# (DEE 324)

## B.Tech DEGREE EXAMINATION, MAY - 2015

### (Examination at the end of Third Year)

### ELECTRICALS AND ELECTRONICS

### Paper - IV : Power Electronics

**Time : 3 Hours**                                                    **Maximum Marks : 75**

*1)*   a)   Write short notes on TRIAC.

    b)   Define freewheeling diode. Explain its significance.

    c)   What is natural and forced commutation? Explain.

    d)   Draw the voltage and load current waveforms of single phase half wave converter with RLE load at $\alpha = 30°$.

    e)   Explain RC half wave firing circuit of SCR.

    f)   Discuss briefly about step-up chopper.

    g)   What is cyclo converter? What are its applications?

    h)   What are the advantages of 120° mode of 3-$\phi$ inverter.

    i)   Explain briefly about CSI.

    j)   Explain about digital firing schemes of SCR.

    k)   Write short notes on circulating current mode of dual converter.

    l)   What is finger voltage? Explain its importance.

    m)   Explain about D.C. circuit breakers.

n) What is pulse width modulation? List the various PWM techniques.

o) Draw the output voltage and current waveforms of 1-$\phi$ full controlled converter with RE load at $\alpha = 60°$.

## UNIT - I

2) a) Explain the theory of operation of SCR.

b) Explain turn on and turn off methods of SCR.

OR

3) Explain various methods of protection of SCR.

## UNIT - II

4) Describe the working of 1-$\phi$ full wave converter with R-load. Draw the relevant waveforms. Also derive the expression for R.M.S and average output voltage.

OR

5) Describe the working of 3-$\phi$ half controlled converter for $\alpha = 45°$ with relevant wave forms and derive the expression for average and rms output voltage for R-load.

## UNIT - III

6) Explain 180° conduction mode of 3-$\phi$ inverter with relevant waveforms and derive the necessary expressions.

OR

7) Describe the operation of parallel Inverter with aid of diagrams. Describe an expression for output frequency, Current and voltages. What are the advantages and disadvantages of parallel inverter?

## UNIT - IV

8) Discuss the working of a 1-$\phi$ bridge cycloconverter with R-load for discontinuous waveform operation with neat circuit diagram and output rms voltage and current waveform for $f_o = 3f_s$.

OR

9) Describe the principle of step-down chopper. Derive and expression for the average output in terms of input dc voltage and duty cycle.

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