Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC – SEMESTER – VII • EXAMINATION – SUMMER 2015

Subject Code: X70905 **Date:18/05/2015**

Subject Name: Advanced Power Electronics – I

Time:02:30 AM to 05:00 PM **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 **(a)** Fill in the blanks. **07**

1) The voltage stress on the controlled switches (IGBTs) of a 3 level NPC inverter is _____ times to that of a conventional two level inverter that operates with the same dc link voltage V_{dc}.
2) A total of _____ switching states are possible to generate five different voltage levels at one leg of a five level cascaded H bridge inverter.
3) Minimum _____ clamping capacitors of equal voltage rating are required in one leg of five level flying capacitor inverter.
4) For a general n level NPC inverter, the total number of switching states ___.
5) In general, for an n level (n>=3) NPC inverter, each capacitor has voltage across it equal to____.
6) In a five level cascaded H bridge inverter, the number of DC voltage sources required per leg of the inverter is _____.
7) One leg of n level inverter requires ___ controlled switches of equal voltage rating and _____ neutral point clamping diodes of unequal voltage rating.

(b) Explain the two quadrant ZVS converter with relevant diagram and waveform. **07**

Q.2 **(a)** How 7 level can be obtained in asymmetric cascaded multi-level inverter? **07**

(b) Explain parallel resonant inverter circuit with wave form. **07**

OR

(b) With neat circuit diagram and waveform discuss class E resonant inverter. **07**

Q.3 **(a)** Explain working of five level diode clamped inverter with necessity circuit diagram and wave forms. **07**

(b) Compare multi-pulse converter with multi-level inverter. **07**

OR

Q.3 **(a)** Explain working of five level flying capacitor inverter with necessity circuit diagram and wave forms. **07**

(b) Discuss components of UPS. **07**

Q.4 **(a)** Explain 12 pulse uncontrolled multi-pulse inverter with waveform and diagram. **07**

(b) What do mean by switch mode power supply? How is it differs from conventional power supply? **07**

OR

Q.4	**(a)**	Explain working of fly-back type switch mode power supply.	**07**
	(b)	Discuss push pull converter and its application in dc power supply.	**07**
Q.5	**(a)**	Explain difference between sinusoidal and trapezoidal BLDC machine.	**07**
	(b)	Discuss working principle of SRM. Explain block diagram of SRM drive.	**07**

OR

Q.5	**(a)**	Discuss control of brushless dc drive. Give its applications.	**07**
	(b)	Discriminate ON line and OFF line UPS.	**07**