Printed Pages : 1 **Roll No.** | | | | | | | | | | | **EEE602**

B.TECH.

THEORY EXAMINATION (SEM–VI) 2016-17

POWER ELECTRONICS

Time : 3 Hours ***Max. Marks : 100***

Note : *Be precise in your answer. In case of numerical problem assume data wherever not provided.*

SECTION – A

1. Explain the following: **10 x 2 = 20**

(a) Define latching current & holding current of a thyristor.

(b) What is freewheeling diode?

(c) What is meant by positive & negative group of thyristors?

(d) Why diodes should be connected in anti-parallel with the thyristors in inverter circuits?

(e) List any two merits & two demerits of a cycloconverter.

(f) Define firing angle.

(g) What is the difference between VSI & CSI?

(h) List any five applications of power electronics.

(i) Write the principle of phase control.

(j) Write principle of operation of step down chopper.

SECTION – B

2. Attempt any five parts of the following questions: **5 x 10 = 50**

(a) What do you understand by dual converters? Explain the operation of a 3- phase dual converter using circulating current mode of operation.

(b) A single- phase full converter operates with 240V, 50Hz ac input & supplies output load consisting of R-L load with very high inductance drawing level load current 15 A & operated at firing angle of 45^0 . Find:

(i) RMS supply current

(ii) Fundamental component of input current

(iii) Input displacement factor

(iv) Power factor.

(c) Calculate the two transistor terminology of thyristor.

(d) Describe with neat circuit diagram & waveform the working of series inverter. Also describe the merit & demerit of this inverter.

(e) Discuss the neat circuit diagram of three phase to single phase half wave cycloconverter for R load. Write the output voltage equation of cycloconverter.

(f) Why does unequal sharing take place in series connected SCR during steady state. Draw the equivalent circuit for two series connected SCR.

(g) Describe the principle of Class D commutation with neat diagram.

(h) Describe the working of a single- phase series inverter with appropriate circuit & waveforms. Also, derive an expression for the output frequency in terms of circuit parameters & $T_{off.}$

SECTION – C

Attempt any two parts of the following questions: **2 x 15 = 30**

3. Discuss the effect of source inductance on performance of three phase full converter with the help of phase voltage waveforms. Also sketch load current waveform.

4. Describe with neat circuit diagram & relevant waveform the working of three phase inverter

under 180^0 mode of conduction for a balance delta connected resistive load. Also state its merit & demerit over 120^0 mode.

5. Write short notes on:

(i) Desired characteristic of a controllable switch.

(ii) Working of class D chopper in first & fourth quadrant.

(iii) Integral cycle control in AC controller.