QP Code: RO20MTECH189 | Reg. No | | | | | | | | | | | AR 19

GIET UNIVERSITY, GUNUPUR – 765022

M. Tech (Second Semester Examinations) – October' 2021

MPCPE2010 – POWER ELECTRONIC CONVERTERS

(Power Electronics)

Time: 2 hrs | Maximum: 50 Marks

(The figures in the right hand margin indicate marks)

PART – A

Q.1. Answer ***ALL*** questions (2 x 10 = 20)

a. What is meant by delay angle?

b. A single-pulse transformer with secondary voltage of 230 V, 50 Hz, delivers power to bulb of R = 10 Ω through a half-wave controlled rectifier circuit. For α = 60°, find the average current in the bulb.

c. Can you overcharge a 12-volt battery? Justify.

d. What are the applications of dc chopper?

e. A step down chopper is operated at 240V at duty cycle of 75%. Find the value of RMS switch (IGBT/MOSFET) current. Take R = 10 Ω.

f. Why thyristors are not preferred for inverters?

g. A single phase full bridge inverter has load R = 2 Ω, and dc voltage source Vs = 230 V. Find the rms value of the fundamental load current.

h. Compare CSI and VSI.

i. What is meant by Cyclo-converter?

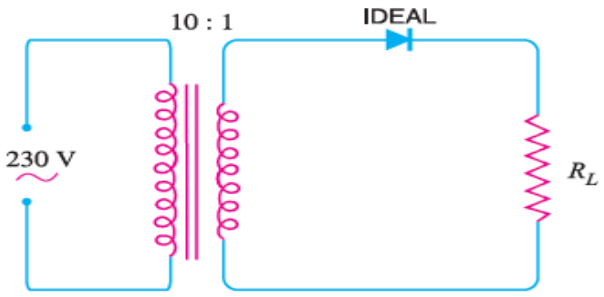
j. What are the disadvantages of continuous gating signal?

PART – B **(6 x 5 = 30 Marks)**

Answer ***ANY FIVE*** questions Marks

2. Draw and explain the single phase half controlled converter operation with RL load and derive the average value of output voltage and power factor. (6)

3. An AC supply of 230 V is applied to a half-wave rectifier circuit through a transformer of turn ratio 10: 1. Find (i) the output DC voltage and (ii) the peak inverse voltage. Assume the diode to be ideal. (6)



4. Describe the working principle of buck converter with relevant waveform. (6)

5. Explain the operation of single phase VSI Full Bridge with R Load. (6)

6. Explain the following PWM techniques used in inverter. (6)

   i. Sinusoidal PWM
   ii. Multiple PWM.

7. Explain the operation of single phase AC voltage controller with RL load. (6)

8. A single phase voltage controller feeds power to a resistive load of 3Ω from 230V, 50 Hz source. Calculate the maximum values of average and RMS thyristor currents for any firing angle? (6)

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