

**DIPLOMA - VIEP - ELECTRONICS AND  
COMMUNICATION ENGINEERING (DECVI)**

**Term-End Examination**

**June, 2016**

00706

**BIELE-005 : INDUSTRIAL ELECTRONICS**

*Time : 2 hours*

*Maximum Marks : 70*

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**Note :** *Attempt five questions including question no. 1 which is compulsory. Missing data may be assumed suitably. Use of scientific calculator is permitted.*

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1. Choose the correct answer. 7×2=14
- (a) An SCR is considered to be a semi-controlled device because
- (i) it can be turned OFF but not ON with a gate pulse
  - (ii) it conducts only during one half-cycle of an alternating current wave
  - (iii) it can be turned ON but not OFF with a gate pulse
  - (iv) it can be turned ON only during one half-cycle of alternating voltage

- (b) An SCR will be turned off when anode current is
- (i) less than latching current but greater than holding current and gate signal is 0
  - (ii) less than holding current
  - (iii) less than latching current but greater than holding current and gate signal is present
  - (iv) Both (i) and (ii)
- (c) A modern power semiconductor device that combines the characteristics of BJTs and MOSFETs is
- (i) IGBT
  - (ii) FCT
  - (iii) MCT
  - (iv) GTO
- (d) In a UJT, the maximum value of charging resistance is associated with
- (i) peak point
  - (ii) valley point
  - (iii) any point between peak and valley points
  - (iv) after the valley point
- (e) The TRIAC can be used only in
- (i) inverter
  - (ii) rectifier
  - (iii) multiquadrant chopper
  - (iv) cyclo converter

- (f) Secondary breakdown occurs in
- (i) BJT but not in MOSFET
  - (ii) both BJT and MOSFET
  - (iii) MOSFET but not in BJT
  - (iv) None of the above
- (g) Which of the following is a two-terminal three-layer device ?
- (i) BJT
  - (ii) Power diode
  - (iii) MOSFET
  - (iv) None of the above

2. Explain the construction of an SCR with its advantages and applications. Draw the  $V - I$  characteristic and discuss the mode of operations of an SCR device. 14

3. Explain the principle of GTO with a neat diagram and its advantages. Also draw a circuit diagram of the application where GTO is used as a controlling device. 14

4. Explain the working of a single-phase full wave controlled rectifier with R-L load. Also draw the I/P-O/P waveforms. 14

5. What are the various methods to turn off a thyristor ? Explain the Class 'B' commutation scheme with a suitable circuit diagram. 14
6. (a) Explain the function of a freewheeling diode in a controlled rectifier circuit.
- (b) Explain the principle of  $\frac{dv}{dt}$  triggering in a thyristor. 2×7=14
7. Write short notes on any *two* of the following : 2×7=14
- (a) PUT
- (b) TRIAC
- (c) Six-phase star half-wave rectifier
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