



HCX-003-1273004 Seat No. _____

M. Sc. (ECI) (Sem. III) (CBCS) Examination

October / November - 2017

**Power Electronics : Paper - 11
(New Course)**

Faculty Code : 003

Subject Code : 1273004

Time : $2\frac{1}{2}$ Hours]

[Total Marks : 70

- Instructions :** (1) All questions carry equal marks.
(2) Figures on right hand side indicate marks.

1 Answer the following : **14**

- (1) A thyristor is a _____ layer PNP semiconductor device. (Three, Four)
- (2) A Triac is a _____ device. (Unidirectional, Bidirectional)
- (3) Natural commutation is also called _____ commutation. (Line, Forced)
- (4) UJT exhibits _____ resistance characteristic. (Positive, Negative)
- (5) Schottky diode has _____ silicon junction. (Germanium, Aluminum)
- (6) When thyristors are connected in series it is desirable that they are triggered simultaneously. (T/F)
- (7) A LASER can be turned on and turned off by light signal. (T/F)
- (8) A snubber circuit provides protection against high dv/dt . (T/F)
- (9) To improve the wave shape of load current and power factor, a diode is known as freewheeling diode. (T/F)

- (10) BJT is a voltage controlled device. (T/F)
- (11) Rectifier circuit converts dc to ac. (T/F)
- (12) A cycloconverter converts ac at one frequency to ac at another frequency. (T/F)
- (13) Give the full form of GTO.
- (14) Draw the symbol of silicon controlled switch.

2 Answer the following : (Any Two)

- 1. What is a thyristor ? Discuss its operation and characteristic. 7
- 2. Draw and discuss v-i characteristic of DIAC with layer diagram. 7
- 3. What is meant by commutation of SCR? How are commutation methods classified ? 7

3 Answer the following :

- 1. Explain the different methods of turning on athysistor. Which one is the most commonly used and why ? 5
- 2. What is a unijunction transistor ? Explain its configuration and characteristic. 5
- 3. Explain the difference between a Power MOSFET and SCR. 4

OR

3 Answer the following :

- 1. What is a GTO ? Discuss its operation. 5
- 2. Draw the V-1 characteristics of a TRIAC and explain its working principle. 5
- 3. Give names of triggering circuits for a thyristor. Draw and explain any one triggering circuits for a thyristor. 4

- 4 Answer the following : (Any Two)
1. Why is it necessary to connect thyristors in series ? 7
Draw static and dynamic equalizing circuits for thyristors in series and explain their operation.
 2. Explain the working of a single phase fully controlled bridge converter supplying purely resistive load with wave shapes. 7
 3. Derive expressions for various performance indices of a controlled rectifier circuit. 7
- 5 Answer the following : (Any Two)
1. Explain the working of a single phase semiconverter with resistive load with wave shapes. 7
 2. What is Inverter ? Give the classification of Inverter and Draw the diagram of a series inverter. 7
 3. Give the classification of chopper. Draw the circuit of Morgan Chopper. 7
 4. What do you mean by cycloconverter ? Explain the single phase cycloconverter using centre tapped transformer. 7
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