

COLLEGE OF ENGINEERING, SCIENCE & TECHNOLOGY
SCHOOL OF ELECTRICAL ENGINEERING & ELECTRONICS
ENGINEERING

CERTIFICATE 4 IN ELECTRICAL ENGINEERING – STAGE 4

EEE445 - ELECTRICAL INSTALLATION TECHNOLOGY 2

FINAL EXAMINATION – PENSTER 2, 2016

INSTRUCTIONS TO STUDENTS

1. *You are allowed 10 minutes Extra reading time during which you are NOT to write*
2. *Two hours only is the time allocated for candidates to do this examination paper*
3. *Begin each answer on a fresh page and use both sides of the sheet.*
4. *Write your candidate-number at the top of each attached sheet.*
5. *Insert all written foolscaps, graph paper, drawing, etc. in their correct sequence and secure with string.*
6. *For all sheets of paper on which rough/draft work has been done, cross it through and you MUST ATTACH to your answer scripts.*
7. *Write clearly the number(s) of the question(s) attempted on top of each sheet.*
8. **ANSWER ALL QUESTIONS.**
9. *Show all workings where necessary.*
10. *Do not use programmable calculators, especially the ones that do the conversion of number systems.*
11. **AS/NZ STANDARD WIRING RULE BOOKS ARE ALLOWED**
12. **ALWAYS CHECK YOUR WORK BEFORE YOU LEAVE THE ROOM.**

EXAMINATION QUESTIONS – (100 MARKS)**QUESTIONS:**

- 1) List four (4) factors that must be known about an installation before any electrical work can commence. (4 marks)
- 2) Explain two (2) factors, which shows that the available electricity supply may affect the installation design. (4 marks)
- 3) Describe five (5) aspects of an installation that may affect its design. (5 marks)
- 4) List four (4) factors that should be considered when arranging electrical installation into circuits (4 marks)
- 5) When arranging an installation why should you consider the intended use of socket-outlets? (3 marks)
- 6) What effect could the installation of electric motors have on how an installation is arranged? (3 marks)
- 7) What effect does frequent overloading have on circuit wiring? (4 marks)
- 8) What is the maximum recommended number of lights points on a 1.5 mm^2 circuits protected by a 16 A circuit breaker? (3 marks)
- 9) Describe what is meant by the term 'maximum demand.' (3 marks)
- 10) Why is it important to limit the number of socket-outlets on a circuit for the connection of class 1 appliances? (3 marks)
- 11) Describe the relationship between a PV cell and a PV module. (2 marks)
- 12) A number of PV modules connected in series are known as what? (2 marks)
- 13) A number of strings connected in parallel are known as what? (2 marks)
- 14) Five PV modules with VOC rating of 50 V and ICS rating of 7.5 A are configured in a string. What is the maximum voltage output of the string? (2 marks)
- 15) What would be the maximum current output of the string configuration in Q14? (1 mark)
- 16) Excluding losses, design an array to supply 250 V and 22.5 A using the module from Q 14. (2 marks)
- 17) Sketch a label block diagram of a simple in-line UPS system. Also describe briefly the in-line UPS operation system. (7 marks)

QUESTIONS: (Cont'd)

- 18) Briefly describe a flywheel UPS (3 marks)
- 19) State two main categories of inverters and describe both types of inverters. (8 marks)
- 20) What is the purpose of a wiring system? (2 marks)
- 21) Why does an electrician need to know about construction and building methods? (2 marks)
- 22) State the three (3) elements of a wiring/cabling system. (3 marks)
- 23) List four (4) main steps in managing the installation of wiring systems. (5 marks)
- 24) What role do substations play in the transmission and distribution of electricity? (5 marks)
- 25) List the configuration of low-voltage supply to consumers. (4 marks)
- 26) Maximum Demand (14 marks)

Determine the maximum demand for a single-phase 230 V installation that comprises:

- 25 lighting points
- 2 × 15 A plug socket-outlets
- 6 single and 10 double socket-outlets
- 10 kW range
- 4.8 kW controlled-load water heater
- 4 × 300 W floodlights in swimming pool area.

END

