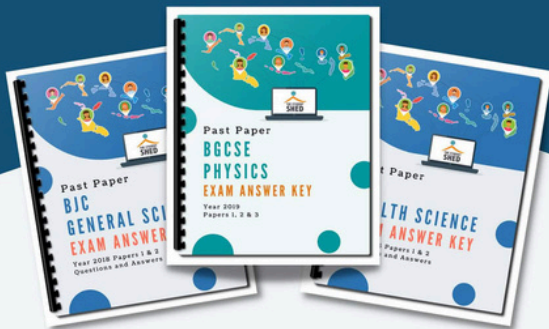


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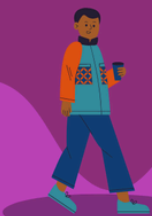
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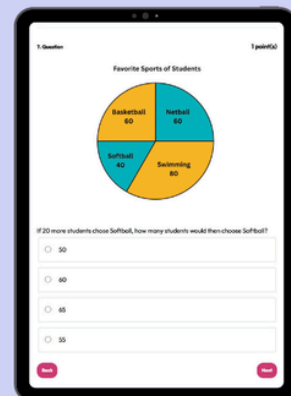
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School Number	Candidate Number
Surname and Initials	

ELECTRICAL INSTALLATION

PAPER 3 PRACTICAL EXAMINATION 4130/PRA/3a
ASSIGNMENT 1

15 APRIL – 8 MAY 2024

Additional materials:
Electrical tools/supplies

1 hour plus
30 minutes for preparation

MINISTRY OF EDUCATION NATIONAL EXAMINATIONS

BAHAMAS GENERAL CERTIFICATE OF SECONDARY EDUCATION

INSTRUCTIONS TO CANDIDATES

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INFORMATION FOR CANDIDATES

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Measuring instruments and electronic calculators are allowed.



This question paper consists of 4 printed pages.

Table of Allowable Excerpt NEC 2011

Ampacities of Insulated Conductors with Not More Than Three Current-Carrying Conductors in Raceway, Cable, or Earth (Directly Buried)

Size AWG or kcmil	Temperature Rating of Conductor [See Table 310.104(A).]						Size AWG or kcmil
	60° C (140° F)	75° C (167° F)	90° C (194° F)	60° C (140° F)	75° C (167° F)	90° C (194° F)	
	Types TW, UF	Types RHW, THHW, THW, THWN, XHHW, XHWN, USE, ZW	Types TBS, SA, SIS, FEP, FEPB, MI, PFA, RHH, RHW-2, THHN, THHW, THW-2, THWN-2, USE-2, XHH, XHHW, XHHW-2, XHWN, XHWN-2, XHHN, Z, ZW-2	Types TW, UF	Types RHW, THHW, THW, THWN, XHHW, XHWN, USE	Types TBS, SA, SIS, THHN, THHW, THW-2, THWN-2, RHH, RHW-2, USE-2, XHH, XHHW, XHHW-2, XHWN, XHWN-2, XHHN	
COPPER				ALUMINIUM OR COPPER-CLAD ALUMINIUM			
18*	—	—	14	—	—	—	—
16*	—	—	18	—	—	—	—
14*	15	20	25	—	—	—	—
12*	20	25	30	15	20	25	12*
10*	30	35	40	25	30	35	10*
8	40	50	55	35	40	45	8
6	55	65	75	40	50	55	6
4	70	85	95	55	65	75	4
3	85	100	115	65	75	85	3
2	95	115	130	75	90	100	2
1	110	130	145	85	100	115	1
1/0	125	150	170	100	120	135	1/0
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300	240	285	320	195	230	260	300
350	260	310	350	210	250	280	350
400	280	335	380	225	270	305	400

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Source from current Wiring Book

For all circuits assume 75 °C temperature, please refer to table above where applicable.

Grounding

- A six-inch grounding wire should be affixed and allowed to hang on all devices or control units that should be grounded.
- Install a grounding wire in the appropriate place in the main switch.
- It is not necessary to run the grounding wire throughout the installation if the conduit run is EMT.



ASSIGNMENT 1

On your wiring boards you are required to wire:

- A. a 100A, 125/250V 3-wire single phase overhead service for a residential installation with **TWO** circuits in the installation. [8]
- B. **Circuit I:** ONE 60A, 125/250V receptacle suitable for an electric range. [5]
- C. **Circuit II:** TWO 40W, 125V lamps each controlled from **ONE** location. [5]

QUESTIONS

1. What size and type are the main service copper conductors?
Size _____ [1]
Type _____ [1]
2. What is the size and type of circuit breaker used in the main disconnect switch?
Size _____ [1]
Type _____ [1]

In Circuit I:

3. State the voltage that is applied across the heater element for the range circuit.
_____ [1]
4. State the size and type of circuit breaker that is required to protect the circuit.
Size _____ [1]
Type _____ [1]

In Circuit II:

5. Calculate the total power used by the lamps when both are lit. [2]

Show all working.

6. Calculate the total current drawn when both lamps are lit. [2]

Show all working.



School Number	Candidate Number
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ELECTRICAL INSTALLATION

PAPER 3 PRACTICAL EXAMINATION 4130/PRA/3b
ASSIGNMENT 2

15 APRIL – 8 MAY 2024

Additional materials:
Electrical tools/supplies

1 hour plus
30 minutes for preparation

MINISTRY OF EDUCATION NATIONAL EXAMINATIONS

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Copyright Goodheart-Willcox Co., Inc.

Source from current Wiring Book

For all circuits assume 75 °C temperature, please refer to table above where applicable.

Grounding

- A six-inch grounding wire should be affixed and allowed to hang on all devices or control units that should be grounded.
- Install a grounding wire in the appropriate place in the main switch.
- It is not necessary to run the grounding wire throughout the installation if the conduit run is EMT.



Assignment 2

On your wiring boards, you are required to wire **THREE** branch circuits in a residential installation.

- A. **Circuit I:** **ONE** 20A, 125V receptacle suitable for a space heater. [5]
- B. **Circuit II:** **THREE** 15A, 125V duplex receptacles, one switched and two live. [5]
- C. **Circuit III:** **ONE** 75W, 125V lamp controlled from **TWO** locations. [5]

QUESTIONS

In Circuit I:

1. What are the minimum size of copper conductors for this circuit?
Size _____ [1]
2. What size and type of circuit breaker are required to protect this circuit?
Size _____ [1]
Type _____ [1]

In Circuit II:

3. What is the name of the switch used to control the duplex receptacle?
_____ [1]
4. Which colour conductors are usually connected to this switch?
_____ [2]
5. How many loads can be safely connected in this circuit?
_____ [1]

In Circuit III:

6. Calculate the current drawn when the lamp is lit.

Show all working

[3]



School Number	Candidate Number
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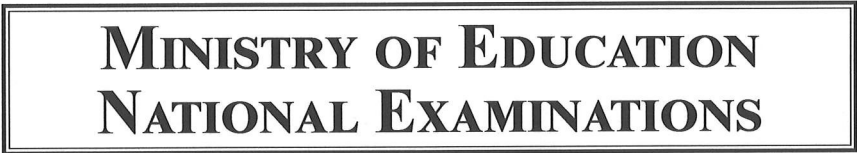
ELECTRICAL INSTALLATION

PAPER 3 PRACTICAL EXAMINATION 4130/PRA/3c
ASSIGNMENT 3

15 APRIL – 8 MAY 2024

Additional materials:
Electrical tools/supplies

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30 minutes for preparation



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This question paper consists of 3 printed pages and 1 blank page.

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Adapted from Goodheart-Willcox Co, Inc.

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Assignment 3

On your wiring boards, you are required to wire **TWO** branch circuits in a residential installation.

Circuit I: **ONE** bell controlled from **ONE** location and a buzzer controlled from another location. [5]

Circuit II: **ONE** fluorescent light strip controlled with a photocell. [5]

QUESTIONS

In Circuit I:

1. State the output voltage on the transformer.

_____ [1]

2. What size conductor is used for this circuit?

Size _____ [1]

3. What type of switch is used for this circuit?

Type _____ [1]

In Circuit II:

4. What is the colour code on the photo cell?

_____ [1]

5. What is another name for the transformer found in the fluorescent light strip?

_____ [1]



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