEVICES & CIRCUITS**  
**(2019 Pattern) (Semester-II) (304194)**

*Time : 1 Hour]*

*[Max. Marks : 30*

*Instructions to the candidates:*

- 1) Answer Q.1 or Q.2, Q.3 or Q.4.
- 2) Neat diagrams and waveforms must be drawn wherever necessary.
- 3) Figures to the right side indicate full marks.
- 4) Use of nonprogrammable calculator is allowed.
- 5) Assume Suitable data if necessary.

**Q1) a)** With the help of construction diagram, Explain the working of SCR. Why it is called as controlled rectifier. **[8]**

b) Explain with neat diagram the turn on and turn off characteristics of SCR. Write down equation for turn on and turn off time. **[7]**

OR

**Q2) a)** Explain with neat diagram the working of power MOSFET. Draw steady state characteristics of it and explain same. **[8]**

b) Explain isolated gate drive circuit for MOSFET and explain its operation. **[7]**

**Q3) a)** Explain operation of single phase full converter for R load with neat circuit diagram and relevant waveforms. **[8]**

b) A single phase half controlled bridge rectifier supplies a ripple free load current of 10 A and operates from the 110V, 60Hz mains. If the average o/p voltage is 75V, **[7]**

Calculate:

- i) Firing angle
- ii) RMS o/p voltage
- iii) RMS supply current
- iv) RMS 7<sup>th</sup> Harmonic supply current

OR

**P.T.O.**

**Q4) a)** Draw the circuit diagram of three phase fully controlled converter with R load. Draw load current and load voltage waveforms with  $\alpha=60^\circ$  and  $90^\circ$ . [8]

b) A three phase full converter operated from three phase star connected 208 V, 60 Hz supply with R load of 10 ohm. It is required to obtain 50% of maximum possible output voltage. [7]

Calculate:

- i) Delay angle  $\alpha$
- ii) rms and average currents (Technical Pg2-81 Ex 2.8.3)

