



# COLLEGE OF ENGINEERING & TECHNOLOGY

Department : Electrical & Computer Control Engineering

Lecturer : Prof. Dr. Hamdy Ashour

Marks: 40

Course : Power Electronics (II)

Time: 2 hours

Course Code: EE 423

Date : 24/ 5/ 2015

## Final Exam

### Answer ALL questions

**Q1. (10 Marks)**

(A4, A8, A12)

Show using illustration and circuit diagrams how to:-

- Generate 3-ph AC voltage using 1-ph inverters
- Provide PWM as a closed loop control technique
- Feeding a LED lamp with fixed 12V from a PV panel of voltage varied from 6V to 16V
- Control the heating of a 3-ph furnace fed from 3-ph supply
- Provide constant V/f speed control technique for 3-ph induction motor

**Q2. (8 Marks)**

(A4, A29)

The single phase AC voltage controller, shown in figure 1, has a resistive load of  $R=5 \Omega$  and the input voltage is  $V_s=220V, 50Hz$ .

- Draw waveforms of gate signals and output voltage and current then calculate the RMS output voltage if:-
  - The thyristors are on for 4 cycles and off for 6 cycles then repeated
  - The thyristors have repeated gate signals of 60 degree phase delay angle
- State two different typical applications of that circuit

**Q3. (7 Marks)**

(A24, B11)

For the cycloconverter circuit, shown figure 2,

- Draw, input voltage ( $v_s$ ), thyristors gate signals, and output voltage ( $v_o$ ) waveforms to make  $(V_o = \frac{V_s}{\sqrt{2}})$  and  $(f_o = \frac{f_s}{2})$
- State two different typical applications of that circuit

(7 Marks)

Members of course Examination Committee:	Signature:	Date:
Lecturer: Prof. Hamdy Ashour		17-5-2015
Course Coordinator : Dr Ahemd Kadry		17-5-2015
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