

M.TECH. DEGREE EXAMINATION, FEBRUARY 2012**Second Semester**

Branch : Electrical and Electronics Engineering

Specialization : Power Electronics and Power Systems

PEPS 201—POWER ELECTRONIC SYSTEM CONTROL

(Regular/Supplementary)

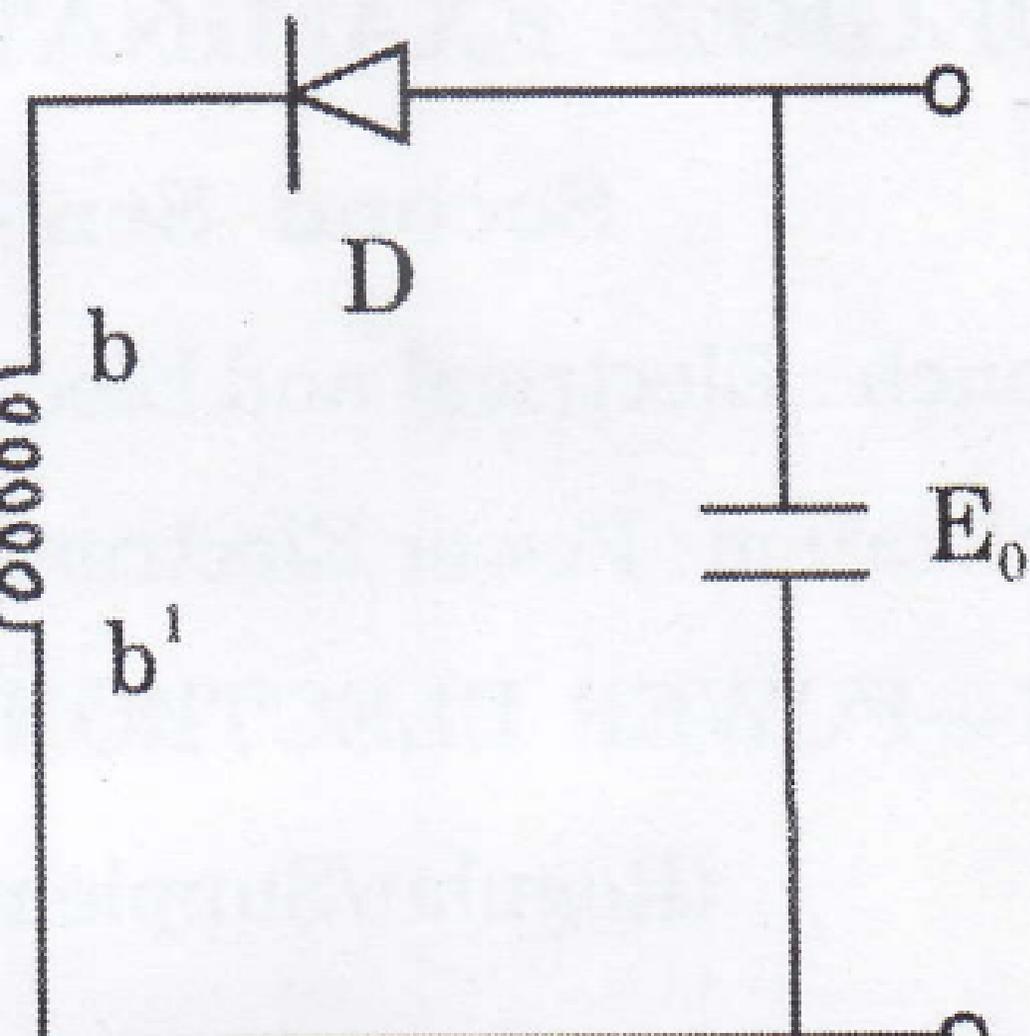
Time : Three Hours

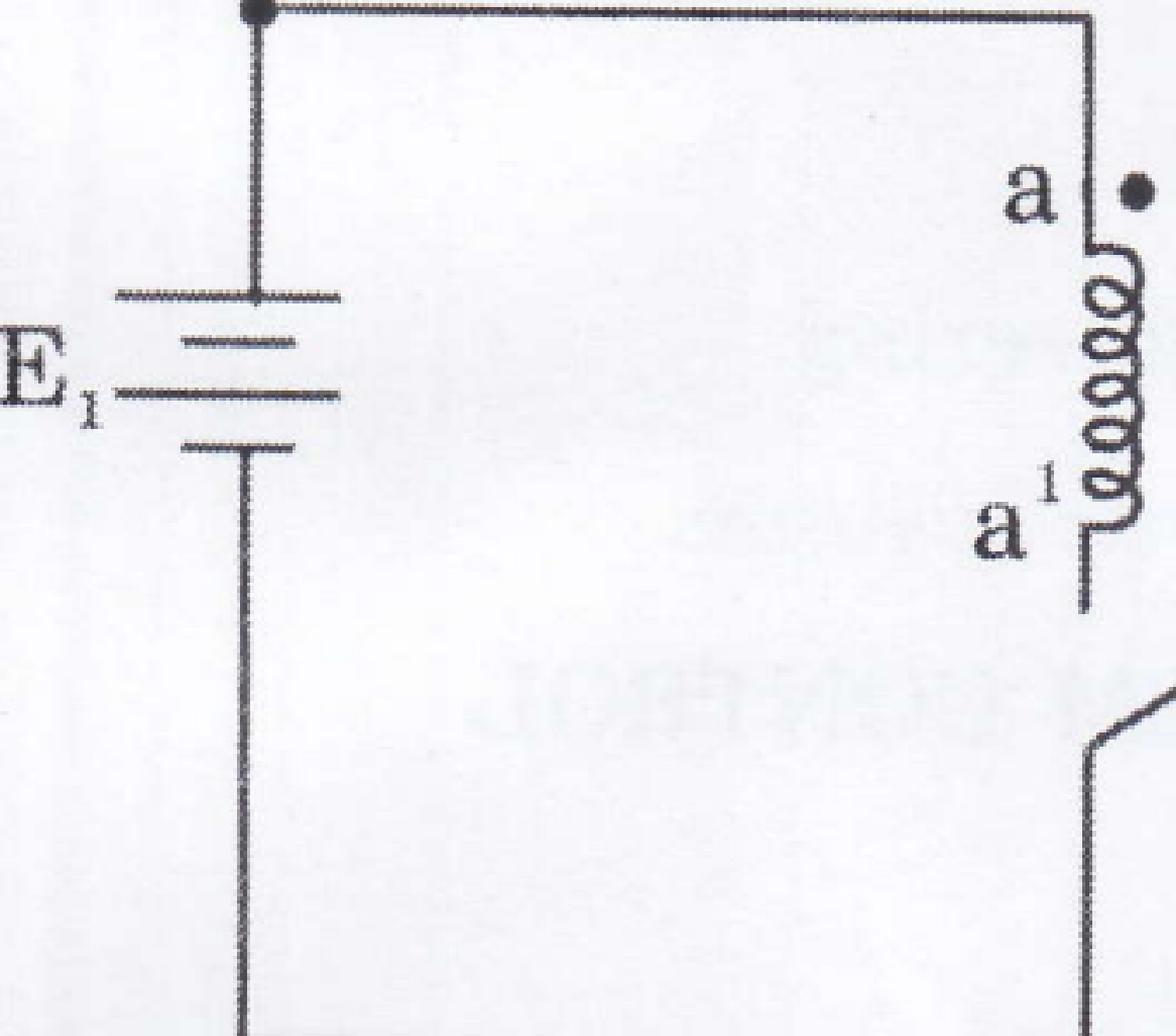
Maximum : 100 Marks

*Answer any five questions.**All questions carry equal marks.*

1. (a) Describe space vector modulation and its various modulation strategies. (10 marks)
(b) With a neat block diagram explain briefly microcomputer Implementation of PWM inverters. (10 marks)
2. (a) With necessary waveforms explain the principle of hysteresis-band current control. Draw the control block diagram for hysteresis-band PWM. (10 marks)
(b) What is distortion factor in SPWM? Derive an expression for the r.m.s value of output voltage in SPWM. (10 marks)
3. (a) Draw the circuit of a buck-boost converter and explain its working principle. (8 marks)
(b) In a buck-boost regulator the following parameters are given :
The input voltage = 24V, Operating frequency = 20 kHz, Inductance = 200 μ H,
Capacitor = 500 μ F, Average load current = 5A, Duty ratios are (i) 0.2 and (ii) 0.7.
Find out the following :
Average output voltage, Peak-to-peak inductor ripple current, Peak-to-peak output ripple voltage, Average input current (assume the circuit is loss free) and the Minimum current at which load current is just discontinuous. (12 marks)
4. (a) Describe the state-space modeling of DC-DC converters. (8 marks)
(b) Explain the operation of the basic CuK converter. What are its main advantages? Obtain the relationship between input and output voltage of this converter. (12 marks)
5. (a) Draw the circuit diagram and explain the working of a push pull converter with the help of relevant waveforms. (8 marks)

Turn over





Duty cycle = 75%, Number of turns $n_{aa'} = 100$ number of turns $n_{bb'} = 25$. Assume ideal components and repetitive conditions. Also consider continuous current through Diode D during OFF switch period. Calculate E_0 and Plot the waveform of voltage $V_{aa'}$ and $V_{bb'}$ considering relative magnitudes and time intervals. (12 marks)

6. (a) What is a flyback converter? Draw the circuit diagram and explain its principle of operation. (10 marks)
- (b) Draw the block schematic diagram of a Switched Mode Power Supply. (10 marks)
7. (a) What are resonant converters? How they are classified? (6 marks)
- (b) Discuss the principle of zero voltage and zero current switching. (6 marks)
- (c) Draw the circuit diagram of a Half bridge Zero current switch-Quasi Resonant Converter