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BIEEE-018

B.Tech. – VIEP – ELECTRICAL ENGINEERING (BTELVI)

Term-End Examination

00456

June, 2015

BIEEE-018 : ADVANCED POWER ELECTRONICS

Time : 3 hours *Maximum Marks : 70*

Note : *Attempt any **seven** questions. All questions carry equal marks. Missing data, if any, may be suitably assumed. Use of calculator is permitted.*

1. Give the structure of an Insulated Gate Bipolar Transistor (IGBT). Explain its operation by drawing its I-V characteristic. *3+4+3=10*

2. Differentiate between power BJTs and power MOSFETs on the basis of their switching characteristics. Also draw their I-V characteristic. *6+4=10*

3. Explain the operation of a three-phase bridge rectifier circuit with the help of a necessary circuit diagram, showing various input and output waveforms. *5+5=10*

4. Clearly explain the effect of blanking time on the output voltage of an inverter. What are the advantages of selective harmonic elimination method ? *6+4=10*

5. Explain the operation of a full-wave controlled rectifier with : *5+5=10*

   (a) Purely resistive load

   (b) Purely inductive load

6. What are the various areas of application of a current regulated Voltage Source Inverter (VSI) ? List the advantages and disadvantages of a current regulated VSI. *5+5=10*

7. Give the block diagram of a single-phase capacitor commuted current source inverter. Also perform the necessary mathematical analysis of the same. *6+4=10*

8. What are the various methods of power factor control ? Explain any of the two methods in detail. *4+6=10*

9. Implement a pulse width modulated current regulated Voltage Source Inverter (VSI) based active power filter and explain its operation. *5+5=10*

10. Write short notes on any ***two*** of the following : *2×5=10*

    (a) Gate Turnoff Thyristors

    (b) Three-phase SPWM Inverter

    (c) Active Power Filtering