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10EE662

Sixth Semester B.E. Degree Examination, June / July 2014
Advanced Power Electronics

Time: 3 hrs. Max. Marks:100

Note: ***Answer FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. What are the different types of switched mode DC-DC converters? Explain in detail the control of switched mode DC-DC converter. **(10 Marks)**

b. Explain in detail the continuous and discontinuous mode of conduction in a buck converter with neat diagram. **(10 Marks)**

2 a. How PWM technique is being used in bipolar and unipolar voltage switching? Explain. **(12 Marks)**

b. Compare buck, boost and buck boost converter. **(08 Marks)**

3 a. Explain with neat diagram and waveforms, the operation of single phase half bridge and full bridge interter. **(10 Marks)**

b. In the full bridge converter circuit input DC voltage $V_d = 300$ V, $m_a = 0.8$, $m_f = 39$ and the fundamental frequency is 47 Hz. Calculate the rms values of the fundamental frequency voltages and some of the dominant harmonics in the output voltage V_0, if a PWM bipolar voltage switching scheme is used. **(10 Marks)**

4 a. What do you mean by 180° mode and 120° mode of conduction in 3 ϕ AC inverter? Explain. **(12 Marks)**

b. Write a note on square wave 3 ϕ inverter. **(08 Marks)**

PART – B

5 a. Explain the various modes of operation in a zero current switching resonant converter and zero voltage switching resonant converter. **(14 Marks)**

b. Wrtie a note on series resonant converter circuit. **(06 Marks)**

6 a. While designing a high frequency inductor and transformer, what are the principles to be followed? Explain in detail. **(10 Marks)**

b. Write the flow chart of a single pass inductor design procedure and explain in detail the complete steps and the parameters to be considered. **(10 Marks)**

7 a. What are the different types of DC power supplies? Name the four common configuration of switched mode or PWM operation of inverter. Explain with neat diagram the operation of flyback converter. **(10 Marks)**

b. The average or dc ouput voltage of the push pull circuit shown below is $V_a = 24$ V at a resistive load of $R = 0.8\ \Omega$. The ON state voltage drops of the transistor and diode are $V_t = 1.2$ V and $V_d = 0.7$ V respectively. The turn ratio of the transformer is $\frac{N_S}{N_P} = 0.25$.

Determine

i) The average input current I_S.
ii) The efficiency η.
iii) The average transistor current I_A.
iv) The RMS transistor current I_R and
v) Open circuit transistor voltage V_{OC}. **(10 Marks)**

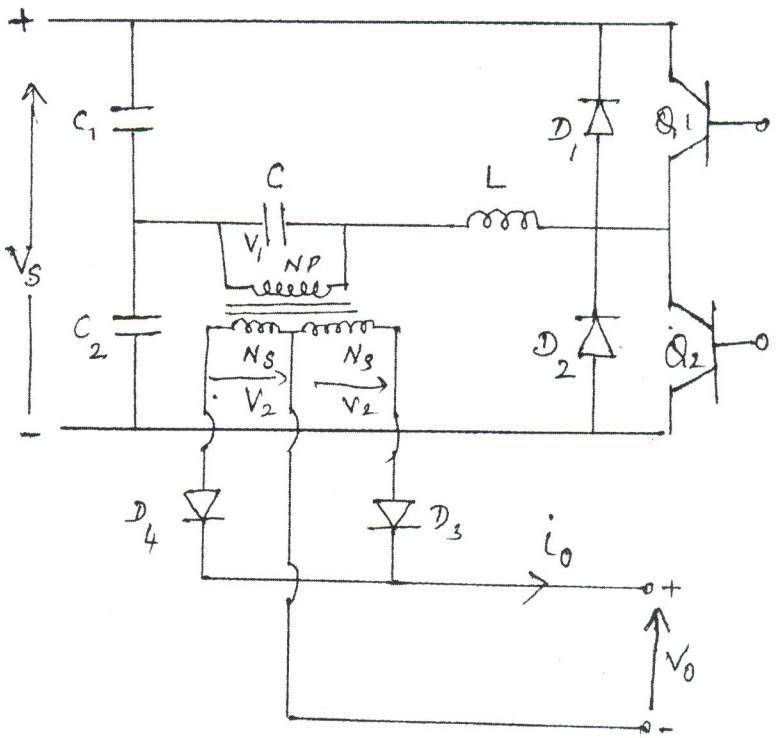

Fig. Q7 (b)

8 a. Draw the block diagram representation of two configurations of uninturrupted power supply and explain their operation. **(10 Marks)**

b. Explain with neat diagram, the working of a bidirectional AC power supply. **(10 Marks)**

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