Seat No: _____ Enrollment No: _____

PARUL UNIVERSITY

FACULTY OF ENGINEERING & TECHNOLOGY

B. Tech. Summer 2018 - 19 Examination

Semester: 7 **Date: 15/05/2019**
Subject Code: 03107432 **Time: 10:30am to01:00pm**
Subject Name: Power Electronics **Total Marks: 60**

Instructions:
1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1 **Objective Type Questions** - (All are compulsory) (Each of one mark) **(15)**

1. If the cathode of an SCR is made positive with respect to the anode & no gate current is applied then only the middle junction is …….biased.
2. The value of anode current required to maintain the conduction of an SCR even though the gate signal is removed is called as the ……
3. Choppers converts …….signal to …….. signal.
4. True or False. An inverter converts DC signal to AC Signal.
5. The values of duty cycle (α) in chopper lies between……..
6. UPS stand for …….
7. SMPS stands for …….
8. A diode with S-factor less than one is called …….
9. In a single phase half wave circuit with RL load, the angle β is called ……. angle.
10. A …… uses a mixture of diodes and thyristors and there is a limited control over the level of dc output voltage.
11. A thyristor (SCR) is a
    A. P-N-P device B. N-P-N device
    C. P-N-P-N device D. P-N device
12. A thyristor can be brought from the forward conduction mode to forward blocking mode by
    A. The dv/dt triggering method B. Applying a negative gate signal
    C. Applying a positive gate signal D.Applying a reverse voltage across anode-cathode terminals
13. If a step up chopper's switch is always kept off then (ideally)
    A. Vo = 0 B. Vo = ∞
    C. Vo = Vs D. Vo > Vs
14. The type of commutation when the load is commutated by transferring its load current to another incoming thyristor is
    A. Class A or load commutation B. Class B or resonant commutation
    C. Class C or complementary commutation D. Class D or impulse commutation
15. In PWM method of controlling the average output voltage in a chopper the on- time is varied but the chopping frequency is
    A. Varied B. Kept constant
    C. Either of these D. None of these

Q.2 Answer the following questions. (Attempt any three) **(15)**

A) With the help of block diagram, briefly describe the concept of Power Electronics.
B) Draw the V-I characteristics of SCR and describe it in brief.
C) Explain working of single phase half wave controlled rectifier circuit with R type load with necessary waveform.
D) Write short note on UPS.

Q.3 A) What is meant by step-up chopper? Explain its operation with necessary circuit and equations. **(07)**

B) For step down chopper, DC source voltage = 230V, load resistance is 10Ω. Take a voltage drop of 2V across chopper when it is ON. For a duty cycle of 0.4, calculate (1) Average output voltage, (2) RMS output voltage and (3) chopper efficiency. **(08)**

OR

B) Explain working of single phase Full wave Mid-Point Converter (M-2 Connection) circuit with RL load with necessary waveform and derivations. **(08)**

Q.4 A) Explain the principle of working of a single phase half bridge inverter with the help of the circuit and waveforms for both resistive and inductive loads. **(07)**

OR

A)With necessary waveforms, describe the operation of three-phase inverter with 180-Degree conduction mode VSI. **(07)**

B) Discuss the concept of Electric drives with neat and clean block diagram. Compare AC & DC Drives. **(08)**