2023 State Envirothon Current Issue Test

Adapting to a Changing Climate

(75 Points Total – 3 points per Questions)

1. Which of the following is true regarding climate change in the upper Midwest part of the United States?
A. A slight warming in the upper Midwest has allowed the hardiness zones to move northward.
B. Heavy rainfall events have increased significantly more than the annual or the seasonal totals have increased.
C. Mean precipitation is predicted to increase slightly, mostly in winter and spring seasons.
D. All of these are true. *

2. Regarding the change in the annual mean temperature across the corn belt,
A. most of the warming has happened during the warm part of the year (April through September)
B. most of the warming has happened during the cool part of the year (October through March)*
C. a warming trend has occurred equally throughout both the warm and cool times of the year.
D. most of the cooling has happened during the cool part of the year (October through March)

3. Over the last fifty years, the Midwest has seen a substantial increase in the number of days with rainfall totaling over four inches,
A. despite the fact that the average annual rainfall has actually gone down.
B. despite the fact that the average annual rainfall hasn't gone up much. *
C. while average annual rainfall has also increased substantially.
D. while most of the rest of the country has seen a decrease in heavy rainfall events.

4. The U.S. Geological Survey measures streamflow in rivers and streams across the United States using continuous monitoring devices called stream gauges. When comparing trends for stream flow in the Midwest by evaluating the lowest water flow days each year and calculating this by averaging the lowest seven consecutive days of streamflow, the long-term rate of change from 1940 to 2018, indicates _____ in the average annual lowest seven consecutive days of streamflow.
A. more than a 50% decrease
B. about a 20% decrease
C. no change
D. about a 20% increase
E. more than a 50% increase *

5. Which of the following is **NOT** among the climate changes Iowa is already experiencing according to the Iowa Climate Change Impacts Committee's Report to the Governor and the Iowa General Assembly in 2010?
A. Increased Precipitation
B. Increased frequency of precipitation extremes that lead to more flooding
C. A larger increase in precipitation in western Iowa than in eastern Iowa *
D. Higher Temperatures

6. “ENERGY STAR” is a voluntary _____program that delivers environmental benefits and financial value through superior energy efficiency.
A. Iowa Department of Natural Resources (IDNR)
B. U.S. Environmental Protection Agency (EPA) *
C. Iowa Climate Change Impacts (ICCI)
D. U.S. Department of Energy (USDE)

7. What impact are recent changes in Iowa’s climate having on native plants and animals?
A. Native plants including prairie plants and forest wildflowers, are leafing out and flowering sooner. *
B. Migrating birds are leaving earlier in the fall.
C. Some wild animals are now being sighted farther south than in the past.
D. All of these are correct.

8. Corn development is correlated with air temperature and therefore,
A. vegetative and reproductive development are predicted using growing degree days (GDD).
B. the optimum temperature range for corn is 50° F to 86° F although growth does occur outside these temperatures to varying degrees.
C. A rise in nighttime temperatures can hasten development and is especially important during grain fill when starch is accumulating.
D. High summer-time temperatures will place additional stress on the vegetative period of development.
E. All of these are correct *

9. Increases in growing season temperature in the Midwest are projected to be the largest contributing factor to
A. increased in the productivity of U.S. agriculture.
B. declines in the productivity of U.S. agriculture. *
C. a large increase in number of farms in the Midwest region.
D. declines in reducing soil erosion problems in the Midwest region.

10. The ‘Greenhouse effect’
A. helps trap heat from the sun, which keeps the temperature on earth comfortable.
B. is influenced by people’s activities that are increasing the amount of heat-trapping gases in the atmosphere
C. are causing the earth to warm up.
D. all of these are true. *

11. Which of the following is NOT considered a key greenhouse gas?
A. F-Gases
B. Atmospheric Nitrogen*
C. Methane
D. Carbon Dioxide

12. Species already are responding to environmental changes that have occurred over the last several decades and rapid climate change over the next century is expected to cause
A. a mass extinction event for many species and destroy many ecological systems in the Midwest.
B. or further amplify stress for many species and ecological systems in the Midwest. *
C. very little impact for many species and ecological systems in the Midwest since most are very adaptable to climate change.
D. very little impact for many species and ecological systems in the Midwest since climate change is a hoax.

13. Globally, we emit around 50 billion tons of greenhouse gases each year. From which of the following sectors do the majority these emissions come from?
A. Agriculture, forestry and land use
B. Energy*
C. Industry
D. Waste

14. Climate change, along with habitat destruction and pollution, are all the important stressors that can contribute to species extinction. Which of the following environment is particularly climate sensitive and could face the risk of significant losses in animal species?
A. animals in mountain environments such as the pika
B. animals that are dependent on sea ice habitats such as ringed seals and polar bears
C. cold-water fish, such as salmon in the Pacific Northwest
D. all of these*

15. How will climate change affect forests?
A. There will be less shifting of tree species from their current ranges.
B. There will likely be a reduction in the range and prevalence of forest pests and pathogens.
C. Warmer temperatures, deeper droughts and drier vegetation will lead to an increase in the extent, intensity and frequency of wildfires *
D. all of these

16. Sequestered biological carbon can be stored in which natural environment?
A. Forests
B. Soil
C. Oceans
D. Grasslands
E. All of the above*

MATCHING: Match the term to the description that best fits (3 Points Each)

A. Aerosols
B. Calcium carbonate
C. Cyanobacteria
D. Carbon credits
E. Carbon cycle
F. Carbon dioxide
G. Carbon mapper
H. Carbon monoxide
I. Carbon-neutral
J. Carbon sequestration
K. Carbon starvation
L. Carbon tax
M. Climate change
N. Decarbonize
O. GHG credits
P. Graphene
Q. Hydrofluorocarbons
R. Hypoxia
S. Photosynthesis
T. Respiration
U. Weather

Write the correct letter for the term above that matches each description below:

17. Biofuels may be considered _____ because the plants that are used to make biofuels absorb CO_2 as they grow and may offset the CO_2 emissions when biofuels are produced and burned. **Carbon-neutral**

18. _____ refers to any significant changes in temperature, precipitation, wind patterns, or other effects that occur several decades or longer. **Climate Change**

19. _____ are microscopic (solid or liquid) particles that are so small that instead of quickly falling to the surface like larger particles, they remain suspended in the air for days to weeks in the atmosphere can affect climate. **Aerosols**

20. _____ is the main cause of human-induced climate change. **Carbon dioxide**

21. _____ are measurable, verifiable emission reductions and have been used as a means for governments and companies to offset carbon emissions. **Carbon credits**

22. _____ typically occur in the polar regions where the colder and nutrient rich parts of the ocean are able to absorb more carbon dioxide than warmer parts. **Carbon sinks**

23. _____ is a technological material made from carbon dioxide and used to produce screens for smart phones and other devices. **Graphene**

24. _____ can result from eutrophication of coastal waters through overloading of nutrients such as nitrogen, phosphorus, silicon and organic matter, leading to a depletion of dissolved oxygen in the water. **Hypoxia**

25. _____ secures carbon dioxide to prevent it from entering the Earth's atmosphere. **Carbon sequestration**