



# higher education & training

Department:  
Higher Education and Training  
**REPUBLIC OF SOUTH AFRICA**

**NATIONAL CERTIFICATE**

**CONTROL SYSTEMS N6**

(8080016)

**17 November 2020 (X-paper)**  
**09:00–12:00**

**REQUIREMENTS:** Three-cycle semilogarithmic graph paper

**This question paper consists of 8 pages, 2 diagram sheets, a formula sheet of 2 pages  
and a Laplace transform table of 3 pages.**

115Q1E2017

**DEPARTMENT OF HIGHER EDUCATION AND TRAINING**  
**REPUBLIC OF SOUTH AFRICA**  
NATIONAL CERTIFICATE  
CONTROL SYSTEMS N6  
TIME: 3 HOURS  
MARKS: 100

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**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. Insert the completed three-cycle semilogarithmic graph paper of the Bode plot into the ANSWER BOOK before handing it in.
  5. Write neatly and legibly.
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**QUESTION 1**

Choose a term from COLUMN B that matches a description in COLUMN A. Write only the letter (A–K) next to the question number (1.1–1.10) in the ANSWER BOOK.

COLUMN A		COLUMN B	
1.1	Control action is dependent on the output	A	time period
1.2	Slow variation of the output voltage or current of the amplifier when the input signal is maintained at a constant level	B	closed-loop system
1.3	Response tends to overshoot the goal with oscillations decaying very slowly or not at all	C	undamped natural frequency
1.4	Time taken by the response to complete one full cycle	D	feedback
1.5	Condition brought about when two complementary energy-storing components of a system produce an oscillation between them	E	total response
1.6	Frequency produced when two complementary energy-storing components of a system produces an oscillation between them	F	transfer function
1.7	Sum of the transient response and the steady state response of a linear constant differential equation	G	underdamping
1.8	System where the output has an effect on the input to maintain the output at a desired value	H	drift
1.9	Mathematical equation containing elements of a system to be transferred from the input to the output assuming all initial conditions to be zero	I	block diagram
1.10	Shorthand pictorial representation of the cause-and-effect relationship between the input and output of a system	J	resonance
		K	pen-loop system

(10 × 1)

**[10]**