

GANPAT UNIVERSITY

B. TECH. SEMESTER V (EC) ELECTRONICS & COMMUNICATION ENGINEERING

EXAMINATION, NOV / DEC-2011

EC 503:- POWER ELECTRONICS

TIME: 3 HOURS]

[TOTAL MARKS: 70

INSTRUCTION:-

1. Attempt all questions.
2. Answers to the two sections must be written in separate answer books.
3. Figures to the right indicate full marks.
4. Assume suitable data, if necessary.

SECTION-I

- Que:-1** (A) What is a thyristor? Describe the different modes of an operation of thyristor with the help of its static I-V characteristics. **8**
- (B) Justify: A very high dv/dt may result in false triggering of SCR. **4**
- OR
- Que:-1** (A) True or False, Justify: The reverse breakdown voltage is greater than forward breakdown voltage. **4**
- (B) What is a Triac? How is it different from a thyristor? Explain the modes of operation of a Triac. **8**
- Que:-2** (A) Explain the operation of relaxation oscillator using PUT. Draw necessary circuit diagrams and waveforms. **6**
- (B) Describe the principle of DC chopper operation? Derive an expression for its average output voltage. **5**
- OR
- Que:-2** (A) Draw and explain the circuit diagram and waveforms for single phase semi converter with resistive load. Derive expression for average and RMS value of output voltage. **6**
- (B) Write short note on parallel operation of thyristor. **5**
- Que:-3** (A) What is meant by commutation of SCR? What are the different classes of forced commutation of SCR? Explain with neat circuit diagram and waveforms operation of class-B self commutation method. **8**
- (B) Explain full wave AC voltage controller using resistive load and draw necessary waveforms. **4**

SECTION-II

- Que:-4** (A) Explain power diode types with all the characteristics. 3
 (B) Explain reverse recovery characteristics of power diode and relate IRR and QRR. 3
 (C) How free-wheeling diode works? List its advantages in the circuit of diode in series with load. 3
 (D) Define: 3
 1. HF
 2. CF
 3. PF
- OR**
- Que:-4** (A) Define: 3
 1. TUF
 2. DF
 3. ODF
 (B) For full wave rectifier with center-tapped transformer connected with purely resistive load, determine 1. Efficiency 2. Form factor 3. Ripple factor. 3
 (C) How to operate BJT faster? Explain any two methods. 4
 (D) How secondary breakdown occurs in power BJT? 2
- Que:-5** (A) Explain any two configuration of switched mode DC power supply. 4
 (B) Explain switching characteristics of power MOSFET. 4
 (C) Write a short note on: AC drives. 3
- OR**
- Que:-5** (A) List equations of field, armature and torque for separately excited dc motor. 3
 (B) Explain switched mode AC power supply. 3
 (C) Draw the circuits of resonant AC power supply and Bidirectional AC power supply. 3
 (D) Discuss the characteristics of SIT. 2
- Que:-6** (A) Compare BJT, MOSFET and IGBT. 3
 (B) Define : String efficiency, Derating factor, Pulse transformer, Firing angle, On state voltage of SCR. 5
 (C) List various modes of operation of DC drives. 2
 (D) Explain FBSOA and RBSOA in brief. 2

END OF PAPER
