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10EE662

Sixth Semester B.E. Degree Examination, Dec.2015/Jan.2016
Advanced Power Electronics

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting atleast TWO questions from each part.***

PART - A

1 a. With neat circuit diagram and waveforms, explain the operation of boost converter for continuous current conduction mode. **(10 Marks)**

b. The buck dc – dc converter has the following parameters : $V_S = 50V$, $D = 0.4$, $L = 400\mu H$, $C = 100\mu F$, $f = 20KHz$, $R = 20\Omega$. Assuming ideal components, calculate i) The output voltage ii) The maximum and minimum inductor current and iii) The output ripple voltage. **(10 Marks)**

2 a. With neat circuit diagram and waveforms, explain the operation of cuk converter. **(10 Marks)**

b. The buck – boost regulator has an input voltage of $V_S = 12V$. the duty cycle $K = 0.25$ and the switching frequency is 25KHz. The inductance $L = 150\mu H$ and filter capacitance $C = 220\mu F$. The average load current $I_a = 1.25A$. Determine i) The average output voltage V_a ii) The peak to peak output ripple voltage ΔV_C iii) The peak to peak ripple current of inductor Δ_I and iv) The peak current of the transistor I_P. **(10 Marks)**

3 a. With neat circuit diagram and waveforms, explain the working of single phase full bridge inverter. **(10 Marks)**

b. With the help of neat circuit diagram and waveforms, explain square wave operation in three phase inverters. **(10 Marks)**

4 a. With the help of neat circuit diagram and waveforms, explain the basic concept of switch mode inverter and PWM switching scheme. **(10 Marks)**

b. With neat circuit diagram and pwm waveforms, explain the operation of three phase voltage source inverter. **(10 Marks)**

PART - B

5 a. With neat circuit diagram and waveforms, explain the operation of zero current switching (ZCS) resonant switch converter. **(10 Marks)**

b. With neat circuit diagrams, explain the working of parallel loaded resonant dc – dc converter. **(10 Marks)**

6 a. Mention the different steps to design a high frequency transformer. **(10 Marks)**

b. What are the factors to be considered while designing the inductor? **(10 Marks)**

7 a. With a neat block diagram, explain the working of a switch mode dc power supply. **(10 Marks)**

b. With neat circuit diagrams and waveforms, explain the operation of Flyback converter. **(10 Marks)**

8 a. With neat circuit diagram and waveforms, explain the operation of push – pull converter. **(10 Marks)**

b. With neat circuit diagram, explain the working of switched mode ac power supplies. **(10 Marks)**

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