

Register Number: .....

**B.E DEGREE EXAMINATIONS: NOV/DEC 2012**

Fifth Semester

**ELECTRICAL AND ELECTRONICS ENGINEERING**

EEE108 : Power Electronics

**Time: Three Hours**

**Maximum Marks: 100**

**Answer all the Questions:-**

**PART A (10 x 1 = 10 Marks)**

1. The term bipolar denotes that the current flow in the device is due to movement of
  - a) Holes
  - b) Electrons
  - c) Holes and Electrons
  - d) Protons
2. Latching current is
  - a) Minimum anode current
  - b) Minimum cathode current
  - c) Minimum gate current
  - d) Minimum base current
3. The six pulse converter is connected to a 415 V, 50 Hz AC supply. The output voltage ripple frequency is
  - a) 0 Hz
  - b) 50 Hz
  - c) 300 Hz
  - d) 100 Hz
4. Dual converters are
  - a) One quadrant converter
  - b) Two quadrant converter
  - c) Three quadrant converter
  - d) Four quadrant converter
5. In Time Ratio Control
  - a) Total time is varying
  - b) Total time is constant
  - c) Switch frequency is varying
  - d) ON time and OFF time is always constant
6. In a Thyristor DC chopper, which type of commutation results in best performance?
  - a) Voltage commutation
  - b) Current commutation
  - c) Load commutation
  - d) Line commutation
7. \_\_\_\_\_ number of device will conduct simultaneously in 120° mode of operation of inverter.
  - a) 1
  - b) 2
  - c) 3
  - d) 4
8. A voltage source inverter is normally employed when,
  - a) Source inductance is large and load inductance is small
  - b) Source inductance is small and load inductance is large
  - c) Both Source inductance and load inductance is small
  - d) Both Source inductance and load inductance is large

9. Cycloconverter is
- |                       |                       |
|-----------------------|-----------------------|
| a) AC to DC Converter | b) AC to AC Converter |
| c) DC to DC Converter | d) DC to AC Converter |
10. AC voltage controller used as a \_\_\_\_\_
- |                     |                      |
|---------------------|----------------------|
| a) Light dimmers    | b) Rectifier circuit |
| c) Inverter Circuit | d) Chopper circuit   |

**PART B (10 x 2 = 20 Marks)**

11. Draw the structure of power MOSFET.
12. List the losses in the power device.
13. Differentiate freewheeling diode from feedback diode.
14. List the effects of source inductance in the controlled rectifier circuit.
15. Define duty ratio.
16. Write the concept of current limit control.
17. Compare voltage source inverter with current source inverter.
18. List the different harmonic reduction techniques.
19. What is meant by integral control?
20. Draw the circuit arrangement for on load transformer tap changers.

**PART C (5 x 14 = 70 Marks)**

21. a) Draw and explain the construction of TRIAC with neat diagram. Also explain the static and dynamic characteristics of TRIAC.
- (OR)**
- b) Explain the basic structure and working of IGBT and also explain the switching characteristics.
22. a) (i) Draw the circuit arrangement for single phase fully controlled converter. Also (7)  
explain how this converter operating in rectifier mode and inverter mode.
- (ii) Derive the performance parameter of single phase half controlled converter. (7)
- (OR)**
- b) Describe the working of three phase fully controlled converter with relevant waveforms. Assume RL load.

23. a) With neat circuit arrangement, explain the operation of four quadrant chopper.

**(OR)**

b) What is switching mode regulator? Describe the working of buck-boost converter with neat circuit diagram.

24. a) (i) Explain the working principle of single phase bridge inverter with RL load. (7)

(ii) Enumerate the construction and working of three phase bridge inverter with  $180^\circ$  mode of operation. From this, plot the line and phase voltage waveform for the same. (7)

**(OR)**

b) Explain all the type of voltage control and harmonic reduction technique in the output of Inverters

25. a) (i) Explain the principle of phase control. (7)

(ii) Explain the working of single phase fully controlled AC voltage controller with R- load. (7)

**(OR)**

b) (i) List the different PWM control techniques and explain any one in detail. (7)

(ii) Describe the working of three phase Cycloconverter with necessary waveforms. (7)

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