



higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

T430(E)(A15)T

NATIONAL CERTIFICATE

CONTROL SYSTEMS N6

(8080016)

15 April 2019 (X-Paper)

09:00–12:00

REQUIREMENTS: 3-cycle semi-logarithmic graph paper

**This question paper consists of 7 pages, 1 diagram sheet, a formula sheet of 2 pages,
1 Nichols chart and 3 Laplace transform pages.**



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TIME: 3 HOURS
MARKS: 100

INSTRUCTIONS AND INFORMATION

1. Answer ALL the questions.
 2. Read ALL the questions carefully.
 3. Number the answers according to the numbering system used in this question paper.
 4. Neat, labelled circuit diagrams must be used in the explanation of answers only where they are requested.
 5. Use only BLUE or BLACK ink.
 6. Make use of drawing equipment and a pencil for ALL sketches and diagrams.
 7. Write neatly and legibly.
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QUESTION 1

Indicate whether the following statements are TRUE or FALSE. Choose the answer and write only 'True' or 'False' next to the question number (1.1–1.10) in the ANSWER BOOK.

- 1.1 A system is a combination of components that act together to perform a function not possible with any of the individual parts. 
- 1.2 A system may become unstable if the output grows although no signal is applied to the system.
- 1.3 An input is the quantity that must be maintained at a prescribed value.
- 1.4 In a closed-loop system the output signal has no effect on the input signal.
- 1.5 A block diagram is a shorthand pictorial representation of the cause and effect relationship between the input and output of a system.
- 1.6 A phase margin is when the gain corresponds to the point where the phase crosses the 180° line. 
- 1.7 Underdamping is where the response tends to overshoot the goal with oscillations decaying very slowly or not at all.
- 1.8 A sine function is a function of time that rises or falls in a linear fashion at a constant rate.
- 1.9 In a derivative control the controlled output varies directly with the input or system error.
- 1.10 In an integral control the correction that is made is proportional to the time integral of the error.



(10 × 1)

[10]