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Roll No

MEPS-301(C)**M.E./M.Tech., III Semester**

Examination, June 2017

Power Controller

(Elective-I)

Time : Three Hours

www.rgpvonline.com **Maximum Marks: 70****Note:** i) Attempt any five questions. Each question carries equal marks.

ii) Part (a) and (b) of a question carries 7 marks each.

1. With the help of neat sketch describe the working of MOSFET. Also explain the steady-state and switching characteristics of MOSFET.
2. a) Explain the sinusoidal PWM method of voltage control in inverters.
b) A single phase full bridge inverter has resistive load of 10Ω and the DC supply is 24V. Determine:
 - i) Output voltage at fundamental frequency
 - ii) The output power
 - iii) The average and peak currents of each thyristor
 - iv) Peak reverse blocking voltage of each thyristor
 - v) The THD, DF and HF.
3. A DC-DC converter is feeding an RL load with $V_s = 220V$, $R = 6\Omega$ and $L = 8mH$, $f = 1KHz$, $k = 0.5$ and $E = 0V$. Determine the followings:
 - a) Maximum peak to peak ripple current
 - b) Average and RMS load current
 - c) RMS chopper current
 - d) Critical value of load inductance for continuous load current.

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4. A highly inductive load is supplied by a chopper circuit. The average load current is 100 ampere and the load ripple current can be considered negligible. A simple LC filter with inductance $0.3mH$ and capacitance $4500\mu F$ is used. If the chopper is operated at $350Hz$ and duty cycle of 0.5. Determine the maximum RMS value of the fundamental component of the chopper generated harmonic current.

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5. Write short notes on the following:
 - i) Dead zone of resonant inverter
 - ii) Class E resonant inverter
 - iii) Principle of ZCS and ZVS resonant inverter
6. a) What is a forced - commutation? What are the advantages of forced-commutation for DC-AC converters.
b) What are the design considerations of Snubber circuit? Explain in details.

7. With neat sketch, explain the $\frac{di}{dt}$ and $\frac{dv}{dt}$ protection of thyristors.

8. What is the principle of operation of cyclo-converters? What are the advantages of sinusoidal harmonic reduction techniques for cycloconverters?

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