**Section i – Vocabulary**

1. \_\_\_\_\_\_\_ Center of an atom
2. \_\_\_\_\_\_\_ Positively charged particles found in the nucleus of an atom
3. \_\_\_\_\_\_\_ Negatively charged particles that are constantly moving around the nucleus of an atom
4. \_\_\_\_\_\_\_ Forces that hold protons and neutrons together in the nucleus
5. \_\_\_\_\_\_\_ Unstable nuclei undergo nuclear \_\_\_\_\_\_\_\_\_\_\_\_, where the nucleus loses particles
6. \_\_\_\_\_\_\_ Splitting a large nucleus into smaller ones to release energy
7. \_\_\_\_\_\_\_ Products of an initial reaction cause more reactions to occur
8. \_\_\_\_\_\_\_ Nuclear fission \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ occur naturally
9. \_\_\_\_\_\_\_ Combining two smaller nuclei to form one large one and release energy
10. \_\_\_\_\_\_\_ Nuclear fusion \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ occur naturally
11. \_\_\_\_\_\_\_ Energy transfer that occurs between objects that are touching
12. \_\_\_\_\_\_\_ Energy transfer that occurs due to the movement of warm fluid
13. \_\_\_\_\_\_\_ Energy transfer in the form electromagnetic waves
14. \_\_\_\_\_\_\_ Material that easily transfers energy as heat
15. \_\_\_\_\_\_\_ Material that transfers energy poorly
16. \_\_\_\_\_\_\_ The total amount of energy needed to raise the temperature of 1kg of an object 1K
17. \_\_\_\_\_\_\_ The ability to do work
18. \_\_\_\_\_\_\_ The amount of work done over a period of time
19. \_\_\_\_\_\_\_ The ratio between the output force and the input force
20. \_\_\_\_\_\_\_ Disturbance that carries energy through matter or space
21. \_\_\_\_\_\_\_ Physical environment made up of matter (water, air, etc)
22. \_\_\_\_\_\_\_ Can travel through space, requires no medium
23. \_\_\_\_\_\_\_ Requires a medium to travel through
24. \_\_\_\_\_\_\_ Particles move perpendicular to the direction the wave is traveling
25. \_\_\_\_\_\_\_ Particles vibrate parallel to the direction of the wave motion
26. \_\_\_\_\_\_\_ Point in a wave where it is the furthest from the resting position
27. \_\_\_\_\_\_\_ The distance from one crest to another on a wave
28. \_\_\_\_\_\_\_ The time it takes for 1 complete wave to occur
29. \_\_\_\_\_\_\_ The number of waves that occur over a set period of time
30. \_\_\_\_\_\_\_ When light, sound, or heat hit a surface that it cannot pass through
31. \_\_\_\_\_\_\_ Change in the direction of a wave due to an obstacle or edge
32. \_\_\_\_\_\_\_ Bending of a wave as it passes from one medium to another
33. \_\_\_\_\_\_\_ Two or more waves that combine to create a new one
34. \_\_\_\_\_\_\_ Sound travels fastest through \_\_\_\_\_\_\_\_\_\_\_
35. \_\_\_\_\_\_\_ The observable change in frequency of a wave when the source or observer is movingA. Reflection
36. Mechanical wave
37. Decay
38. Convection
39. Electrons
40. Doppler effect
41. Wavelength
42. Does
43. Does not
44. Period
45. Electromagnetic wave
46. Chain reaction
47. Conduction
48. Interference
49. Solids
50. Longitudinal
51. Refraction
52. Medium
53. Radiation
54. Frequency
55. Nucleus
56. Insulator
57. Energy
58. Wave
59. Nuclear forces
60. Nuclear fusion
61. Nuclear fission
62. Diffraction
63. Mechanical advantage
64. Transverse
65. Protons
66. Power
67. Amplitude
68. Conductor
69. Specific heat

**Section ii – Matching**

1. \_\_\_\_\_\_\_ Constructive interference
2. \_\_\_\_\_\_\_ Destructive interference
3. \_\_\_\_\_\_\_ cmΔt
4. \_\_\_\_\_\_\_ P = w/t
5. \_\_\_\_\_\_\_ Sun light
6. \_\_\_\_\_\_\_ Sound
7. \_\_\_\_\_\_\_ λ
8. \_\_\_\_\_\_\_ High pitch = \_\_\_\_\_\_\_\_\_\_\_\_\_\_
9. \_\_\_\_\_\_\_ v = λ/T
10. G.

1. High frequency
2. Mechanical wave H. Wavelength I. Electromagnetic wave

 J. Power

1.

1. Wave speed
2. 

**Section iii –Questions**

1. Below, draw a diagram of an atom. **Label** each of the following items: **electrons, protons, neutrons, nucleus**
2. If like forces repel, then how is it that protons (positively charged) and neutrons (no charge) can be held together so closely inside the nucleus?
3. What does it mean if a nucleus is unstable? What makes it unstable? How can it become stable?
4. Describe the process of nuclear fission, from initiation to the final product(s).
5. Describe the process of nuclear fusion, from initiation to the final product(s).
6. Compare and contrast nuclear fission and fusion in the table provided below. **List 2 facts in each box.**

|  |  |
| --- | --- |
| Both |  |
| Fission |  |
| Fusion |  |

1. List **3** pros and **3** cons of nuclear power.
2. You are making mac’n’cheese with a metal-handled pot. After the water comes to a boil you grab the handle and it burns you. Why?
3. The specific heat of water is 4,186 J/kg x K. How much energy is required to increase 10,000kg of water in a swimming pool from 25°C to 28°C? **Show your work.**
4. Use the phase diagram below to determine the temperature at which the unknown substance will melt. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

100

80

60

40

20

0

Temperature °C

Energy

1. Calculate the amount of work it would take for Josh to throw an 8kg weight 4m into the air. **Show your work.**
2. In your **own words**, define power. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Lisa is moving and wants to know if it would be worth it to use a ramp. The ramp is 2.0m long and 4m high. Calculate the mechanical advantage and determine if it make sense for her to use this ramp. **Show your work**.
4. Why can light travel through space but not sound?
5. Describe how your eardrum works and how it is possible for humans to hear.
6. Draw a longitudinal wave in the space to the right and **label** the **amplitude** and **wavelength**.