higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

RENEWABLE ENERGY TECHNOLOGIES
NQF LEVEL 2

11 March 2020

This marking guideline consists of 5 pages.

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QUESTION 1

1.1 1.1.1 Agreement between government, business and labour✓ committing each to tangible targets in achieving✓ low carbon-based economic development growth through renewable energy✓ (3)

1.1.2
- Commitment 1 – rollout of solar water heaters
- Commitment 2 – investment in green economy
- Commitment 3 – rollout of renewable energy
- Commitment 4 – energy efficiency
- Commitment 5 – waste recycling, reuse and recovery
- Commitment 6 – bioenergy
- Commitment 7 – clean-coal initiatives
- Commitment 8 – retrofitting
- Commitment 9 – reducing carbon emission on roads
- Commitment 10 – electrification of poor communities and reduction of fossil – fuel open-fire cooking and heating
- Commitment 11 – economic development in the green economy
- Commitment 12 – cooperation around the United Nations Cop 17 and its follow-up talks on climate change (Any 8 × 1) (8)

1.2

ADVANTAGES	DISADVANTAGES
• Predictable 24/7 power, can provide base, intermediate or peak load for demand • Can expand irrigation • Can provide drinking water	• Limited locations available • Restricts areas with flowing water and creates environmental stress on water ecosystems • Can destabilise relations between regions or neighbouring countries (up-river and down-river water rights) • Dam building costly • Possible relocation of people

(8)

1.3 1.3.1 True (1)

1.3.2 Wind and hydroelectric power are the direct result of differential heating of the Earth's surface✓ which leads to air moving (wind) and precipitation (rain) forming as the air is lifted.✓ Solar energy is also embedded in fossil fuels, since the energy we get from coal are aged decomposed plants.✓ (3)

[23]

QUESTION 2

2.1 2.1.1 i $2 \times 1,45 \times 1,2$✓ = R3,48✓

ii $1,1 \times 1,45 \times 1,2 \times 365$✓ = R698,61✓

iii $2,7 \times 1,45 \times 1,2 \times 365$✓ = R1 714,77✓

(3 × 2) (6)

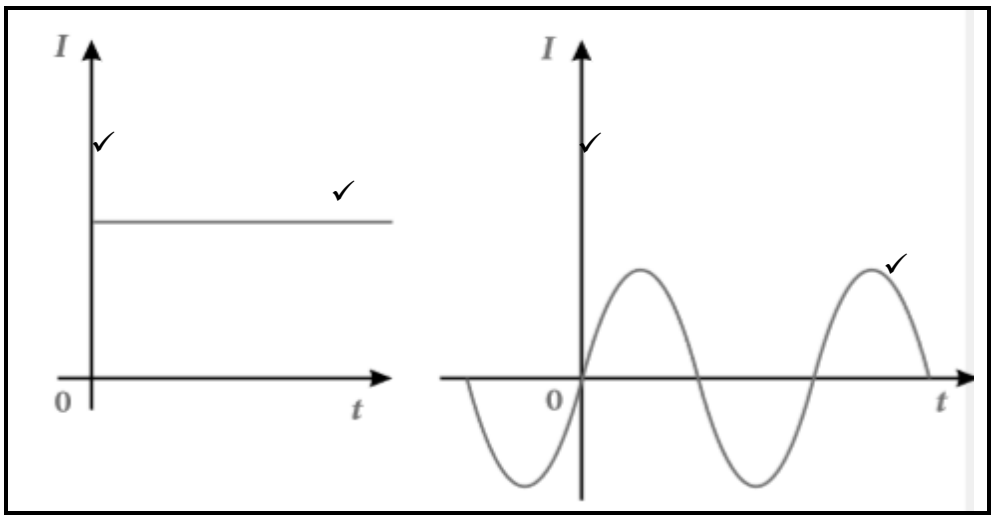
2.1.2 A: [(1,1 × 1,45 × 25 000)✓ + 250]✓ × 3 0000/25 000✓ = R48 150,00

B: (2 × 1,45 × 30 000)✓ + 200✓ = R87 200,00✓

C: [(2,7 × 1,45 × 10 000)+ 110]✓× 30 000/10 000✓ = R117 780,00✓
A is the most cost effective✓ (10)

2.2 2.2.1
- Direct current
- Alternating current (2)

2.2.2



(4)

2.2.3 Current is directly proportional to potential✓ and inversely proportional to resistance✓ provided that the temperature in the circuit remains constant.✓ (3)
[25]

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QUESTION 3

3.1 Communication is essential in maintaining appropriate safety standards. ✓ Employees must know about the risks they face, the prevention measures being taken, and any emergency action plans.✓ (2)

3.2
- List of hazardous substances used or produced available in workplace
- Having safety data sheets readily available for each classified hazardous chemical substance used
- Turning information from safety data sheet into workplace instructions giving practical information on handling substances
- Ensuring containers for hazardous substances clearly labelled with appropriate hazard warnings relating to physical and health hazards
- Communicating results of risk assessments
- Regularly asking workers about potential health and safety problems
- Providing workers with relevant information, instructions and training on precautions to protect themselves and other workers
- Ensuring that all workers know how to use control measures properly, to whom problems should be reported, and what they should do in the event of accident involving hazardous substances (Any 4 × 1) (4)

3.3
- Working area clean and tidy at all times
- Yard tidy and clean
- No redundant materials
- Adequate storing space
- Safe stacking
- No obstruction in aisles?
- Cupboards and shelves tidy and clean (Any 6 × 1) (6)

[12]

QUESTION 4

4.1 Number of panels = 2000/230✓ = 9 panels✓

Area of module = 1,705 × 0,942✓ = 1,6 m^2✓
Area of PV system = 9 × 1,6 = 14,4 m^2✓ ~ 15 m^2✓

System will fit on rooftop✓✓ (8)

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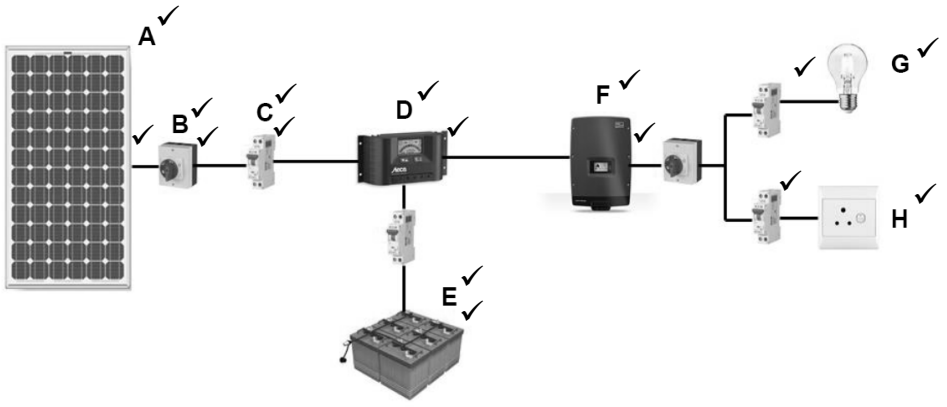
4.2



(16)

4.3 4.3.1 (a) 2 V
(b) 0,5 V
(c) 2 mA

(3 × 2) (6)

4.3.2 The solar cells✓ convert the radiation energy✓ from the spotlight to dc electrical energy.✓ (3)

4.4 4.4.1 STC represents standardised test conditions✓ at which all PV modules are tested and rated✓ (2)

4.4.2 Energy output from the solar cell✓ to input energy from the sun✓ (2)

4.4.3 Allow current to pass around shaded cells or modules✓ thereby reducing potential loss through shaded module✓ (2)

4.4.4 6 (1)

[40]

TOTAL: 100

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