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Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

T1230(**E**)(N17)T

NOVEMBER EXAMINATION

NATIONAL CERTIFICATE

RADIO AND TELEVISION THEORY N1

(11040821)

17 November 2016 (X-Paper)
09:00–12:00

Calculators may be used.

This question paper consists of 6 pages and 1 formula sheet.

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DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE
RADIO AND TELEVISION THEORY N1
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. Write neatly and legibly.

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QUESTION 1

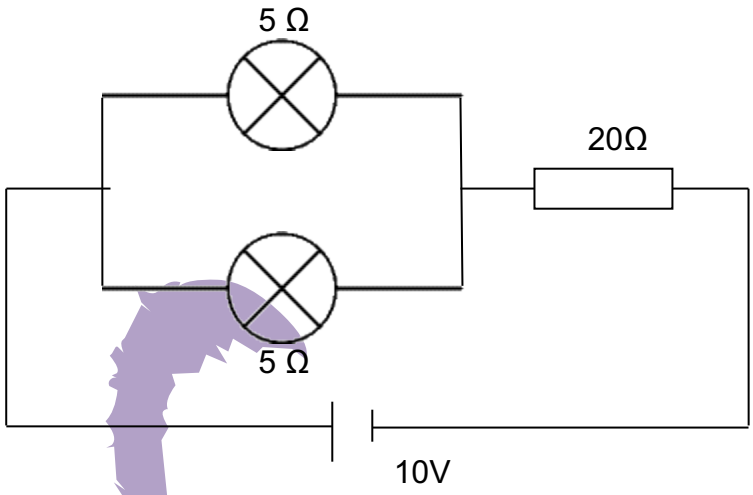

FIGURE 1

1.1 Refer to FIGURE 1 above and calculate the following:

1.1.1 Total resistance of the circuit

1.1.2 The total current of the circuit

1.1.3 The voltage drop across the 20 ohms resistor

1.1.4 The voltage across the lamps

1.1.5 The current flow of the lamps

(5 × 2) **[10]**

QUESTION 2

2.1 Sketch the IEC symbols of the following:

2.1.1 Capacitor

2.1.2 Inductor

2.1.3 Resistor

(3 × 2) (6)

2.2 Make a neat labelled sketch which indicates a reverse-biased PN junction of a diode. (4)

[10]

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QUESTION 3

Choose an item from COLUMN B that matches a description in COLUMN A. Write only the letter (A–K) next to the question number (3.1–3.10) in the ANSWER BOOK.

COLUMN A		COLUMN B	
3.1	electric current theory	A	Raster
3.2	cells and batteries	B	Oscilloscope
3.3	electromagnetic induction	C	Black and white TV
3.4	alternating current	D	Superheterodyne
3.5	radio transmission	E	Diode
3.6	semiconductor	F	Radio waves
3.7	AM receiver	G	RMS
3.8	monochrome receiver	H	Faraday's law
3.9	instruments	I	EMF
3.10	antenna faulty	J	Ohm's law
		K	Half wave

(10 × 1) **[10]**

QUESTION 4

4.1 Draw a neat, labelled block diagram of an FM superheterodyne receiver. (ALL the directions and interconnections must be indicated.) (10)

4.2 Name the stages from the block diagram in QUESTION 3.1 which perform the following functions:

4.2.1 Electrical signal to mechanical sound

4.2.2 Output of intermediate frequency (IF)

4.2.3 Amplification

(3 × 2) (6)
[16]

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QUESTION 5

5.1 Define the following:

5.1.1 Faraday's law

5.1.2 Lenz's law

(2 × 3) **[6]**

QUESTION 6

Draw a neat, labelled block diagram of a 625-line television receiver.
(ALL the directions and interconnections must be indicated.) **[12]**

QUESTION 7

7.1 Define the following terms used in radio-wave propagation:

7.1.1 Polarisation

7.1.2 Ground-reflected wave

7.1.3 Direct-reflected wave

(3 × 2) **[6]**

QUESTION 8

Define the following terms:

8.1 Peak white

8.2 Phosphor

8.3 Shadow mask

8.4 Critical angle

8.5 Line of sight

(5 × 2) **[10]**

QUESTION 9

Draw a labelled circuit diagram of a stabilised common emitter-amplifier circuit. Show all components, input and output waveforms. **[7]**

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QUESTION 10

Write the following abbreviations in full:

10.1 AGC

10.2 RMS

10.3 DC

10.4 AF

10.5 IF

10.6 RF

10.7 VLF

10.8 VHF

10.9 LF

10.10 UHF

(10 × 1) **[10]**

QUESTION 11

Indicate whether the following statements are TRUE or FALSE. Choose the answer and write only 'true' or 'false' next to the question number (11.1—11.3) in the ANSWER BOOK.

11.1 Digital multimeters are more accurate than analog meters.

11.2 The CRT of a monochrome TV has three electronic guns.

11.3 A microphone is one form of a transducer.

(3 × 1) **[3]**

TOTAL: 100

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RADIO AND TELEVISION THEORY N1

FORMULA SHEET

$V = 3 \times 10^8 m/s$

$R_T = R_1 + R_2 + \cdots R_N$

$P = V \times I$

$V = \frac{P}{I}$

$F = \frac{1}{T}$

$I = \frac{E}{R + r}$

$\lambda = \frac{V}{f}$

$P = I^2 R$

$I = I_M \sin 2\pi ft$

$R = \frac{P}{I^2}$

$V = I \times R$

$R = \frac{V^2}{P}$

$\frac{1}{R_T} = \frac{1}{R_1} + \frac{1}{R_2} + \cdots \frac{1}{R_N}$

$m\% = \frac{A-B}{A+B} \times \frac{100}{1}$

$e = E_M \sin 2\pi ft$

$emf = {}^{b}/_{v}$

$I = \sqrt{\frac{P}{R}}$

$c = r \times t$

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