Reg. No. :

Question Paper Code: 31553

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2016

Fifth Semester

Electronics and Instrumentation Engineering

01UEI503 - INDUSTRIAL ELECTRONICS

(Regulation 2013)

Duration: Three hours   Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

1. The reverse recovery time of diode is $trr = 3\mu s$ and rate of fall of diode current is $di/dt = 30\ A/\mu s$. Determine (a) the storage charge Q_{RR} (b) the peak current $I_{RR.}$

2. Two MOSFETs are connected in parallel carry a total current $I_T = 20\ A$. The drain to source voltage of MOSFET M_1 is $V_{DS1} = 4.5V$ and that of MOSFET M_2 is $V_{DS2} = 3V$. Determine the drain current of each transistor if $R_{S1} = 0.3\ \Omega$ and $R_{S2} = 0.2\ \Omega$.

3. What is meant by single phase dual converter?

4. Draw the circuit of a single phase cycloconveter.

5. A Single phase full wave AC voltage controller control, the power flow from 230 V 60 Hz AC source into resistive load. The maximum desired power is 10 KW. Calculate (a) Maximum RMS current rating of thyristors I_{RM} and (b) Maximum average current rating of thyristors I_{AM}

6. Give the principle of step down chopper with resistive load.

7. What is the torque - speed characteristics of induction motors?

8. Write the principle of rheostatic braking of DC chopper – fed DC motor drive?

9. Give the need for electronic counters.

10. Define line regulation and load regulation in voltage regulators.

11. (a) What is meant by power diode? Explain about power diode types and also explain about effect of forward and reverse recovery time. (16)

Or

(b) Explain about steady state and switching characteristics of enhancement MOSFETs. (16)

12. (a) Draw the circuit arrangement of single phase semi converter and derive the rms current, average current, rms output current, average output current for a single phase semi converter with RL Load operating in mode 1 and mode2. (16)

Or

(b) Write in detail about three phase cyclo converters with circuit diagram and associated waveforms. (16)

13. (a) Explain in detail about the methods for controlling gain in inverters used in industries. (16)

Or

(b) A Chopper feeding an RL load with $Vs = 220\ V$, $R = 5\Omega$, $L = 7.5\ mH$, $f = 1\ kHz$, $k = 0.5$ and $E = 0\ V$. Calculate the (i) minimum instantaneous load current I_1 (ii) Peak instantaneous load current I_2 (iii) maximum peak to peak load ripple current (iv) average value load current Ia (v) rms load current Io (vi) effective input resistance Ri seen by source and (vii) the rms chopper current I_R. (16)

14. (a) Explain in detail about closed loop control of separately excited DC motor drive. (16)

Or

(b) Write in detail about stator and rotor voltage control of induction motors. (16)

15. (a) Explain in detail about the operation and types of switching mode power supplies with a neat block diagram. (16)

Or

(b) Describe the operation of shunt and linear voltage regulator with necessary diagrams. (16)

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