

**GANPAT UNIVERSITY**  
**B. TECH SEM-V (ELECTRONICS AND COMMUNICATION ENGINEERING)**  
**REGULAR EXAMINATION- NOV-DEC 2016**  
**2EC503: Power Electronics and Applications**

TIME: 3 HRS

TOTAL MARKS: 60

**Instructions:** (1) This Question paper has two sections. Attempt each section in separate answer book.  
(2) Figures on right indicate marks.  
(3) Be precise and to the point in answering the descriptive questions.

**SECTION-I**

- Q-1 (A)** Draw and explain power electronic system in detail. 5  
**(B)** Define: Intrinsic standoff ratio, holding current, Derating factor, Over Drive Factor, UJT snowballing process 5

OR

- Q-1 (A)** Explain the modes of operation of a Triac. 5  
**(B)** Explain static and dynamic equalizing network design for series operation of SCRs. 5
- Q-2 (A)** Explain working of Bridge-configuration of single phase full wave controlled rectifier with resistive load. 5  
**(B)** Explain the principle of operation of an inverter. Explain the working of a single-phase half bridge inverter with resistive load. 5

OR

- Q-2 (A)** What is UPS? Explain working of UPS with related block diagrams. 5  
**(B)** Why snubber circuits are required? Explain the snubber circuit used for SCR. 5
- Q-3 (A)** Write short note on UJT as a relaxation oscillator. 4  
**(B)** Calculate number of SCRs, each with rating of 500V, 75 A required in each branch of a series and parallel combination for a circuit with total voltage and current rating of 7.5kV and 1000A. Assume derating factor of 14%. 3  
**(C)** Compare natural and forced commutation. 3



## SECTION-II

Q-4 (A) List the applications of DIAC. Explain any one application of the DIAC with necessary circuit diagram and waveforms. 5

(B) What is SMPS? List various types of SMPS and explain any one of them. 5

OR

Q-4 (A) Explain basic structure and two transistor model of thyristor. Derive equation for anode current. 5

(B) Explain turn on switching characteristics of SCR. 5

Q-5 (A) Explain with neat diagram the construction of a P-N junction power diode, and state the effects of including the drift layer. 5

(B) What is meant by "AC voltage controller"? Compare on-off control and phase angle control techniques of AC voltage controller. 5

OR

Q-5 (A) Draw and explain Class A chopper. 5

(B) Write a short note on GTO. 5

Q-6 (A) Explain the full wave RC firing circuit. 4

(B) Explain in brief: Pulse transformer, Delay angle, PUT 6

-----END OF PAPER-----