S.Y. Diploma : Sem. IV
[ET/EN/EX/EJ/DE/ED/EI/IS/IC/IE/IU]

Power Electronics

Time: 3 Hrs.] Prelim Question Paper **[Marks : 70**

Instructions :(1) All questions are compulsory.
(2) Illustrate your answers with neat sketches wherever necessary.
(3) Figures to the right indicate full marks.
(4) Assume suitable data, if necessary.
(5) Preferably, write the answers in sequential order.

1. Attempt any **FIVE** of the following : **[10]**
(a) Draw the symbols of (i) SCR (ii) DIAC
(b) Define holding and latching current.
(c) List different turn-on methods of SCR.
(d) State the applications of inverter.
(e) Draw the symbol of MOSFET and IGBT.
(f) State the function of freewheeling diode in any rectifier circuit.
(g) Define the term commutation of SCR.

2. Attempt any **THREE** of the following : **[12]**
(a) Draw the circuit diagram input-output waveforms and explain the working of single phase half wave controlled rectifier with R load.
(b) Draw the characteristics of power BJT. Explain Quasi-saturation.
(c) Draw the structural diagram and symbol of GTO. Describe its working.
(d) Draw and explain step-down chopper with relevant waveforms.

3. Attempt any **THREE** of the following : **[12]**
(a) Compare SCR & TRIAC. (any four points)
(b) Draw the circuit diagram of single phase fully controlled bridge rectifier with R load. Draw the waveforms of input and output voltage.
(c) State the types of power MOSFETS. Explain the working of any one type with a constructional diagram.
(d) Explain pulse triggering of SCR, with a neat circuit diagram and necessary waveforms.
(e) A single phase full wave controlled Rectifier is supplied with a voltage V_S = 300 sin (314 t). Find average output voltage and current if firing angle is 60° and load resistance is 500Ω.

4. Attempt any **THREE** of the following : **[12]**
(a) Compare 'Power BJT' with 'Power MOSFET' for their performance factor, construction and area of applications.
(b) Explain the working of "PUT" with relevant diagrams. Why it is called programmable?
(c) Draw the circuit diagram of temperature controller using SCR with neat circuit diagram.
(d) Explain Complementary Commutation with necessary diagrams and waveforms.

5. Attempt any **TWO** of the following : **[12]**
(a) Draw and explain the battery charger using SCR.
(b) Describe the operation of pulse transformer used in triggering circuits.
(c) Describe constructional details of PUT. Why it is called programmable?
(d) Draw neat labeled construction of IGBT. State any two advantages.

6. Attempt any **TWO** of the following : **[12]**

(a) Draw electronic timer and state its working.

(b) What is class B commutation? Explain its operation with neat diagram.

(c) Draw layered diagram of LASCR. What is the effect of increasing intensity of light? State any two applications.

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Paper Discussion Schedule for : S.Y. Diploma Sem. IV

Date	Day	Timing	Centre
21 April 2019	Sunday	9 a.m. to 11 p.m.	Dadar