



THE UNIVERSITY OF THE WEST INDIES

EXAMINATIONS OF: Semester I – 2012/2013

**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. The price of crude oil is controlled largely by
 - a. OPEC
 - b. The USA
 - c. The United Nations
 - d. China

2. Some people accept science as proven knowledge based on the belief that it is objective and reliable because
 - a. it discovers irrefutable truths.
 - b. scientists are honest.
 - c. of the truth preserving character of deduction.
 - d. of its hypothetico-deductive method.

3. Which of the following is a list of genetic diseases ONLY?
 - a. Huntington's disease, Cystic Fibrosis, Sickle Cell Anaemia, Down's Syndrome
 - b. Hypertension, Cystic Fibrosis, Sickle Cell Anaemia, Down's Syndrome
 - c. Huntington's disease, Cystic Fibrosis, Cancer, Down's Syndrome
 - d. Huntington's disease, Diabetes, Sickle Cell Anaemia, Down's Syndrome

4. The smallest unit of an element is
 - a. DNA.
 - b. a molecule.
 - c. an atom.
 - d. an enzyme.

5. If the phenotype of a mother and father displays the sickle cell trait then the probable phenotypes of the children are:
 - a. 1 normal; 2 trait; 1 sickler
 - b. 2 normal; 1 trait; 1 sickler
 - c. 1 normal; 1 trait; 2 sicklers
 - d. All sicklers

6. 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

7. What are the molecules that control the rate of chemical reactions in living cells called?
 - a. RNA
 - b. Enzymes
 - c. Cellulose
 - d. Chromosomes

8. Which of the following are NOT non-communicable?
 - a. Inherited diseases
 - b. Nutrition-related diseases
 - c. Mental illnesses
 - d. STDs

9. Moore's law states that
 - a. the power of a computer increases as time passes with no change in price.
 - b. the power of a computer doubles every eighteen months without an increase in price.
 - c. the power of a computer increases proportionately with price.
 - d. the power of a computer doubles every eighteen months with a halving of price.

10. A human disease caused by one too many chromosomes is
 - a. Huntington's Chorea.
 - b. Tay Sachs.
 - c. Down's Syndrome.
 - d. vCJD.

11. Solar panels that produce electricity are made of
 - a. silicon.
 - b. copper pipes.
 - c. spinning generators.
 - d. large metal sheets painted black.

12. The following are examples of programming languages except
 - a. PHP
 - b. Javascript
 - c. Microsoft Word
 - d. C++

13. The process of arriving at general scientific statements by making an appropriate number of specific observations is known as
 - a. deduction.
 - b. induction.
 - c. hypothetico-deduction.
 - d. paradigm shifts.

14. Acceptance of two sets of standards was important to the growth of the internet. These were
 - a. Blue Tooth and Wi Fi
 - b. TCP/IP and HTML
 - c. Windows and Apple
 - d. DOS and Mac

15. William Harvey's approach to science was said to be innovative and experimental. This is because he
 - a. interrupted the normal flow of nature in living organisms to observe the results.
 - b. used instruments.
 - c. used mathematics.
 - d. speculated on reality by using existing theories.

16. Which type of renewable energy has been most successful in Barbados?
- Solar electricity
 - Biogas
 - Natural gas
 - Solar water heating
17. What is the process used to obtain diesel from crude oil?
- Fractional distillation
 - Electrolysis
 - Precipitation
 - Crystallization
18. Which of the following statements is correct?
- There is evidence that the average temperature of the world is rising.
 - All scientists agree that the rise in the world's average temperature is caused by large amounts of Carbon Dioxide produced by human activity.
 - All scientists agree that the rise in the world's average temperature is normal.
 - There is NO evidence that the average temperature of the world is rising.
19. The world's most important gene banks housing over 2,500 varieties of cocoa germplasm is the
- World Cocoa Foundation (WCF)
 - Cocoa Research UK Ltd
 - The UWI Cocoa Research Unit (CRU) in Trinidad and Tobago.
 - The United States of America Cocoa project.
20. When women were not granted PhD degrees in science departments in the early 20th century, they were unable to obtain research funding and could not be promoted beyond the rank of tutor or lecturer at universities. This is an example of what kind of gender barrier?
- Psychological
 - Superior
 - Spatial
 - Structural

21. The INCIDENCE of a disease refers to which of the following?
- The number of persons in the population with the disease at a particular time.
 - The rate of deaths from a disease.
 - The number of persons likely to contract the disease.
 - The number of new cases of a disease over a specified period time.
22. E-commerce has the potential to “level the playing the field” so that Caribbean countries can compete with larger more developed countries but they must first solve the problem/s of:
- Access to the internet and finding ways to penetrate markets.
 - The infrastructure of financial institutions to handle the e-commerce transactions.
 - Intellectual Property rights.
 - All of the above.
23. Prions are the causative agent for which of the following diseases?
- Bovine Spongiform Encephalopathy (BSE)
 - H1N1
 - Foot and Mouth Disease
 - H5N1
24. A car in motion makes which of the following energy conversions?
- Chemically stored potential energy to kinetic energy.
 - Kinetic energy to stored electrical energy.
 - Electrical energy to light energy.
 - All of the above.
25. The PREVALENCE of a disease refers to which of the following?
- The number of new cases of a disease over a specified time period.
 - The number of persons in the population with the disease at a particular time.
 - The rate of deaths from a disease.
 - The number of persons likely to contract the disease.

26. Recombinant DNA has made the large scale production of insulin possible by inserting the gene that codes for human insulin into which bacterium?
- a. *Escherichia coli*
 - b. *Staphylococcus aureus*
 - c. *Chlamydia trachomatis*
 - d. *Clostridium*
27. Golden rice is an example of a GMO which was produced to reduce the incidence of
- a. Marasmus
 - b. Childhood blindness
 - c. Kwashiorkor
 - d. Leukemia
28. In information technology, the translation of an algorithm into a program is known as
- a. mechanical realization.
 - b. linguistic realization.
 - c. computational logic.
 - d. transmission control protocol.
29. Which of the following is NOT true of petroleum based fuels?
- a. They are currently more accessible than alternative sources of energy.
 - b. Their energy originated with the sun.
 - c. They are renewable.
 - d. They are distilled from crude oil.
30. 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.

31. Which of the following was the first Genetically Modified food (GMO) to be sanctioned by the Food and Drug Administration of the United States of America?
- Genetically modified corn
 - The "Flavr Savr" tomato
 - Genetically modified soybean
 - Genetically modified Papaya
32. Darwin's theory of evolution states that
- humans descended from monkeys.
 - humans and primates have a common ancestor.
 - we should be able to see monkeys becoming human during our life time.
 - the universe started with a Big Bang.
33. Meiosis differs from mitosis. This is because
- 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.
34. 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.
35. Energy stored in a battery is
- sound energy
 - thermal energy
 - kinetic energy
 - potential energy
36. Acquired Immune Deficiency Syndrome is caused by what type of infection?
- Viral
 - Bacterial
 - Fungal
 - Genetic

37. Which one of the following statements explains why technology is different from science?
- Technology came before science.
 - Technology does not necessarily depend on explanations.
 - Science came before technology.
 - Ancient civilizations had no science.
38. 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.
39. One reason why aluminium is NOT produced from alumina during the process of refining bauxite ore in Jamaica and Guyana is the
- complex nature of this final step.
 - radioactive nature of alumina.
 - high cost of electrolysis.
 - environmental hazard of red earth.
40. Green House gases warm the earth by
- radiating their own internal heat.
 - trapping and conducting energy from the earth's core.
 - vibration and friction.
 - trapping the sun's energy that is being reflected from the earth's surface.
41. How is modern genetic engineering different from older methods in biotechnology?
- It operates at the molecular level.
 - It operates at the cellular level.
 - It operates at the level of the whole organism.
 - It is safer.

42. Hypertension and diabetes are
- treatable using antibiotics.
 - communicable diseases.
 - caused by viruses.
 - chronic non-communicable diseases.
43. Which statement is correct?
- Somatic cells are called eggs in females and sperm in males.
 - Mitosis occurs in all cells.
 - Meiosis is a form of cell division required for growth.
 - Sister chromatids are homologous to each other.
44. Diamond is hard and expensive while coal is soft and cheap yet they are both
- easily dissolved in a solution of acid.
 - easily manufactured.
 - found in volcanoes.
 - made of carbon atoms in different configurations.
45. The knowledge that oxygen is responsible for the reactions referred to as combustion and its subsequent displacing of phlogiston theory is an example of
- normal science.
 - a paradigm shift.
 - incompetent scientists.
 - inductive progress.
46. What is ASCII?
- An American Standard for representing every word and image as discrete "on" and "off" states symbolized by ones and zeros.
 - A method for assessing the amount of RAM available.
 - An American method of programme execution.
 - One of the categories of computers.

47. A rise in temperature of the ocean
- a. causes glaciers to melt more rapidly.
 - b. bleaches coral reefs.
 - c. makes it a less effective carbon sinks.
 - d. All of the above.
48. 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.
49. What is the term used for “primitive cells” which have the capacity to become several types of specialised adult cell?
- a. Early Cells
 - b. Gene Cells
 - c. Somatic Cells
 - d. Stem Cells
50. Evidence suggests that greenhouse gases are directly responsible for:
- a. Destruction of the ozone layer.
 - b. An increase in the average global temperature.
 - c. A decrease in the average global temperature.
 - d. An increase in the UV radiation entering the atmosphere.

END OF SECTION A

SECTION B

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

- B.1. There are more male than female students in the UWI Cave Hill Campus' Faculty of Science and Technology although the ratio for the entire Campus is just over two females to every male. After clarifying the difference between "sex" and "gender," discuss the social and structural barriers faced by females doing science and how it is reflected in the ratios above.
- B.2. Review the weaknesses of the hypothetico-deductive method that prevent scientific knowledge from being absolutely objective. Discuss how these weaknesses are related to extraordinary science and scientific revolutions using at least two examples.
- B.3. List the Caribbean's most important resources and discuss strategies for securing them.
- B.4. Explain the scientific basis of global warming and the debate surrounding its cause. Describe the impact of the resulting climate change on agriculture in the Caribbean and trace the major attempts at global solutions to this problem.

END OF SECTION B

SECTION C

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

- C.1. Give the scientific definition of energy. Using examples, explain the difference between renewable and non-renewable energy sources and their role in Caribbean industrial development.
- C.2. What are the major chronic non-communicable diseases found in the Caribbean? Discuss the social and economic impact of these diseases and give your opinion on the solutions being used by Governments in the region.
- C.3. Define biotechnology and explain why it is a very old technology. Using examples, discuss the benefits as well as the practical problems and ethical issues of genetic manipulation using modern biotechnology.
- C.4. Describe the key technologies used for modern Information Communications and explore how ICT can propel regional development while noting its ethical and cultural challenges.

END OF PAPER