[Total No. of Questions - 9] [Total No. of Printed Pages - 3]
(2127)

17238(N)

**B. Tech 5th Semester Examination**

**Power Electronics (CBS)**

**EC-505**

**Time : 3 Hours** **Max. Marks : 60**

*The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.*

**Note :** Attempt five questions in all with at least one from each Unit. The unit-V is compulsory.

## UNIT - I

1. (a) With the help of neat diagram, explain structure of IGBT & its V.I characteristics?

   (b) Draw and explain the UJT firing circuit. (6+6 =12)

2. (a) Explain the switching characteristics of power MOSFET.

   (b) Differentiate between DIAC and TRIAC. (6+6 =12)

## UNIT - II

3. (a) What is dual converter and its various mode of operations?

   (b) Explain the operation of circulating current mode dual converter. (6+6 =12)

4. Draw the input & output waveforms in inverter mode for a Three Phase half wave converter with RL load. Also, derive an expression for average load voltage in inverter mode for this converter. (12)





## UNIT - III

5. Draw the circuit diagram of three phase to single-phase cycloconverter and explain its operation with necessary waveforms. (12)

6. Write short note on any three of the following:

   (a) Heat sink efficiency.

   (b) Heat sink transfer coefficient.

   (c) Illumination control. (4+4+4=12)

## UNIT - IV

7. (a) What is resonant inverter and its types? (5)

   (b) Draw the circuit diagram and waveform of parallel inverter and explain its working operation. (7)

8. (a) What is need of DC-DC converter? Write down its various types.

   (b) Draw the circuit diagram of buck converter and explain its operation with equivalent circuit for different modes with necessary waveform. (6+6=12)

## UNIT - V

9. Answer the following questions in brief:

   (a) Briefly explain dv/dt triggering.

   (b) What is the need of free wheeling diode in single-phase half wave converter with RL load? What are the advantages of six pulse converters?

**[P.T.O.]**

(c) For the class C commutation circuit, the d.c. source voltage is 120 V and current through resistances is 20 A. The turn off time of both the SCR is 60μs. Calculate the value of commutation capacitance C for successful commutation.

(d) Explain the use of feedback diodes in inverters.

(e) What is the purpose of having four diodes connected in parallel in emergency light circuit?

(f) What are the changes in operation of AC phase control circuit using TRIAC will occur, if the DIAC is replaced (by short circuit)? 

(g) Evaluate the thermal resistance of heat sink. List the various type of heat sink mounting technique.

(h) What is Induction heating and dielectric heating?

(i) Calculate the turn off time for single phase midpoint converter.

(j) What will happen if the diode connected in series with the capacitor is removed (by short circuit) in emergency light circuit?

(1.2×10=12)