



JAI-003-1273004

Seat No. _____

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

November - 2019

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) Figure on right hand side indicates 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 LASCR 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 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 different methods of turning on a thyristor. 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 IGBTs. **4**

OR

- 3** Answer the following :
- (1) What is a GTO ? Discuss its operation. **5**
 - (2) Draw the V-I 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 ? Draw static and dynamic equalizing circuits for thyristors in series and explain their operation. **7**
 - (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 half wave converter with resistive load and draw its 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**