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**NA—117—2023**

**FACULTY OF SCIENCE**

**B.Sc. (Fifth Semester) EXAMINATION**

**NOVEMBER/DECEMBER, 2023**

**(New/CBCS Pattern)**

**ELECTRONICS**

**Paper-XIII**

**(Power Electronics-I)**

**(Thursday, 21-12-2023)**

**Time : 10.00 a.m. to 12.00 noon**

*Time—2 Hours*

*Maximum Marks—40*

*N.B. :-* (1) Attempt *all* questions.

(2) Illustrate your answers with suitably labelled diagram wherever necessary.

1. Discuss the two transistor model of a thyristor. Derive an expression for the anode current and discuss therefrom the turn-on mechanism of a thyristor. 15

*Or*

(a) Draw and explain the output characteristics of *n*-channel enhancement mode MOSFET. 8

(b) With the help of a neat structural diagram explain the operation of IGBT. 7

2. What is the necessity of connecting SCRs in series ? What are the problems associated with series connections of SCRs ? How are they eliminated ? 15

*Or*

(a) Discuss the basic requirement for successful firing of thyristor in detail. 8

(b) With the help of neat circuit diagram and suitable waveforms explain resistance firing circuit. 7

P.T.O.

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3. Attempt any *two* of the following :

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- (a)  $dv/dt$  triggering
- (b) SUS and LASCR symbol and V-I characteristics
- (c) UJT as on SLR trigger
- (d) Derating.