Enrollment No: _____   Exam Seat No: _____

C.U.SHAH UNIVERSITY
Winter Examination-2019

Subject Name: Power Electronics II

Subject Code: 4TE07PEL1   **Branch: B.Tech (Electrical)**

Semester : 7   Date : 13/11/2019   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) The DC-DC converter should be operated at a very low switching frequency.
A) True B) False

2) In a Buck converter if, $T_{on} = 1\mu s$, $T_{off} = 2\mu s$,then duty cycle D = _____.
A) 0.5 µs B) 2 µs C) 0.33 µs D) 3 µs

3) In a steady state operation of DC-DC converter average voltage across the inductor is _____
A) Finite B) Zero

4) A flyback 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) The number of switches used in a half bridge push pull converter is_____
A) 4 B) 1 C)2 D) 6

10) If a hybrid stepper motor has a rotor pitch of 36° and a step angle of 9°, the number of its phases must be……………..
 A) 4   B) 2   C) 3

11) Give any two advantages of multilevel 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)	Draw the circuit diagram of buck converter and explain its operation with necessary waveforms.	**07**
(b)	Draw the block diagram of ON LINE UPS and explain the function of each block.	**07**
Q-3	**Attempt all questions**	**(14)**
(a)	Draw the circuit diagram and waveforms of CLASS E resonant inverter and explain its operation.	
(b)	Explain operation of push-pull converter with waveform.	**07**
Q-4	**Attempt all questions**	**(14)**
(a)	Explain 3-level diode clamped capacitor and advantage and disadvantage.	**07**
(b)	Draw the circuit diagram and waveforms of a FLYBACK converter and explain its operation.	**07**
Q-5	**Attempt all questions**	**(14)**
(a)	Explain ZVS resonant converter with Waveform.	**07**
(b)	Explain Bidirectional AC power supplies with diagram	**07**
Q-6	**Attempt all questions**	**(14)**
(a)	Explain Single Phase Parallel resonant inverter circuit diagram with waveform.	**07**
(b)	A series resonance inverter with series loaded delivers a load power of $P_L = 1$ kW at resonance. The load resistance is R= 10Ω. The resonant frequency is f_o= 20 kHz. Find (a) the d.c. input voltageV_s (b) Quality factor Q_s if it is required to reduce the load power to 250 W by frequency control so that u= 0.8 (c) inductor L and (d) capacitor C.	**07**
Q-7	**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-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)	Explain Design of apparent transformer power for half bridge circuit.	**07**