

SARDAR PATEL UNIVERSITY

M.Sc. (Instrumentation & Control) Semester II Examination

Power Electronics (PS02EINC01)

Tuesday, 12th April 2016

Time: 10:30 am – 1:30 pm

Total Marks: 70

Note: The figures to the right indicate maximum marks.

- Que.1 Answer the following questions by selection most appropriate option. 08**
- 1 Light triggered thyristors are used in _____ applications
A. HVAC B. HVDC
C. High power D. Low power
 - 2 Which device is also known as gateless TRIAC?
A. SCS(Silicon Controlled Switch) B. SUS(Silicon Unilateral Switch)
C. DIAC D. SCR
 - 3 What is other name of "load commutation"?
A. Self-commutation B. Impulse commutation
C. Resonant-Pulse commutation D. External-Impulse commutation
 - 4 For RL loads extinction angle $\beta =$ _____
A. 0 B. π
C. Greater than π D. Less than π
 - 5 Which of the following is not a category of chopper?
A. Current commutation B. Load commutation
C. Line commutation D. Forced commutation
 - 6 For voltage sourced inverter the voltage source should be _____
A. Of low impedance type B. Of high impedance type
C. Of variable voltage type D. None is correct
 - 7 A step down cycloconverter is used to _____
A. Divide voltage B. Divide current
C. Divide frequency D. Change phase
 - 8 Output wave form of an inverter for a resistive load is _____
A. Rectangular B. Triangular
C. Sinusoidal D. All are possible

- Que. 2 Answer the following questions in brief (any Seven) 14**
- 1 Briefly explain Silicon Controlled Switch (SCS).
 - 2 Enlist different voltage ratings of thyristor.
 - 3 Compare power BJT with MOSFET.
 - 4 Explain load commutation in brief.
 - 5 Draw the wave diagram of 3-phase full-wave converter.
 - 6 Compare full-converter and semi-converter.
 - 7 What is firing and extinction angles?
 - 8 Differentiate between voltage and current sourced inverters.
 - 9 What is a cycloconverter? Mention its types.

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Answer the following questions in detail.

- Que.3** A Write a detailed note on TRIAC construction, characteristics and its turn ON process. **06**
B Write a detailed note on switching characteristics of thyristor during Turn-On and Turn-Off. **06**
- OR**
- B Define string efficiency. With help of necessary expressions explain series operation of SCR. **06**
- Que.4** A Enlist commutation methods for SCR. Write a note on complementary commutation and impulse commutation. **06**
B Describe the construction and working of power MOSFET and IGBT. **06**
- OR**
- B With help of necessary circuit and wave diagrams explain working of single-phase semi-converter with RLE load. **06**
- Que.5** A With help of necessary circuit and wave diagrams explain the effect of source impedance on performance of converters. **06**
B Write a detailed note on principle of chopper operation. Also explain control strategies for chopper. **06**
- OR**
- B With help of neat diagrams explain working of single phase half and full bridge inverters. **06**
- Que.6** A Explain the principle of cycloconverter operation. Also explain working of mid-point and bridge type cycloconverter. **06**
B Write short notes on: **06**
1. Single phase full-converter with discontinuous current
2. Full wave controlled converter
- OR**
- B Explain the principle of phase control in detail. **06**

Best Wishes