



**UNIVERSITY OF MINES AND TECHNOLOGY, TARKWA**

**FIRST SEMESTER EXAMINATIONS, NOV/DEC. 2018**

**COURSE NO:** RN 273

**COURSE NAME:** CLIMATE CHANGE AND CARBON BALANCING

**CLASS:** RN II

**TIME:** 3 HOURS

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Name: \_\_\_\_\_ Index Number: \_\_\_\_\_

**ANSWER ALL QUESTIONS IN YOUR ANSWER BOOKLET PROVIDED**  
**SECTION A**

***ANSWER TRUE OR FALSE both in your answer booklet and question paper. Half mark will be deducted for every wrong answer given. The question paper must be tied loosely into the answer booklet.***

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1. CH<sub>4</sub> is more effective at absorbing infrared radiation than N<sub>2</sub>O.
2. Carbon offset helps to combat global climate change as well as caring for local communities.
3. Global hectares are needed because different land types have different productivity.
4. Carbon footprint is expressed in grams of CO<sub>2</sub>e per one kilogram of product.
5. All land use types have a corresponding biocapacity calculation.
6. The purpose of carbon tax is to place an economic incentive on carbon emitting activity.
7. Ecological Footprint of production mirrors the gross domestic product.
8. The total impact of an organization on the environment, measured in emissions of GHGs, is known as its carbon footprint.
9. At a global level, biocapacity deficit can be compensated through trade defining overshoot.
10. The greenhouse effect maintains Earth's surface at an average of about 0°F.
11. Smoky soot reflects incoming sunlight, while other aerosols, such as dust particles, absorb it.
12. Water vapour acts as a feedback factor in global warming.
13. Radiative forcing is defined as the change in net irradiance at the stratopause, produced by a specified cause.
14. LCA is a quantitative approach that assesses a product's impact on the environment throughout its life.

15. The greenhouse effect is not a natural phenomenon.
16. The ecological footprint can be used for comparing the sustainability of resource use among different populations.
17. The CO<sub>2</sub>e of a greenhouse gas is derived by multiplying the number of the gas emitted by its associated global warming potential.
18. A product carbon footprint helps to better understand and manage your supply chains.
19. In the atmosphere, CO<sub>2</sub> acts like a visible blanket that warms the planet.
20. The Ecological Footprint is usually measured in global hectares.
21. Unusual weather conditions can affect a person's health, as well as their mental functioning.
22. Greenhouse gases let sunlight through the earth's surface then impede the escape of heat into space.
23. HFCs emanate primarily from the aluminium and semiconductor industries.
24. Adaptation measures will not reduce climate change, but they can reduce vulnerability to the impacts of climate change.
25. The voluntary markets include all carbon offsets outside any regulatory requirement.
26. Carbon offset represents one tonne of carbon dioxide only.
27. The term carbon credit is reserved for voluntary purchases of carbon-reduction services by individuals or corporations for reasons of conscience or public relations.
28. Product carbon footprint does not cover emissions created by disposing of any waste, and the impact of recycling.
29. Emission factors should be used to convert units of energy and fuel into carbon dioxide equivalents.
30. Lighter areas, such as snow, tend to be good reflectors of heat.
31. Water has high heat capacity, which means that it can absorb small amounts of heat with very little temperature change.
32. Advanced climate modelled projections could play a key role to help guide investment decisions, enhance productivity and increase security across many different sectors.

33. The LCI creates an inventory of input and output data for the system.
34. Interpretation of the result evaluates the significance of the potential environmental impacts associated with the inventory assessment results.
35. Natural adaptation for plants consists mostly of range shifting.
36. Greenhouse gases do not allow incoming sunlight to pass through the atmosphere.
37. Ionosphere is the upper limit of our atmosphere.
38. Interiors of the continent have lower range of temperature.
39. Continental interiors have warmer summers, colder winters and greater range of temperature as compared with maritime districts.
40. Earth is warming, because it is radiating slightly more energy than it is absorbing.
41. The rising atmospheric CO<sub>2</sub> absorbed by the ocean reduces the seawater pH making it more acidic.
42. Carbon footprints can be calculated for events.
43. La Niña is sometimes referred to as the warm phase of ENSO.
44. Pre-combustion capture involves chemical reactions which are used to extract CO<sub>2</sub> from the fuel before it is burned.
45. A carbon tax is a tax levied on the carbon content of fuels.
46. Tradable units from Joint Implementation initiatives are known as Certified Emissions Reductions.
47. Biocapacity for cropland is not equal to the cropland Footprint of production.
48. Weighting in LCA determines the relative importance of the two impacts.
49. Projects like building a wind farm, supporting truck stop electrification projects, planting trees or preserving forests are very common carbon credit projects.
50. Biocapacity represents the biosphere's ability to meet human demand for material consumption and waste disposal.

**SECTION B**

**Choose the correct answer from the options provided (A – D)**

51. The greenhouse effect \_\_\_\_\_.
- a. did not exist until humans started polluting the atmosphere.
  - b. exists only on Earth and not on any other planet.
  - c. makes life on Earth possible, because without it Earth would be too cold for life to develop.
  - d. can be completely eliminated if we stop using fossil fuels and switch to renewable energy.
52. Seasons are caused by \_\_\_\_\_.
- a. ocean currents and revolution
  - b. air masses and rotation of the earth
  - c. ocean current and rotation of the earth
  - d. inclination of the earth's axis and earth's revolution
53. Climate represents
- a. the long-term average and its statistical variation for a given region.
  - b. weather averaged over a year.
  - c. the measure of variations in the amount of precipitation.
  - d. none of the above
54. Which of the following activities contributes the most to carbon emissions globally?
- a. Agriculture
  - b. Transport
  - c. Forestry
  - d. Energy supply
55. Carbon sequestration is
- a. removal of carbon from the ocean and store it in the land
  - b. removal of carbon from underground such as hydrocarbon deposit and storing in Earth's surface
  - c. removal of carbon from the surface environment and placing it in storage
  - d. none of the above
56. Which of these natural events affect the climate?
- a. Variations in ocean current
  - b. The path of the Earth around the sun
  - c. Volcanic eruptions
  - d. All of the above
57. What do greenhouse gases do?
- a. They cause more heat to be kept out of the Earth.
  - b. They cause the sun's light to be kept out of the Earth.
  - c. They absorb and hold in heat.
  - d. They cause acid rain.

58. The greenhouse gas generated by the decomposition of waste is
- a. carbon dioxide
  - b. methane
  - c. CFCs
  - d. nitrous oxide
59. Which country emits the most greenhouse gases?
- a. India
  - b. China
  - c. United States
  - d. Canada
60. Climate forcing refers to
- a. the forces that act on the climate
  - b. the forces that affect the weather
  - c. processes that disrupt Earth's heat balance forcing the climate to change
  - d. none of the above

### SECTION C

#### Answer only one question in this section

#### QUESTION 1

- a) Explain three factors which affect climate of a place. [6 marks]
- b) What is the difference between the troposphere and stratosphere? [2 marks]
- c) Define carbon dioxide equivalent [2 marks]
- d) Explain the term ecological overshoot [3 marks]
- e) Distinguish between organisation and product footprint. [4 marks]
- f) Why calculate carbon footprint? [4 marks]
- g) State the three main types of emissions. [3 marks]
- h) State two ways in which co-product allocation can be done. [2 marks]
- i) What is the difference between cap and trade system and baseline and credit? [4 marks]

#### QUESTION 2

- a) What is the enhanced greenhouse effect? [2 marks]
- b) State three mitigation options in the transport sector. [3 marks]
- c) Explain the term fuel substitution [2 marks]
- d) State and explain three adaptation strategies for natural resources [6 marks]
- e) Describe the stages of LCA methodology. [8 marks]

- f) What are ecological footprints? [2 marks]
- g) Write down the equation for calculating biocapacity of a country. [4 marks]
- h) State the three essential features of carbon offsets [3 marks]

**Examiner: D. Yellezuome/ I. Osei**