



THE UNIVERSITY OF THE WEST INDIES

EXAMINATIONS OF: Semester I – 2018/2019

**CODE AND NAME OF COURSE: FOUN 1210 – Science, Medicine and
Technology in Society**

DATE AND TIME:

DURATION: 3 Hours

INSTRUCTIONS TO CANDIDATES:

This paper has 12 Pages and 58 Questions.

This examination consists of three Sections: Part A Multiple Choice Questions, and Parts B and C, Essay Questions.

Answer ALL questions in Part A in the Multiple Choice answer section of the examination booklet.

Answer ONE (1) question from Section B AND ONE (1) question from section C.

Section A is worth FIFTY (50) marks and each question in Sections B and C has a value of TWENTY FIVE (25) marks.

SECTION A

1. There is still some controversy about Global Warming. What are the two sides in this debate?
 - a. "The earth is getting warmer" versus "the temperature of the earth has not increased."
 - b. "Earthquakes are worse due to Global Warming" versus "earthquakes are the same with Global Warming."
 - c. "Global Warming only happens during the day" versus "Global Warming happens during day and night."
 - d. "Global Warming is caused by man" versus "Global Warming is caused by a natural geological cycle."

2. What is one effect of the rise in the average temperature of the ocean?
 - a. There is a direct increase in the frequency of tsunamis.
 - b. The salt level of the ocean increases.
 - c. The ocean becomes a less effective carbon sink.
 - d. All fish populations significantly increase.

3. What is the main cause of coral bleaching around the world?
 - a. Industrial dumping of large quantities of waste into the ocean.
 - b. The rise in the temperature of the oceans.
 - c. Overfeeding by fish on the coral reef polyps.
 - d. Diseases caused by microorganisms infecting the coral.

4. A major outcome of the Kyoto protocol was that countries, companies and individuals offset carbon emissions from one activity with another. This has led to which of the following?
 - a. Carbon Emissions Trading
 - b. The eradication of carbon dioxide
 - c. Carbon chemistry
 - d. The distillation of hydrocarbons

5. What is the causative agent of Bovine Spongiform Encephalopathy?
 - a. A prion
 - b. A bacterium
 - c. A virus
 - d. A fungus

6. Who or what were the measures which were put in place against vCJD primarily designed to protect?
 - a. The human population
 - b. Cattle farms
 - c. Caribbean economies
 - d. Poultry farms

7. Imagine that, in a country other than yours, there is an outbreak of a viral, contagious disease that is transmitted by touch and affects only cattle. What steps would you advise your government to take to prevent its spread to your country?
 - a. Kill all of the local cattle and prevent visitors from going to local farms.
 - b. Use specially prepared mats at the ports of entry to disinfect the shoes of travellers coming from the country with the outbreak.
 - c. Start awareness campaigns on how to cook lamb properly.
 - d. Quarantine local cattle.

8. If you are given the role of designing policy for your government, which natural resources would you make recommendations to secure?
 - a. Human, fauna and flora
 - b. Solar, wind and thermal
 - c. Science, technology and medicine
 - d. Food, water and energy

9. What is the process called that is often used by desalination plants to produce fresh water from sea water?
 - a. Salt precipitation
 - b. Water reversal
 - c. Diffusion
 - d. Reverse osmosis

10. A scientist, after heating several different types of metals under different conditions on a large number of occasions and noting that the length of the metals increase each time, finally announces that all metals expand when heated. What type of reasoning did she use?
- Deduction
 - Induction
 - Hypothetico-deduction
 - Paradigm shifts
11. What gives science its great authority and enables most people to have faith in facts that are scientifically proven?
- The honesty of scientists
 - The impact of television shows that depict scientists as knowledgeable
 - The rigour of the hypothetico-deductive method
 - Media sensationalism
12. In a discussion with a group of scientists, you heard them remark on the complete objectivity of the scientific method, why might you have to disagree with them?
- Scientific facts are “theory-laden”
 - Scientists sometimes make mistakes
 - Scientific instruments are not perfect
 - Deduction is truth preserving
13. When you take a general statement and then use other premises related to that statement to arrive at a specific conclusion, what type of reasoning are you using?
- Experimental
 - Inductive
 - Deductive
 - Hypothetical
14. What is the key methodological step that makes science different from non-science?
- The definition of a problem
 - The publication of findings
 - Experimentation in nature
 - Broad literature research

15. What is the term used to describe a set of fundamental premises to which scientists subscribe and which they use as a framework for conducting research?
- A hypothesis
 - A paradigm
 - Predictive statements
 - Models in science
16. What are the mechanisms that drive Charles Darwin's theory of evolution?
- Mutation and natural selection
 - Intelligent direction
 - Genetic complexity
 - Long life-cycles
17. In terms of the origin of human beings, what does Darwin's theory of evolution say?
- Humans and primates have a common ancestor
 - Humans descended from monkeys
 - We should be able to see monkeys becoming human during our life time
 - The universe started with a Big Bang
18. Which of the following was an unfortunate consequence of Darwin's theory?
- Genetics
 - Eugenics
 - Lamarckianism
 - Paleontology
19. A scientist investigating a new substance found that its smallest unit is an atom. How should that substance be classified?
- As an element
 - As a molecule
 - As a compound
 - As a noble gas

20. What is the smallest unit of a compound?
- DNA
 - An atom
 - A molecule
 - A cell
21. What are enzymes known to do in living organisms?
- They process biological waste
 - They store energy in the cells
 - They are biological catalysts
 - They code for the development of the cells
22. Why is diamond hard and expensive while coal is soft and cheap?
- They are made from different atoms
 - Coal is formed naturally but diamond is artificially manufactured
 - Diamond is a metal and coal is made from wood
 - They made both made of carbon atoms but in different configurations
23. Where are protons and neutrons found?
- Throughout the entire atom
 - In the outer shells of atoms
 - In the nucleus of atoms
 - As particles in light waves
24. How are combinations of different atoms held together?
- They form bonds between their inner electron shells
 - They form bonds between their outer electron shells
 - They fuse their nuclei
 - Neutrons bond with each other
25. What is an electric current?
- The rapid change of temperature in a metal
 - A flow of charge
 - Mechanical energy
 - The result of neutral particles moving

26. What are the basic structural units of living things?
- Cells
 - Enzymes
 - Molecules
 - Organs
27. In Einstein's famous equation, $E = mc^2$, what does "c" represent?
- Electric charge
 - The rate of change
 - Capacity
 - The speed of light
28. The different lengths of hydrocarbon chains in crude oil have different boiling points that are exploited to separate this complex mixture into simpler mixtures. What is the name of the industrial process that is used to separate the complex mixtures?
- Crystallization
 - Electrolysis
 - Fractional distillation
 - Desalination
29. Which type of renewable energy has been most successful in Barbados?
- Solar electricity
 - Biogas
 - Natural gas
 - Solar water heating
30. The high cost of electrolysis is responsible for which of the following?
- A switch to the use of mechanical energy to separate aluminium from alumina
 - A change in the chemistry of bauxite mining
 - The final step in producing aluminium being done outside of Jamaica
 - Red mud pollution

31. Which massive molecule codes the genotype that determines the phenotype?
- DNA
 - An enzyme
 - A protein
 - An antibiotic
32. How does meiosis differ from mitosis?
- Meiosis reduces the number of chromosomes by half while mitosis does not
 - Meiosis produces identical copies of cells while mitosis does not
 - Meiosis occurs in every cell while mitosis only occurs in gametes
 - Meiosis only occurs in females
33. What is the human haploid number of chromosomes?
- 46
 - 28
 - 23
 - 266
34. Which of the following statements is correct?
- Antibiotics will cure viral infections but not bacterial infections.
 - Antibiotics will cure all infections.
 - Antibiotics work as a placebo.
 - Antibiotics will cure bacterial infections but not viral infections.
35. What ratio of offspring will crossing XX with XY produce on average?
- 50% males and 50% females
 - All males
 - All females
 - Cannot say
36. Which of the following is a list of genetic diseases ONLY?
- Huntington's disease, Cystic Fibrosis, Sickle Cell Anaemia, Down's Syndrome
 - Hypertension, Cystic Fibrosis, Sickle Cell Anaemia, Down's Syndrome
 - Huntington's disease, Cystic Fibrosis, Cancer, Down's Syndrome
 - Huntington's disease, Diabetes, Sickle Cell Anaemia, Down's Syndrome

37. What is the term used for “primitive cells” with the capacity to become several types of specialised adult cell?
- Early Cells
 - Stem Cells
 - Somatic Cells
 - Gametes
38. A recessive variant (HbS) of the gene for making haemoglobin (Hb) which is situated on chromosome 11 causes which disease?
- Hypertension
 - Sickle cell anaemia
 - Down’s syndrome
 - Cystic fibrosis
39. How is science different from technology?
- Science is about tools and techniques while technology provides explanations
 - There is no difference
 - Science explains and predicts while technology uses tools and techniques to change the environment
 - Science is modern while technology is ancient
40. Why are modern scientific instruments critical to science?
- They enable all scientists to agree on the facts of experiments
 - They extend human senses and actions
 - They always lead to paradigm shifts
 - They always falsify old theories
41. Nuclear and genetic technologies have which of the following in common?
- They are both modern important sources of energy
 - All countries have the resources and ability to apply them for routine benefit
 - There is concern about the great global damage that can result from their misuse and unintended consequences
 - They are both considered harmless but beneficial technologies that will ensure global progress

42. Which of the following is having the greatest impact on developing countries?
- Landline telephones
 - The personal computer
 - The television
 - Cellular phones
43. Parts of computers are commonly known by acronyms. What is RAM?
- Readily accessible mouse
 - Readily accessible monitor
 - Random access memory
 - Random algorithm monitor
44. What is the term for a series of unambiguous executable steps to perform some task in a finite amount of time?
- An algorithm
 - Programme code
 - A website
 - Machine code
45. The World Wide Web (WWW) is based on which of the following two concepts?
- Hardware and software
 - Registers and output units
 - Hypertext and graphical user interface
 - Microsoft Office and online payment systems
46. What was the internet probably designed to do originally?
- Manage large private corporations
 - Predict weather systems
 - Form a decentralized communications system for defensive purposes for the US military
 - Provide a way for government to conduct large censuses

47. In gender theory, how are sex and gender determined?
- Both are determined by genetics alone
 - Both are determined by the level of education
 - Sex is determined by morals and gender by parental lifestyles
 - Sex is determined by genetics and gender by socialization
48. How are persons with a Body Mass Index of over 30 classified?
- Under weight
 - Diabetic
 - Hypertensive
 - Obese
49. Which of the following applies to hypertension and diabetes?
- They are treatable using antibiotics
 - They are communicable diseases
 - They are caused by viruses
 - They are chronic non-communicable diseases
50. What is the term for the method used to detect genetic abnormalities in a human foetus?
- Hybridomas
 - Amniocentesis
 - Stem cell therapy
 - DNA profiling

END OF SECTION A

SECTION B

Answer ONE (1) question ONLY. Each question is worth twenty five (25) marks.

- B.1. Define global warming, explain the greenhouse effect and discuss the natural and social impacts in the Caribbean.
- B.2. Write an essay on the strengths and weaknesses of induction, deduction and the hypothetico-deductive method while explaining how the scientific method sometimes leads to “scientific revolutions.”
- B.3. Explain the differences between science, technology and medicine. Examine how they depend on each other in order to advance.
- B.4. Discuss the importance of food security and examine the issues that must be taken into consideration to protect our food supply.

END OF SECTION B

SECTION C

Answer ONE (1) question ONLY. Each question is worth twenty five (25) marks.

- C.1. Write an essay on the history and development of biotechnology up to the present. Discuss its tremendous social benefits while noting the biological and ethical challenges that accompany its advance.
- C.2. Identify and discuss the critical communicable and non-communicable diseases that challenge Caribbean states today.
- C.3. What is energy? Discuss the production and use of energy from fossil fuels and the possible alternative sources of energy available to the Caribbean. Explain how either the sugar, bauxite or tourism industry uses and produces energy.
- C.4. What are the consequences of creating global communities using the Internet? Consider both the positive and negative aspects of, for example, e-Commerce, political interest groups, criminal/terrorist activity, privacy issues, interpersonal relations, nationhood, neighbourhood cohesion, and social networking.

END OF PAPER