



**THE UNIVERSITY OF THE WEST INDIES**

**EXAMINATIONS OF: Semester II – 2011/2012**

**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.**

P.T.O

SECTION A

1. Who or what are Hiroshima and Nagasaki?
  - a. Japanese scientists who won the Nobel Prize.
  - b. Japanese cities destroyed by atomic bombs.
  - c. Japanese cities that generate energy using nuclear power plants.
  - d. Genetically modified viruses.
  
2. Which of the following is partly responsible for shifts from NORMAL science to REVOLUTIONARY science?
  - a. Incompetent scientists
  - b. More knowledgeable young scientists
  - c. Theory-laden facts and observations
  - d. Imperfect mathematical logic
  
3. The outer atomic shells bond different types of atoms in various combinations to form which of the following?
  - a. Elements
  - b. Protons
  - c. Neutrons
  - d. Molecules
  
4. In relation to water security in the Caribbean which of the following statements is/are correct?
  - I) The quantity of water may not be of immediate concern in the Caribbean but water quality should be.
  - II) Most Caribbean nations are water-scarce.
  - III) No Caribbean country depends on water desalination or imports water.
  - a. I only.
  - b. II and III only.
  - c. I and IV only.
  - d. I, II and III.

5. Energy stored in a chemical substance is
  - a. potential energy
  - b. thermal energy
  - c. kinetic energy
  - d. light energy
  
6. Foot and mouth disease
  - a. is always fatal.
  - b. severely reduces milk and meat production.
  - c. causes the brain to develop holes like a sponge.
  - d. is easily passed to humans.
  
7. Fractional distillation separates hydrocarbons according to their
  - a. purity.
  - b. usefulness.
  - c. molecular size.
  - d. water content.
  
8. Which of the following is NOT a possible long-term impact of global warming?
  - a. Increased desertification
  - b. Melting glaciers causing a rise in sea levels
  - c. Loss of coral reefs
  - d. Tsunamis caused by earthquakes
  
9. Solar panels that produce electricity are made of
  - a. silicon.
  - b. copper pipes.
  - c. spinning generators.
  - d. large metal sheets painted black.
  
10. Which of the following statements is correct?
  - a. There is evidence that the average temperature of the world is rising.
  - b. All scientists agree that the rise in the world's average temperature is caused by large amounts of Carbon Dioxide produced by human activity.
  - c. All scientists agree that the rise in the world's average temperature is normal.
  - d. There is NO evidence that the average temperature of the world is rising.

11. Fertilization occurs when gametes merge to produce
  - a. a foetus.
  - b. a zygote.
  - c. an embryo.
  - d. spermatozoa.
  
12. Who promoted the idea that it was important to test scientific theories by conducting experiments with the aim of showing that they are false?
  - a. William Harvey
  - b. Isaac Newton
  - c. Galileo Galilei
  - d. Karl Popper
  
13. What is the process whereby genes from one organism are inserted into the chromosomes of another organism of the same or different species?
  - a. Cloning
  - b. *In vitro* fertilization
  - c. Gene therapy
  - d. Genetic engineering
  
14. Deductive reasoning is logically valid and safe but induction
  - a. is a better scientific approach.
  - b. opens new horizons.
  - c. always produces better predictions.
  - d. is more cost-efficient.
  
15. What is the process used to obtain aluminium from alumina?
  - a. Fractional distillation
  - b. Electrolysis
  - c. Precipitation
  - d. Crystallization

16. Warm oceans fuel hurricanes which can be therefore be thought of as
- heat engines.
  - light engines.
  - kinetic engines.
  - sound engines.
17. People with a BMI greater than 30 are defined as
- pre-obese.
  - malnourished.
  - obese.
  - iron deficient.
18. Induction leads to universal scientific laws through a process that
- is rational and follows rules of logic.
  - preserves the truth.
  - is completely objective.
  - is based on the repetition of specific observations.
19. In information technology, the translation of an algorithm into a program is known as
- mechanical realization.
  - linguistic realization.
  - computational logic.
  - transmission control protocol.
20. When scientists understand the basic science of a phenomenon or illness then
- useful technology or medical cures ALWAYS immediately follow.
  - all debates about the science are settled forever.
  - it ALWAYS results in a paradigm shift.
  - useful technology or cures do NOT ALWAYS immediately follow.
21. What distinguishes science from other cognitive practices?
- Experiment and observation
  - Insightful theories
  - Careful research
  - Peer-reviewed findings

22. Why are very high fevers dangerous?
- The body loses too much water.
  - The DNA breaks down.
  - Enzymes are destroyed and function less effectively.
  - Fatty tissue melts.
23. Power is
- equivalent to work.
  - equivalent to energy.
  - measured in joules.
  - the rate of doing work.
24. Most Caribbean countries have
- energy and water security but not food security.
  - food and water security but not energy security.
  - energy security but not food and water security.
  - water security but not food and energy security.
25. What type of chemical reaction releases energy from hydrocarbons?
- Endothermic
  - Combustion
  - Neutralization
  - Esterification
26. Which of the following presents a major problem in tracking Bovine Spongiform Encephalopathy?
- The causal agent is unknown.
  - Many years elapse between exposure and the development of symptoms.
  - Cattle will not display any symptoms.
  - It is not passed to humans in any form.
27. The price of crude oil is controlled largely by
- China
  - The USA
  - The United Nations
  - OPEC

28. The dominant alleles of chromosome 4 bears the mutation responsible for
- Huntington's disease
  - Cystic Fibrosis
  - Sickle Cell Anaemia
  - Down's Syndrome
29. Scientists who practice NORMAL science within a particular paradigm
- always produce the expected results.
  - are able to control all of the possible environmental variables.
  - all subscribe to the same set of fundamental assumptions.
  - are often ridiculed.
30. The first commercially grown genetically modified food to be sanctioned by the USA's Food and Drug Administration is
- rot resistant "Flavr Savr" tomato.
  - virus resistant papaya.
  - pesticide resistant sugar cane.
  - sweet corn that produces its own insecticide.
31. The "scientific method" is understood by most people to be
- the hypothetico-inductive method.
  - the syllogism.
  - the hypothetico-deductive method.
  - falsification.
32. In Type I diabetes
- normal levels of insulin may be secreted but the cells that should, do not respond.
  - insulin-producing cells in the pancreas have been destroyed.
  - the blood glucose level is always low.
  - food is not digested properly.
33. Hypertension and diabetes are
- treatable using antibiotics.
  - communicable diseases.
  - caused by viruses.
  - chronic non-communicable diseases.

34. Scientific knowledge is considered “proven knowledge” by most people because
- its method is believed to be objective and reliable.
  - science is inherently logical.
  - empirical evidence based on observation is always interpreted truthfully.
  - the mathematics behind science is rigorous.
35.  $E = mc^2$  was derived by
- Karl Popper.
  - Thomas Kuhn
  - Albert Einstein.
  - Isaac Newton
36. The 23<sup>rd</sup> pair of human chromosomes determines
- sex.
  - gender.
  - intelligence.
  - eye colour.
37. It can be said that
- science controls the environment while technology explains.
  - science always comes before technology.
  - technology always comes before science.
  - science explains while technology controls the environments.
38. It is understood academically that a model in science:
- Represents a real mechanism or process.
  - Is a perfect replica of reality.
  - Allows for visualisation and aids our imagination.
- I only.
  - II only
  - I and III only
  - I, II and III



39. Which of the following statements is correct?
- a. Antibiotics will cure viral infections but not bacterial infections.
  - b. Antibiotics will cure all infections.
  - c. Antibiotics work as a placebo.
  - d. Antibiotics will cure bacterial infections but not viral infections.
40. A rise in crude oil prices will lead to which of the following?
- a. A fall in prices throughout the economy.
  - b. A reduction of investment into research for alternative energy.
  - c. A reduction of export revenues among OPEC countries.
  - d. An increase in costs across the economy.
41. Which of the following is an example of a wireless connection?
- a. Bluetooth
  - b. Cable Modem
  - c. Web browser
  - d. A computer server
42. What is ASCII?
- a. An American Standard for representing every word and image as discrete “on” and “off” states symbolized by ones and zeros.
  - b. A method for assessing the amount of RAM available.
  - c. An American method of programme execution.
  - d. One of the categories of computers.
43. What is E-commerce?
- a. The business of identity theft.
  - b. The commerce associated with the energy trade.
  - c. Use of electronic communications to do business.
  - d. Spam.
44. Which of the following is ethical?
- a. Sterilizing people of low intelligence.
  - b. Producing GMOs whose seeds are sterile.
  - c. Modifying stem cells from a patient to cure their genetic disease.
  - d. Patenting a natural product used by native peoples from time immemorial.

45. Which of the following was an unfortunate consequence of Darwin's theory?
- Eugenics
  - Genetics
  - Lamarckianism
  - Paleontology
46. Evidence suggests that greenhouse gases are directly responsible for:
- Destruction of the ozone layer.
  - An increase in the average global temperature.
  - A decrease in the average global temperature.
  - An increase in the UV radiation entering the atmosphere.
47. What is the name of the chromosome which determines that a human will be male?
- Y chromosome
  - XY genotype
  - AB blood type
  - X chromosome
48. The "Black Florence Nightingale" was a Caribbean doctress who travelled to Panama and worked during the Crimean War to deliver her unique brand of medical expertise. Who was she?
- Nita Barrow
  - Mary Seacole
  - Cicely Williams
  - Mary Prince
49. The method used to detect genetic abnormalities in a human foetus is called
- hybridomas.
  - stem cell therapy.
  - amniocentesis.
  - DNA profiling.

50. Which of the following conditions must the inductive process fulfill in order for a general scientific law to be legitimate?
- I. The number of observations must be large.
  - II. The observations must be repeated under a wide variety of conditions.
  - III. The syllogism must be valid.
  - IV. The major premise must be sound.
  - V. No observation should conflict with the derived universal law.
- a. I and IV only
  - b. I, II, and V only
  - c. I, III and V only.
  - d. II, III, IV only.

**END OF SECTION A**

**SECTION B**

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

- B.1. Thomas Kuhn defines Paradigms as "*Universally recognized scientific achievements that for a time provide model problems and solutions to a community of practitioners*". By citing examples, outline and assess Thomas Kuhn's arguments on Paradigms, Paradigm Shifts and Scientific Revolutions and their influence on the development of modern science.
- B.2. Explain the difference between "sex" and "gender." Naming two Nobel Prize winning female scientists, explain the social and structural challenges that women doing science generally encounter.
- B.3. Discuss and assess the impact of global warming on resource security in the Caribbean. By providing specific examples, explain which resources need to be secured and by what means.
- B.4. Write an essay on the reputed authority and objectivity of science. Name, explain and review the strengths and weaknesses of the scientific method.

**END OF SECTION B**

**SECTION C**

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

- C.1. What do you understand by the term biotechnology? Discuss its history, benefits and dangers.
- C.2. Write an essay on ethics in science, medicine and technology.
- C.3. Critically assess and evaluate the problems of a future reliable energy supply for the Caribbean. Discuss how Caribbean leaders can implement or develop solutions for problems. Defend your answer.
- C.4. Identify two non-communicable diseases commonly found in the Caribbean. Discuss their medical causes and the impact that they have on society. What steps should be taken to reduce their incidence?

**END OF PAPER**

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