



**THE UNIVERSITY OF THE WEST INDIES**

**EXAMINATIONS OF: Semester I – 2016/2017**

**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 method used to detect genetic abnormalities in a human foetus is called
  - a. hybridomas.
  - b. DNA finger-printing.
  - c. stem cell therapy.
  - d. amniocentesis.
  
2. 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
  
3. Long coiled strands of DNA are stored in the nuclei of human somatic cells as
  - a. 46 chromosomes.
  - b. prions.
  - c. ribosomes.
  - d. mitochondria
  
4. 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*
  
5. Evidence suggests that greenhouse gases are responsible for
  - a. an increase in Ultra Violet 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.

6. Which of the following is caused by Global Warming?
  - a. Depletion of the ozone layer
  - b. Climate Change
  - c. Acid Rain
  - d. None of the above
  
7. The key objective of the Kyoto protocol is to
  - a. limit the emission of gases that produce acid rain.
  - b. balance the level of carbon dioxide released naturally with that consumed naturally.
  - c. establish global strategies for limiting the emissions of chlorofluorocarbons.
  - d. establish global strategies for limiting the emission of greenhouse gases.
  
8. Which of the following is NOT a greenhouse gas?
  - a. Nitrogen
  - b. Methane
  - c. Carbon Dioxide
  - d. Nitrous Oxide
  
9. 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.
  
10. The scientific method is NOT completely objective because
  - a. scientific instruments are not perfect.
  - b. scientists sometimes make mistakes.
  - c. scientific facts are “theory-laden”.
  - d. deduction is not truth preserving.

11. An argument that starts with a general statement and then uses a minor premise to arrive at a specific conclusion is
- always sound.
  - inductive.
  - not valid.
  - deductive.
12. 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 conducts **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
13. Who proposed that “falsifiability” was a key characteristic of a scientific theory?
- William Harvey
  - Albert Einstein
  - Karl Popper
  - Thomas Kuhn
14. Who introduced the notions of “**paradigm shifts**,” “**normal**” and “**extraordinary science**” into the discussion of how science progresses?
- Karl Popper
  - Thomas Kuhn
  - Charles Darwin
  - Albert Einstein

15. The explanation of an observation may change when the associated theories and their assumptions change. The resultant scientific facts are therefore
- mere guesses.
  - theory-laden.
  - laws that are always true everywhere.
  - changing arbitrarily.
16. Which industrial process is used to separate complex mixtures of hydrocarbons in crude oil?
- Precipitation
  - Electrolysis
  - Crystallization
  - Fractional distillation
17. 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.
18. 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.
19. Which of the following is correct?
- Antibiotics will cure AIDS.
  - HIV is transmitted through casual contact.
  - HIV is transmitted through the exchange of bodily fluids.
  - HIV is transmitted ONLY among homosexuals.

20. Which of the following diseases is transmitted by a vector?
- Lou Gehrig's disease
  - Dengue
  - Skin cancer
  - Leukaemia
21. Haemophilia is normally found only in males. This disease is
- an autosomal recessive disease.
  - an autosomal dominant disease.
  - a sex-linked dominant disease.
  - a sex-linked recessive disease.
22. 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.
23. The division of cells to produce reproductive cells (gametes) is called
- meiosis.
  - stenosis.
  - mitosis.
  - narcosis.
24. What is the central concept in computer science?
- The algorithm
  - TCP/IP
  - HTML
  - The internet
25. In information technology, the translation of an algorithm into a program is known as
- mechanical realization.
  - linguistic realization.
  - computational logic.
  - transmission control protocol.

26. The World Wide Web (WWW) is based on which of the following two concepts?
- Hyper text and a graphical user interface
  - Hardware and software
  - Registers and output units
  - Microsoft Office and online payment systems
27. What is RAM?
- Readily accessible mouse
  - Readily accessible monitor
  - Random access memory
  - Random algorithm monitor
28. Which hydrocarbon comes off at the top of a fractionating column?
- Tar
  - Kerosene
  - Methane
  - Heating oil
29. The smallest units of elements are
- enzymes.
  - molecules.
  - hydrogen and oxygen.
  - atoms.
30. Darwin's theory of evolution says that
- 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.
31. Which of the following was an unfortunate consequence of Darwins's theory?
- Genetics
  - Eugenics
  - Lamarckianism
  - Paleontology

32. Semi-conductors are
- used to manufacture photovoltaic cells.
  - store energy as a compound.
  - a type of semi-permeable membrane.
  - plant chemicals that absorbs sunlight.
33. OTEC is a source of energy that
- is distilled from crude oil.
  - originates with the sun.
  - is harnessed from ocean tides.
  - utilizes the difference in the temperature of the water at the surface of the ocean and the water about 1000 meters deep.
34. Scientists who practice EXTRAORDINARY science
- always function within the established paradigm.
  - are able to control all of the possible environmental variables.
  - do not subscribe to the normal set of fundamental assumptions.
  - are often immediately embraced by the scientific community.
35. Galileo Galilei's work was experimental because he
- had an hypothesis.
  - made predictions.
  - constructed artificial conditions to minimize or ignore some variables.
  - interrupted the flow of nature.
36. Von Humboldt, Snider-Pellegrini and Alfred Wegener all contributed to the paradigm shift of
- continental drift.
  - phlogiston.
  - heliocentrism.
  - space-time curvature.



37. Solar panels that produce hot water are made of
- silicon based semi-conductors.
  - copper pipes and large sheets of metal painted black.
  - heat-producing, spinning generators.
  - chemical catalysts activated by sunlight.
38. 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 electrical energy.
  - environmental hazard of red earth.
39. What distinguishes science from other cognitive practices?
- Experiment and observation
  - Insightful theories
  - Careful research
  - Peer-reviewed findings
40. 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.
41. Hypertension and diabetes are
- chronic non-communicable diseases.
  - communicable diseases.
  - caused by viruses.
  - treated using antibiotics.

42. 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.
43. 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
44. In gender theory, sex and gender are determined by
- genetics alone.
  - socialization.
  - parental lifestyles alone.
  - biology and socialization respectively.
45. Which region/country experienced the greatest impact from the occurrence of Foot and Mouth Disease?
- Africa
  - The Caribbean
  - North America
  - The United Kingdom
46. Stem Cell research is controversial when
- the clones produced may be dangerous.
  - the cells are harvested from unused human embryos.
  - the cells cause cancer.
  - diseases are genetic.

47. "Mad cow disease" is the common name for which of the following:
- Variant Creuzfeld-Jacob disease (vCJD)
  - Bovine Spongiform Encephalopathy
  - the cells cause cancer.Scrapie
  - Kuru
48. Litmus paper is used to
- test the acidity and alkalinity of liquids.
  - test for lithium.
  - as a check for the truth value of a theory.
  - determine the presence of lipids.
49. The prevalence of women in science has historically been hindered by
- their lack of interest in scientific discovery.
  - the natural ability of men to more easily master scientific concepts.
  - the fact that women are not good at mathematics.
  - personal, structural and institutional bias.
50. The number of people living with any disease in a population is measured by its
- virulence.
  - incubation period.
  - incidence.
  - prevalence.

**END OF SECTION A**

**SECTION B**

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

- B.1. Explain scientifically the “green house effect” as the cause of global warming and discuss the social and economic impacts of climate change in the Caribbean.
- B.2. Discuss Thomas Kuhn’s contribution to understanding scientific progress.
- B.3. Give definitions for “science,” “medicine,” and “technology.” With an explanation and examples, give your opinion on which came first, if any, and list sites where we can see their interaction.
- B.4. Explain the threats that Foot and Mouth disease and Mad Cow disease pose. Noting the differences in the causes and who or what is impacted, discuss the approaches taken by Caribbean governments to prevent their spread.

**END OF SECTION B**

**SECTION C**

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

- C.1. Explore the history, science, and impact of biotechnology on society. Briefly outline some of the ethical issues that have emerged with the advance of this science and its associated technologies.
- C.2. Write an essay on nutritional, genetic, communicable and non-communicable diseases. Where relevant, give examples that significantly impact on the Caribbean.
- C.3. How does Fractional Distillation work? Write an essay on the threats and opportunities associated with the use of natural gas and crude oil as sources of energy in the Caribbean.
- C.4. Name three areas of productive activity and explain how they benefit from the emergence and evolution of modern digital information and communications technology. Describe the technologies and explain the positive and negative impacts on society.

**END OF PAPER**