F 3648
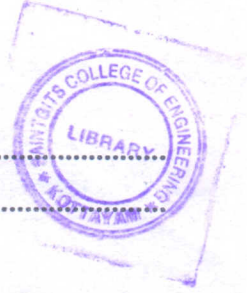
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B.TECH. DEGREE EXAMINATION, NOVEMBER 2014

Fifth Semester

Branch : Electrical and Electronics Engineering

EE 010 504 : POWER ELECTRONICS (EE)

(New Scheme—2010 Admission onwards)

[Regular/Improvement/Supplementary]

Time : Three Hours

Maximum : 100 Marks

Part A

Answer all questions.
Each question carries 3 marks.

1. What is the difference between power diode and signal diode ?

2. Mention some of the applications of controlled rectifier.

3. What is meant by step-up and step-down chopper ?

4. What are the applications of an inverter ?

5. What are the industrial applications of SMPS ?

(5 × 3 = 15 marks)

Part B

Answer all questions.
Each question carries 5 marks.

6. Explain the characteristics of SCR.

7. Describe the working of 1 ϕ fully controlled bridge converter in the rectifying mode.

8. Describe the basic working principle of single phase cyclo converter.

9. Describe the operation of series inverter with aid of diagrams.

10. Explain the basic operation of fly back converter.

(5 × 5 = 25 marks)

Part C

Answer all questions.
Each question carries 12 marks.

11. Describe the various methods of thyristor turn on.

Or

12. Explain the switching characteristics of MOSFET and GBT.

**Turn over**

13. Describe the working of Dual converter.

Or

14. Describe the working of 3 φ fully controlled bridge converter in the rectifying mode for firing angle of 30°.

15. Derive an expression for the average output voltage in terms of input d.c. voltage and duty cycle for step-up and step-down chopper.

Or

16. Figure 1 shows A non-isolated buck converter operating at a duty ratio of 0.5 at a switching frequency of 20 kHz. The components may be taken to be ideal.
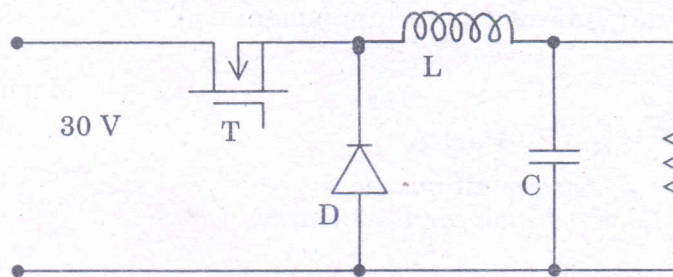
$T_S = 50 \mu S$

$C = 500 \mu F$

$R = 50 \Omega$

$D = 0.5$

Fig. 1. A Non-isolated Buck Converter

Evaluate the value of L such that the converter operates in the discontinuous mode.

17. Explain the operation of 3φ bridge inverter for 120 degree mode of operation with aid of relevant phase and line voltage waveforms.

Or

18. State different methods of voltage control inverters. Describe about PWM control in inverter.

19. Explain the operation of buck regulator for continuous current mode with aid of relevant waveforms and derive the expression of ripple voltage.

Or

20. Explain the DCM operation of Fly back converter with relevant circuit diagram and waveforms.

(5 × 12 = 60 marks)