



ROLL NO:

PRESIDENCY UNIVERSITY, BENGALURU
SCHOOL OF ENGINEERING

Weightage: 20 %

Max Marks: 20

Max Time: 1 hr.

Tuesday, 25th September, 2018

TEST – 1

Odd Semester 2018-19

Course: **ECE 302 Power Electronics**

V Sem. ECE

Instruction:

- (i) Read the question properly and answer accordingly.
- (ii) Question paper consists of 3 parts.
- (iii) Scientific and Non-programmable calculators are permitted.

Part A

(2 Q x 2 M = 4 Marks)

1. What is power electronics? Write the advantages and disadvantages of power electronics?
2. Mention different types of power electronic converters?

Part B

(2 Q x 3 M = 6 Marks)

3. Explain the operation of SCR with two transistor analogy?
4. What are the peripheral effects of power electronics?

Part C

(2 Q x 5 M = 10 Marks)

5. The switching characteristics of the BJT shown in Fig. 1. The parameters are $V_{CC}=200V$, $V_{CE(sat)}=2V$, $I_{CEO}=2.5mA$, $I_{C(sat)}=80A$, $V_{BE(sat)}=2.5V$, $I_B=8A$, $t_d=0.4\mu s$, $t_r=0.9\mu s$, $t_s=5\mu s$, $t_f=3.2\mu s$, duty cycle (δ)=50% and switching frequency (f) is 10KHz. Sketch the instantaneous power curve due to collector current and determine (a) Average power loss (P_{AVIC}) due to collector current (b) Average power loss (P_{AVIB}) due to base current (c) Total average power loss (P_{TAV}) (d) Total energy (E_T).

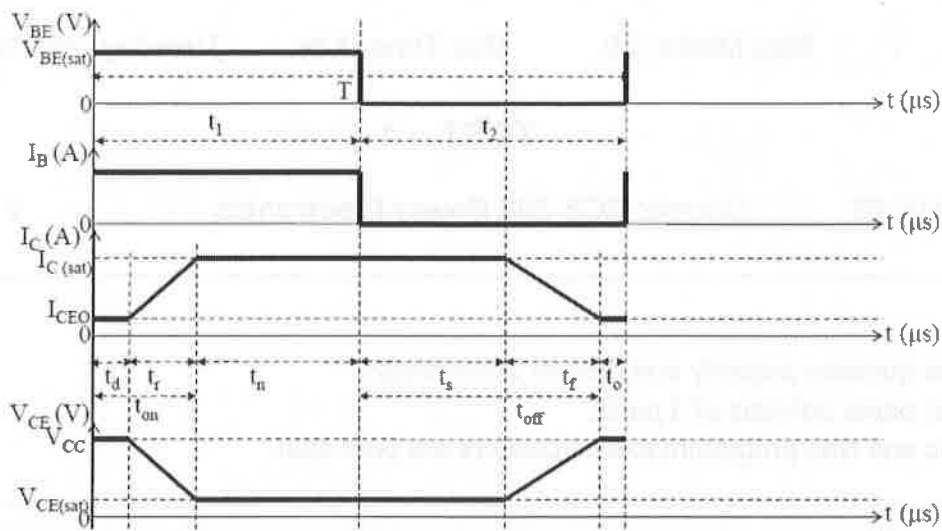


Fig. 1.

6. Explain self commutation with necessary waveforms?



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TEST 2

Odd Semester: 2018-19

Course Code: ECE 302

Course Name: Power Electronics

Branch & Sem: ECE & V Sem

Date: 28 November 2018

Time: 1 Hour

Max Marks: 40

Weightage: 20%

Instructions:

- (i) Read the question properly and answer accordingly.
- (ii) Question paper consists of 3 parts.
- (iii) Scientific and Non-programmable calculators are permitted.

Part A

Answer **all** the Questions. **Each** question carries **four** marks. (2x4=08)

1. What is controlled rectifier? Give the classification of controlled rectifier?
2. Draw the circuit diagram of line side commutation?

Part B

Answer **all** the Questions. **Each** question carries **six** marks. (2x6=12)

3. Explain the operation of Uni-directional AC voltage controller?
4. A 1- Φ half wave AC voltage controller has a resistive load of $R=6\Omega$ and input voltage $V_s=230V$, 50Hz. The thyristor switch is triggered at an angle of $\alpha=\pi/2$. Determine (i) RMS output voltage (ii) Input power factor (iii) Average input current?

Part C

Answer the Question. Question carries **ten** marks. (2x10=20)

5. Draw the circuit diagram, sketch the output voltage waveform and derive the average and RMS output voltage for 1- Φ full-converter?
6. The half wave controlled rectifier has a supply voltage $V_s = 220V$, $R = 10\Omega$, and the delay angle $\alpha = \frac{\pi}{4}$. Determine (i) V_{odc} (ii) V_{orms} (iii) η (iv) FF (v) RF (vi) TUF (vii) PIV ?



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**PRESIDENCY UNIVERSITY
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END TERM FINAL EXAMINATION

Odd Semester: 2018-19

Course Code: ECE 302

Course Name: Power Electronics

Programme & Sem: ECE & V Sem

Date: 29 December 2018

Time: 2 Hours

Max Marks: 40

Weightage: 40%

Instructions:

- (i) Read the question properly and answer accordingly.
- (ii) Question paper consists of 3 parts.
- (iii) Scientific and Non-programmable calculators are permitted.

Part A

Answer **both** the Questions. **Each** question carries **four** marks. (2Qx4M=08)

1. What is inverter? Give the classification of inverter?
2. Define the terms (i) range of output voltage (ii) maximum peak to peak ripple current with respect to chopper?

Part B

Answer **both** the Questions. **Each** question carries **six** marks. (2Qx6M=12)

3. The 1- Φ half bridge inverter has a resistive load of 10Ω and the DC input voltage is 24V. Calculate (i) RMS output voltage (ii) Fundamental component of the output voltage (iii) First five harmonics of the output voltage (iv) Fundamental power consumed by the load (v) RMS power consumed by the load.
4. With circuit diagram and associated waveform, explain step-up chopper?

Part C

Answer **both** the Questions. **Each** question carries **ten** marks. (2Qx10M=20)

5. Write a note on (i) class C chopper (ii) Modified sinusoidal PWM
6. Explain 3- Φ inverter with circuit diagram and associated waveform under 1800 conduction mode?