[This question paper contains 3 printed pages.]

1021 *Your Roll No. .....*

B.Sc. (Hons.) / III **C**

ELECTRONICS – Paper 3.7 (XXI)

(Power Electronics)

Time : 3 Hours *Maximum Marks : 38*

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt **five** *questions in all, including Question No.* 1 *which is compulsory. Use of scientific non-programmable calculators is allowed.*

1. Do any **five** :

   (a) Define Surge ON current and Forward Blocking voltage. (2)

   (b) Determine the RMS value of Half wave phase controlled rectifier for a firing angle of 30°. (2)

   (c) A shunt motor is driven by 30 KW, 200 V supply. If the motor armature resistance and shunt field winding resistance are 0.02 Ω and 50 Ω. Determine the back EmF induced in motor. (2)

P.T.O.

(d) Why germanium is not used for construction of SCR ? (2)

(e) Explain Class F commutation. (2)

(f) What is Snubber circuit ? (2)

2. (a) Explain the working of UJT as relaxation oscillator. (4)

(b) Discuss the series and parallel operation of Power Diodes. (3)

3. (a) Explain the various triggering mechanisms of SCR. (4)

(b) Draw and explain the current-voltage characteristics of SCR. (3)

4. (a) Explain the working of Auxillary Commutation circuit. (4)

(b) Design a Class C commutation circuit for a DC source voltage of 100V and current through R_1 and R_2 is 15A. The turn-off time of both SCRs is 40 μs. Calculate commutating capacitance for the circuit. (3)

5. (a) Explain the working of voltage commutated chopper. (4)

(b) A chopper circuit is operating on TRC principle at a frequency of 3 KHz on a 110V DC supply. If the load voltage is 70V, compute the conducting and blocking period of SCR in each cycle. (3)

6. (a) Discuss the operation of Parallel Inverter circuit. (4)

(b) Explain various modes of operation of Induction Motor. (3)

7. (a) Explain different modes of excitation of Synchronous Motor. (4)

(b) Explain the different losses associated with motors. (3)