

N.B.: (1) Question No. 1 is compulsory.

(2) Solve **any three** questions out of remaining **five** questions.

(3) Figures to the right indicate full marks.

(4) Assume suitable data if required.

1. Attempt the following :-

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- (a) Explain the need of harmonic neutralization in the output of inverter.
- (b) Discuss the principle of phase control in single phase full wave a.c. voltage controller.
- (c) Explain the importance of Snubber circuit with neat diagram.
- (d) Explain the principle of operation of cyclo converter. Enumerate some of its industrial applications.

2. (a) Explain with neat diagram and waveform the operation of single phase full bridge voltage source inverter.

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(b) Explain the operation of single phase dual converter with neat diagram and waveforms.

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3. (a) Explain the working of three phase bridge inverter in 120° conduction mode with circuit diagram and associated waveform.

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(b) Draw and explain the switching characteristics of SCR during its turn on and turn off processes.

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4. (a) With the help of neat diagram and associated waveforms discuss the operation of Cuk converter.

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(b) Explain with neat circuit diagram and waveforms the operation of three phase fully controlled rectifier with R load.

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5. (a) Explain the operating principle of an IGBT on the basis of :

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1. Creation of an inversion layer
2. Conductivity modulation of the drift layer

(b) Explain the need of commutation in thyristor circuits. Enumerate the various commutation techniques used for thyristors. Describe class 'D' commutation with relevant waveforms.

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6. (a) Explain the various triggering modes of Triac with neat diagram. Also draw its V-I characteristics.

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(b) Explain the operation of single phase, half controlled bridge converter with RL load. Derive the expression for average load voltage and load current.

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