

FINAL ASSESSMENT/EXAMINATION APRIL 2016

Course Code and Title: SCIE 4001 – EARTH AND LIFE SCIENCES II

Programme: Bachelor of Education.

Date: [Date] **Time:** [Start Time] - [End Time] **Duration:** 3 hours

PLEASE READ ALL INSTRUCTIONS CAREFULLY BEFORE YOU BEGIN THIS EXAMINATION

Instructions to Candidates

1. This paper has ten (10) pages with FOUR (4) sections A, B, C and D and a multiple choice answer sheet.
2. Section A consists of twenty-five (25) questions. You are required to detach and answer this section on the Multiple Answer Sheet provided on page 10.
3. Section B, C and D consists of TWO (2) questions each. You are required to answer ONLY ONE question from EACH of these sections in your answer booklet.
4. You must return the MULTIPLE CHOICE ANSWER SHEET along with your answer booklet and other writing paper to the Invigilator at the end of the examination.
5. The question paper does NOT have to be returned.

Key Examination Protocol

1. Students please note that academic dishonesty (or cheating) includes but is not limited to plagiarism, collusion, falsification, replication, taking unauthorised notes or devices into an examination, obtaining an unauthorised copy of the examination paper, communicating or trying to communicate with another candidate during the examination, and being a party to impersonation in relation to an examination.
2. The above mentioned and any other actions which compromise the integrity of the academic evaluation process will be fully investigated and addressed in accordance with UTT's academic regulations.
3. Please be reminded that speaking without the Invigilator's permission is **NOT** allowed.

SECTION A (25 marks)
MULTIPLE CHOICE QUESTIONS

This Section contains twenty-five (25) multiple choice questions. You are required to answer all the questions on the answer sheet provided. You must indicate ONLY ONE (1) response per question by shading the appropriate letter on the answer sheet. Changes to your response must be made by placing a large X through the answer to be changed and initialling next to the changed response.

1. Which of the following suggests that matter is made up of particles in continuous motion?
 - A. Water boils at 100 degrees Celsius
 - B. Iron rusts when exposed to air and water
 - C. Methane burns in oxygen to produce gases
 - D. We can smell the perfume of a lady walking past

2. Which one of the following statements about the kinetic theory of matter is NOT correct.
 - A. Matter is made up of particles called atoms and molecules
 - B. Changes in the states of matter are due to changes in the motion of the particles.
 - C. The higher the temperature the faster the particles move.
 - D. In going from solid to liquid to gas, the motion of molecules decreases and the forces of attraction between them increase.

3. Atoms within a substance that collide frequently and move independently of one another are most likely in a
 - A. Liquid
 - B. Solid
 - C. Gas
 - D. Crystal

4. When the temperature of a liquid is decreased, the particles slow down, the attractive forces between them become stronger and stronger until their positions become fixed. This change in the arrangement and motion of particles is referred to as
 - A. melting
 - B. freezing
 - C. condensing
 - D. boiling

5. A teacher sweeps the floor near the grinding machine to collect iron filings in the metalwork shop. How does she separate iron filings from the 'dirt'?
 - A. Sieving with a fine wire mesh
 - B. Hand picking the filings
 - C. Evaporating to dryness
 - D. Using a strong magnet

6. Anything that has mass and takes up space is an example of
- A. energy
 - B. technology.
 - C. matter
 - D. temperature
7. Which of the following is an example of a homogeneous mixture?
- A. Compound
 - B. Colloid
 - C. Suspension
 - D. Solution
8. Which of the following is an example of a change of state?
- A. Crushing limestone rock into powder
 - B. Melting ice in a glass of water
 - C. Stretching copper into a wire
 - D. Burning gasoline in an engine
9. In what state are particles closest together?
- A. Liquid
 - B. Gas
 - C. Vapour
 - D. Solid
10. In which state or states of matter can particles flow?
- A. Gas only
 - B. Liquid only
 - C. Solid only
 - D. Fluids only
11. Solids particles have a definite shape because they
- A. can be compressed
 - B. have strong force of attraction between the particles
 - C. are packed together very tightly
 - D. are arranged in a regular way
12. According to the scientific definition of work, pushing on a rock accomplishes no work unless there is
- A. an applied force greater than its weight.
 - B. a net force greater than zero.
 - C. an opposing force.
 - D. movement in the same direction as the force.

13. A metal rod used to stir up Bar-B-Que coals gets hot because heat is transferred from the coals to the “hand end” along the rod by

- A. continual emission of electromagnetic radiation from the hot coals.
- B. the movement of mass inside the rod
- C. the vibration of particles inside the rod
- D. the interchange of kinetic and potential energy of particles inside the rod

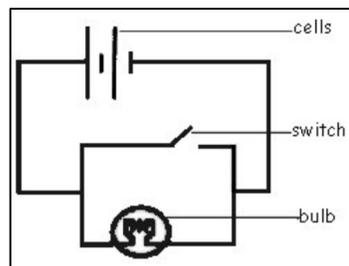
14. Four objects were left out in the sunlight for the same duration of time (hours). Which object will feel hottest to the touch?

- A. a wooden chair
- B. a large glass mirror
- C. an iron pot
- D. a polystyrene ice cooler

15. A student lowers one end of his pencil in a glass of water and to his amazement he observes that it looks bent. Which statement below best explains the behaviour of light waves that accounts for the student’s observation?

- A. Some materials absorb light waves of certain frequencies.
- B. Some materials reflect some of the waves and absorb some.
- C. Light waves change direction when they meet a new medium.
- D. Light waves are emitted by some materials

Use the information in the circuit to answer the next two questions. The connection wires are assumed to have negligible resistance.



16. When the switch is opened the bulb will:

- A. not glow because the circuit is open
- B. glow brightly because the circuit is closed
- C. not glow because the circuit is closed
- D. glow brightly because the circuit is open

17. When the switch is closed bulb will:

- A. glow
- B. not glow
- C. glow less brightly
- D. glow more brightly

18. In which medium will sound travel fastest?
- A. Vacuum
 - B. Air
 - C. Water
 - D. Metal
19. Which of the following is NOT a feature of the image formed by a plane mirror?
- A. Same size as the object
 - B. Same distance behind the mirror as the object is in front of it
 - C. Upside down but same size as the object
 - D. Upright and same size as the object
20. Which class of elements best conducts electricity?
- A. Metals
 - B. Non metals
 - C. Semi metals
 - D. Noble (inert) gas
21. When an acid is added to a base it produces a
- A. Salt only
 - B. Salt and water only
 - C. Salt and gas only
 - D. Gas and water only
22. An example of a second class lever is:
- A. A hammer
 - B. A wheel barrow
 - C. A shovel lifting soil
 - D. A nut cracker
23. The amount of matter in an object is its
- A. mass
 - B. weight
 - C. volume
 - D. density
24. Sublimation is a change directly from a
- A. solid to a gas
 - B. solid to a liquid
 - C. liquid to a solid
 - D. liquid to a gas

25. In which state or states of matter can particles spread out in all directions?

- A. Gas only
- B. Liquid only
- C. Solid only
- D. Fluids only

SECTION B (25 marks)

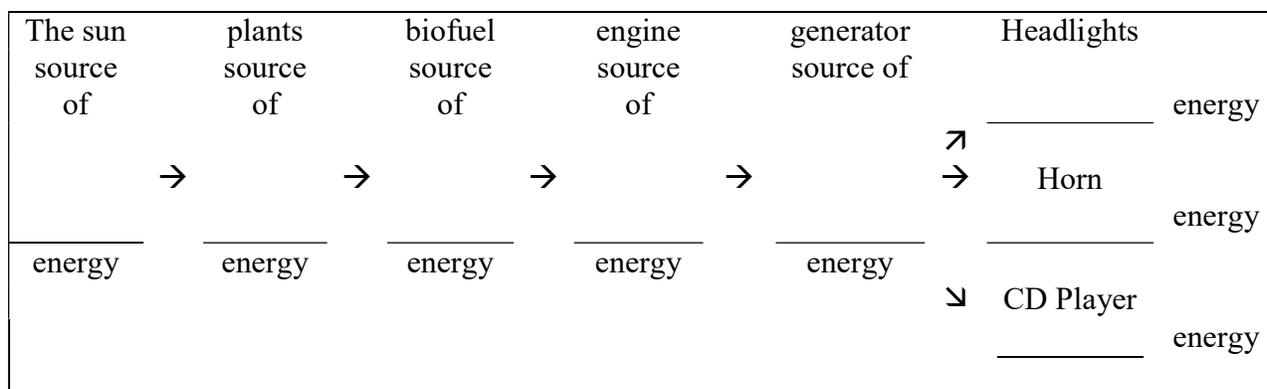
This Section contains two (2) questions. You are required to answer ONLY ONE (1) question in the answer booklet provided.

1. (a) (i) Matter exists in three (3) distinct phases. Describe, with diagrams, how the particles are organized in each phase. (6 marks)
- (ii) Describe the amount and type of movement experienced by the particles in each phase of matter. (6 marks)
- (iii) Describe the forces between the particles in each phase of matter. (3 marks)
- (b) (i) Explain how rain water acquires temporary hardness as it flows over rocks and down rivers. (3 marks)
- (ii) Write a word equation for the formation of permanent hard water. (4 marks)
- (iii) Describe how water is made safe for drinking by the water utility. (3 marks)
2. (a) Sugar is obtained by crushing sugar cane stems and squeezing the liquid cane juice which is boiled to produce a viscous liquid called molasses and sugar crystals.
- (i) Explain the science behind the process of obtaining the sugar from the sugar cane juice. (4 marks)
- (ii) Icing sugar is made by grinding the sugar into a very fine powder. Explain why it dissolves faster than regular sugar made of large crystals. (3 marks)
- (iii) The cane is bundled using heavy iron chains which can severely damage the crusher. Explain why the cane is passed over a very strong electromagnet before being passed through the crusher. (2 marks)
- (b) How can the salt be recovered from a salt and sand mixture? (6 marks)
- (c) Describe how you would find the density of an irregular shaped solid. (10 marks)

SECTION C (25 marks)

This Section contains two (2) questions. You are required to answer ONLY ONE (1) question in the answer booklet provided.

3. (a) Explain the term Work. (2 marks)
- (b) (i) Draw a labelled diagram of a circuit with two cells (C1 and C2), and switches (S1, S2 and S3) to independently control three bulbs. (5 marks)
- (ii) Use an X to mark the position of a fourth switch (S4) in the above circuit that will switch off all three bulbs. (1 mark)
- (c) (i) Describe the function the circuit breaker in the house or the fuse in a car. (1 marks)
- (ii) How does the fuse work? (1 mark)
- (iii) Define the term conductor and give an example. (2 marks)
- (iv) Define the term insulator and give an example. (2 marks)
- (d) You are given three identical rods and told two are magnets. Explain how you would determine which of these are magnets, without the use of additional equipment. (3 marks)
- (e) The sun shines on plants which are used to make bio fuels to run a car engine which has a generator to power headlights, horn and play a CD Player. Copy and complete the following diagram to indicate the MAIN form of energy which is output from each stage. (8 marks)



4. (a) Draw a labelled diagram of a laboratory thermometer. (6 marks)
- (b) Define conduction, convection and radiation giving examples. (6 marks)
- (c) Two children playing near a swimming drop a toy into the water which sinks to the bottom of the pool.
- (i) Using a ray diagram trace two rays of light from the toy to the eye of a person on the bank. (4 marks)
- (ii) Explain the principle which causes light to behave in this manner. (3 marks)
- (d) What are the primary colours of light? (3 marks)
- (e) Discuss the speed of sound in solids, liquids and gases. (3 marks)

SECTION D (25 marks)

This Section contains two (2) questions. You are required to answer ONLY ONE (1) question in the answer booklet provided.

5. (a) Discuss the similarities and differences between science and technology. (7 marks)
(b) Explain the technological processes. (12 marks)
(c) Explain the relationship between function and form in two named everyday structures. (6 marks)
6. (a) Give a brief explanation with an example of how ANY FOUR (4) simple machines work: (12 marks)
(b) Draw diagrams to show the THREE classes of levers work. (9 marks)
(c) State four possible effects of a force. (4 marks)

END OF EXAMINATION

Student ID # _____

Term II 2015/2016 Final Examinations
SCIE 4001: EARTH AND LIFE SCIENCES II
Multiple Choice Answer Sheet.

Please shade the correct response.

- 1. (A) (B) (C) (D)
- 3. (A) (B) (C) (D)
- 5. (A) (B) (C) (D)
- 7. (A) (B) (C) (D)
- 9. (A) (B) (C) (D)
- 11. (A) (B) (C) (D)
- 13. (A) (B) (C) (D)
- 15. (A) (B) (C) (D)
- 17. (A) (B) (C) (D)
- 19. (A) (B) (C) (D)
- 21. (A) (B) (C) (D)
- 23. (A) (B) (C) (D)
- 25. (A) (B) (C) (D)
- 27. (A) (B) (C) (D)
- 29. (A) (B) (C) (D)

- 2. (A) (B) (C) (D)
- 4. (A) (B) (C) (D)
- 6. (A) (B) (C) (D)
- 8. (A) (B) (C) (D)
- 10. (A) (B) (C) (D)
- 12. (A) (B) (C) (D)
- 14. (A) (B) (C) (D)
- 16. (A) (B) (C) (D)
- 18. (A) (B) (C) (D)
- 20. (A) (B) (C) (D)
- 22. (A) (B) (C) (D)
- 24. (A) (B) (C) (D)
- 26. (A) (B) (C) (D)
- 28. (A) (B) (C) (D)
- 30. (A) (B) (C) (D)