



THE UNIVERSITY OF THE WEST INDIES

EXAMINATIONS OF: Semester I – 2013/2014

**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 13 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. Although there is some controversy surrounding Global Warming, it is true to say that
 - a. everyone agrees that Global Warming is caused by man's activities.
 - b. everyone agrees that there is an increase in average global temperature.
 - c. Global Warming is part of a natural cycle.
 - d. climate change will always cause droughts.

2. Green House gases warm the earth by
 - a. radiating their own internal heat.
 - b. trapping and conducting energy from the earth's core.
 - c. vibration and friction.
 - d. trapping the sun's energy that is being reflected from the earth's surface.

3. Evidence suggests that the greenhouse gases are directly responsible for:
 - a. an increase in UV radiation entering the atmosphere.
 - b. an increase in the average global temperature.
 - c. a decrease in the average global temperature.
 - d. destruction of the ozone layer.

4. 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.

5. Which of the following is NOT a greenhouse gas?
 - a. Nitrogen
 - b. Methane
 - c. Carbon Dioxide
 - d. Nitrous Oxide

PLEASE TURN OVER

6. 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.
7. What is the central concept in computer science?
- The internet
 - TCP/IP
 - HTML
 - The algorithm
8. “Gilder’s law” states that
- e-commerce transactions decreases cost.
 - all technology will increase in price as it becomes more complex.
 - the power of the computer doubles every eighteen months.
 - the amount of bandwidth available globally triples every year.
9. In information technology, the translation of an algorithm into a program is known as
- mechanical realization.
 - linguistic realization.
 - computational logic.
 - transmission control protocol.
10. What is RAM?
- Readily accessible mouse
 - Readily accessible monitor
 - Random access memory
 - Random algorithm monitor

11. A series of unambiguous executable steps to perform some task in a finite amount of time is
- a programme code.
 - an algorithm.
 - a website.
 - HTML code.
12. The steps observation \longrightarrow pattern \longrightarrow hypothesis is typical of
- deductive reasoning.
 - inductive reasoning.
 - a hypothetico-deductive approach.
 - a scientific law.
13. A scientist who follows the **W** is aware of a problem and goes about solving it by first researching and formulating a new hypothesis. She then does **X** which require careful **Y** and data collection. Finally she **Z** and comes to conclusions. Which order of steps below is correct for what W, X, Y and Z represent?
- W = inductive method; X = experiments; Y = analysis; Z = makes observations
 - W = deductive method; X = data analysis; Y = experimentation; Z = makes observations
 - W = hypothetico-deductive approach; X = experiments; Y = observation; Z = analyses the data
 - W = a paradigm; X = data analysis; Y = induction; Z = experiments
14. A shift from one set of fundamental assumptions to another set of fundamental assumptions is called
- falsification.
 - theory-ladenness.
 - hypothesis formulation.
 - a paradigm shift.

15. 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 leading to the generalization 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.
16. The acceptance of science as proven knowledge since the twentieth century is 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.
17. Scientists who practice EXTRAORDINARY science
- a. always function within the established paradigm.
 - b. are able to control all of the possible environmental variables.
 - c. do not subscribe to the normal set of fundamental assumptions.
 - d. are not often ridiculed.
18. What did Karl Popper argue was a key characteristic of a scientific theory?
- a. Revolutionary science
 - b. Paradigm shifts
 - c. Falsifiability
 - d. Perfect mathematical logic

19. The “Black Florence Nightingale” was a Caribbean doctress who traveled to Panama and worked during the Crimean War to deliver her unique brand of medical expertise. Her name was
- Mary Seacole.
 - Cicely Williams.
 - Nita Barrow.
 - Laura Secord.
20. Galileo Galilei’s work was experimental because he
- had an hypothesis.
 - made predictions.
 - constructed artificial environments to minimize or ignore some variables.
 - interrupted the flow of nature.
21. Who was William Harvey?
- A natural philosopher who discovered that blood circulates.
 - A mathematician who proposed the heliocentric model.
 - The inventor of the microscope.
 - The father of microbiology.
22. William Harvey’s approach is said to be innovative and experimental because
- interrupted the normal flow of nature in living organisms to observe the results.
 - used instruments.
 - used mathematics.
 - speculated on reality by using existing theories.
23. Which of the following diseases is transmitted by a vector?
- Lou Gehrig’s disease
 - Dengue
 - Skin cancer
 - Leukaemia

24. Which of the following statements is correct?
- Antibiotics will cure bacterial infections but not viral infections.
 - Antibiotics will cure viral infections but not bacterial infections.
 - Antibiotics will cure all infections.
 - Antibiotics are a form of placebo.
25. The time allowed for HIV to develop into AIDS is called the
- infection cycle.
 - incubation period.
 - response rate.
 - immune health index.
26. The infectious agent of Acquired Immune Deficiency Syndrome is a
- virus.
 - bacterium.
 - fungus.
 - protozoa.
27. Which of the following are NOT non-communicable?
- Inherited diseases
 - Nutrition-related diseases
 - Mental illnesses
 - STDs
28. 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.
29. The normal figures for blood pressure range between
- 120/80 mmHg and 130/85 mmHg
 - 80/20 mmHg and 100/60 mmHg
 - 160/120 mmHg and 200/150 mmHg
 - 80/120 mmHg and 100/130 mmHg

PLEASE TURN OVER

30. Prions are the causative agent for which of the following diseases?
- a. Bovine Spongiform Encephalopathy (BSE)
 - b. H1N1
 - c. Foot and Mouth Disease
 - d. H5N1
31. Darwin's theory of evolution states that
- a. humans descended from monkeys.
 - b. humans and primates have a common ancestor.
 - c. we should be able to see monkeys becoming human during our life time.
 - d. the universe started with a Big Bang.
32. The mechanisms that drive Darwin's theory of evolution are
- a. mutation and natural selection.
 - b. intelligent direction.
 - c. genetic complexity.
 - d. long life-cycles.
33. The chromosome set in a normal human, non-reproductive, cell is
- a. diploid.
 - b. triploid.
 - c. tetraploid.
 - d. haploid.
34. Meiosis differs from mitosis. This is because
- a. meiosis reduces the number of chromosomes by half while mitosis does not.
 - b. meiosis produces identical copies of cells while mitosis does not.
 - c. meiosis occurs in every cell while mitosis only occurs in gametes.
 - d. meiosis only occurs in females.

35. When females with sickle cell trait have children from males with sickle cell trait, what proportion of their children will have sickle cell disease?
- a. 0%
 - b. 25%
 - c. 50%
 - d. 100%
36. 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
37. Which hydrocarbon comes off at the top of a fractionating column?
- a. Tar
 - b. Kerosene
 - c. Methane
 - d. Heating oil
38. The technique by which genes from one organism can be inserted into the chromosomes of another organism of the same or different species is termed
- a. Gene Therapy.
 - b. DNA profiling.
 - c. In vitro fertilization.
 - d. Genetic Engineering.
39. A GMO differs from a hybrid produced by cross-breeding in all of the following ways EXCEPT it
- a. contains the genes from a different species.
 - b. is produced artificially.
 - c. is patented.
 - d. looks the same.

40. Hundreds of new plants can be produced by stimulating very small portions of an original parent plant through the biotechnological technique known as
- Cloning.
 - Hybridization.
 - Genetic modification.
 - Tissue Culture.
41. Genes are found within the nuclei of cells and
- are a set of genetic instructions which define the characteristics of an organism.
 - are the precursors of vitamins.
 - are NOT found in gametes.
 - separate from chromosomes during cell division.
42. Long coiled strands of DNA are stored in the nuclei of human somatic cells as
- 46 chromosomes.
 - genes.
 - ribosomes.
 - Mitochondria.
43. Human genes were introduced into *Escherichia coli* to produce large quantities of which of the following hormones for medical proposes?
- Insulin
 - Human Growth Hormone
 - Erythropoietin
 - All of the above
44. The human body has 220 different specialized cell types. The cells of an embryo that has the potential to become the various types of cells are called
- Hybridomas.
 - Stem Cells.
 - Antigens.
 - Antibodies.

PLEASE TURN OVER

45. Male and female gametes fuse to form a
- Stem cells
 - Mitosis
 - New virus
 - Zygote
46. Marie Curie was a woman scientist who
- won two (2) Nobel prizes.
 - played a major role in describing DNA's double helix structure.
 - invented the atomic bomb.
 - pioneered botany.
47. In gender theory sex and gender are determined by
- genetics alone.
 - education.
 - parental lifestyles alone.
 - genetics (biology) and socialization respectively.
48. Atoms form bonds using their
- outer shells.
 - protons.
 - nuclei.
 - neutrons.
49. Photovoltaic cells are typically made of silicon which is
- a semi-conductor.
 - an energy producing compound.
 - an energy storage compound.
 - a plant chemical that absorbs sunlight.

50. 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.

END OF SECTION A

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SECTION B

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

- B.1. What is global warming? Discuss the social and economic consequences of global warming and climate change 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. What is the difference between “science” and “technology”? With relevant examples discuss which one may have come first historically and describe their modern interplay in medicine.
- B.4. Apart from our people, what are our most important resources in the Caribbean? Using examples explain how we have protected them in the past and suggest ideas for their security into the future.

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 notions of “modern” and “ancient” biotechnology? Using your knowledge of genetics and genetic modification, discuss the benefits and ethical problems of biotechnological advances.
- C.2. Dealing with **chronic non-communicable** diseases is a serious developmental challenge to Caribbean governments. Advise the government of your country on how to combat this challenge while citing the most problematic diseases and their causes.
- C.3. Write an essay explaining the nature of energy and its critical role in Caribbean industrial development.
- 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

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