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**SIXTH SEMESTER B.TECH. (ENGINEERING) DEGREE
[2K SCHEME] EXAMINATION, APRIL 2013**

EE 2K 602/PT EE 2K 502 – POWER ELECTRONICS

Time : Three Hours

Maximum : 100 Marks

Answer all questions.

Part A

- I. (a) Explain with a neat sketch, the switching characteristics of a power MOSFET.
- (b) Write a short note on TRIAC characteristics.
- (c) A single-phase bridge rectifier has a purely resistive load $R = 10 \Omega$, the peak supply voltage $V_m = 170 \text{ V}$, and the supply frequency $f = 60 \text{ Hz}$. Determine the average output voltage of the rectifier if the source inductance is negligible.
- (d) Explain the importance of the inverters and give its merits and demerits.
- (e) Explain the basic principle of operation of a cycloconverter.
- (f) Derive an expression for output voltage in terms of duty cycle for a step-down chopper.
- (g) Explain with neat sketch, the working of a buck-boost regulator.
- (h) With the help of a neat block diagram, describe the operation of on-line UPS system.

(8 × 5 = 40 marks)

Part B

- II. 1. Draw and discuss the switching characteristics of a thyristor during turn-on and turn-off process.
- Or*
2. Describe and distinguish between natural and forced commutation.
- III. 1. Explain with a neat circuit diagram and waveforms, the working of a single-phase half-wave rectifier with RL load.

Or

2. Explain briefly the operation of a three-phase inverter with 180° mode of operation and draw its waveforms.

Turn over

- IV. 1. With a neat circuit and waveforms, explain the operation of a single-phase a.c. voltage controller with RL loads.

Or

2. Draw the single SCR chopper circuit for the control of a d.c. series motor. Explain its working with voltage and current waveforms.

- V. 1. Write short notes on :

(a) Boost regulators.

(b) UPS.

Or

2. With a neat block diagram, explain the working of a SMPS. Also give a comparison between SMPS and linear power supply.

(4 × 15 = 60 marks)