Enrollment No: _____ Exam Seat No: _____

C.U.SHAH UNIVERSITY

Summer Examination-2019

Subject Name: Power Electronics II
Subject Code: 4TE07PEL1 Branch: B.Tech (Electrical)
Semester: 7 Date: 11/03/2019 Time: 10:30 To 01:30 Marks: 70

Instructions:
(1) Use of Programmable calculator & any other electronic instrument is prohibited.
(2) Instructions written on main answer book are strictly to be obeyed.
(3) Draw neat diagrams and figures (if necessary) at right places.
(4) Assume suitable data if needed.

Q-1 Attempt the following questions: (14)

1) For a buck converter to reduce the conduction losses in diode…….

A) high on - resistance switch can be added in parallel

B) low on - resistance switch can be added in parallel

C) A high on - resistance switch can be added in series

2) The magnitude of output voltage at duty cycle D=1 for a practical BOOST converter is infinite.

A) True B) False

3) For a BOOST converter, input voltage=25 V, duty cycle D=0.5, then output voltage is_____

A) 50 V B) 12.5 V C) 25 V D) 75 V

4) A forward converter is also known by an isolated_____converter.

A) Boost B) Buck C) Buck-Boost D) None of the above

5) The output voltage equation for a flyback converter is V_o=_____

A) $\frac{N_2}{N_1}DV_{in}$ B) $\frac{N_2}{N_1}\frac{1}{1-D}V_{in}$ C) $\frac{N_2}{N_1}\frac{1}{D}V_{in}$ D) $\frac{N_2}{N_1}\frac{D}{1-D}V_{in}$

6) The number of DC sources required for a Five level cascaded H Bridge inverter is_____

A) One B) Five C) Two D) Three

7) The number of clamping diodes required in a three level diode clamped inverter with one leg is _____

A) Three B) Five C) Four D) Two

8) Which one of the below given harmonic order gets eliminated in a six pulse diode rectifier?

A) Third B) Fifth C) Seventh D) Eleventh

9) In a Delta/Z-1(Zigzag) transformer the secondary line voltage lags the primary line voltage.

A) True B) False

10) If a hybrid stepper motor has a rotor pitch of 36º and a step angle of 9º, the number of its phases must be……..

A) 4 B) 2 C) 3

11) Give any two advantages of multilevel inverter over two level inverter.

12) Define resonant converter?

13) Which of the following phase switching sequence represents half-step operation of a VR stepper motor……

A) A, B, C, A…. B)AB, BC, CA, AB.... C) A, AB, B, BC…

14) Percentage THD for cascaded H-bridge inverter is……..

24.4% B) 60% C) 3% .

Attempt any four questions from Q-2 to Q-8

Q-2		**Attempt all questions**	**(14)**
	(a)	Explain overlapping and non-overlapping mode of operation in the case of full bridge series resonant inverter with bidirectional switches.	**07**
	(b)	Explain two Quadrant ZVS resonant converter. Support the answer with necessary circuit and waveforms.	**07**
Q-3		**Attempt all questions**	**(14)**
	(a)	Draw the circuit diagram of buck converter and explain its operation with necessary waveforms	
	(b)	Draw the block diagram of ON LINE UPS and explain the function of each block.	**07**
Q-4		**Attempt all questions**	**(14)**
	(a)	Explain 3-level diode clamped capacitor and advantage and disadvantage.	**07**
	(b)	Explain operation of push-pull converter with waveform.	**07**
Q-5		**Attempt all questions**	**(14)**
	(a)	Draw the circuit diagram of five level flying capacitor inverter with one leg and explain its operation. Draw the output voltage waveform of five level inverter	**07**
	(b)	Explain Bidirectional AC power supplies with diagram	**07**
Q-6		**Attempt all questions**	**(14)**
	(a)	Explain construction and working of stepper motor drive.	**07**
	(b)	Drive the equation for DC-link capacitor voltage balancing.	**07**
Q-7		**Attempt all questions**	**(14)**
	(a)	Draw the circuit diagram 12-pulse series type diode rectifier. With the help of Fourier series equation and harmonic spectrum explain which individual harmonics	**07**

gets eliminated in this rectifier.

(b) Draw and explain the structure of Switched Reluctance Motor (SRM). **07**

Q-8 **Attempt all questions** **(14)**

(a) Draw the circuit diagram and waveforms of three phase half wave Brushless DC motor drive and explain its operation. **07**

(b) Draw the circuit diagram and waveforms of CLASS E resonant inverter and explain its operation. **07**