Model Question Paper

COURSE: M.TECH.   **BRANCH**: ELECTRICAL ENGINEERING
SEMESTER: 1 .   **SUBJECT**: ADVANCED POWER ELECTRONICS
Duration: 3:00 hrs   **Max marks: 100**

Note: Attempt all questions.

1. **Attempt any four parts of the following.**   5x4 = 20

   A. Why simultaneous firing of thyristor is required? Explain.
   B. What are applications of series parallel connections of diodes? Illustrate with examples,
   C. Compare the characteristics of thyristor, UJT, PUJT and DIAC.

   D   What are Boost and Buck converter? Where are they preferred?

   F   Write the principle of PWM Control technique of voltage.

2. **Attempt any two parts of the following.**   10x2=20

   A. What are performance parameter of PWM inverters? Explain in brief.

   B. A three phase fully controlled bridge converter is feeding a load drawing a constant and ripple free load current of 10A at a firing angle of 30°. Determine the approximate Total Harmonic Distortion (%THD) and the terms value of fundamental component of the input current.
   C. Draw and explain the operation of a three phase dual converter. Draw its wave forms also.

3. **Attempt any two parts of the following.**   10x2=20

   A.Write the principle of phase control converters. Draw and explain behaviour of three phase full wave cycloconverter.

   B. A battery is charged through a single phase half wave controlled converter. The supply voltage is 230 V, 50 Hz and battery emf is constant at 160 V. Find the value of average charging current for firing angle of 30 degrees. Internal resistance of battery is 2 Ω.

   C. What is a load commutated cycloconverter? How does it differ from line commutated cycloconverter?

4. **Attempt any two parts of the following.**   10x2=20

   A.Discuss why a 3{ to I O cyclo-converter requires positive and negative group phase control converters. Under what conditions, the group works as inverter or rectifier

A. Consider the regulator system shown below Explain the sinusoidal pulse width modulation used in single phase inverter and draw its waveform.

B. With the help of circuit diagram explain the working of single phase dual converter with circulating current mode.

5. Attempt any two parts of the following. **10x2=20**

A. Explain the 1200 conduction mode of a three-phase bridge inverter with output

B. voltage waveforms, indicating the devices conducting in each state.For a single-phase voltage controller, develop a relationship between conduction angle and firing angle. Under what condition conduction angle equals π?

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C.Derive the expression for output voltage of a Buck-Boost regulator, showing relevant waveforms.