Bond International College
Bond Academy

FINAL EXAMINATION

Student's Name: _____ **Course:** Grade 11 Physics

Time: 12:10-14:10 **Course: SPH3U**

Room: online **Date:** June 25, 2021

Number of Pages: (8) **Teacher**: Mrs. Rivkind

Total Marks: /67 **Value of Exam**: 30%

Instructions:

1. There are **(8) pages**, including the cover page. Please check now to make sure you have all pages.
2. All questions should be answered on this paper in the spaces provided.
4. Absolutely no talking is permitted. If you have a question, please send it as a personal message to the teacher in the Zoom chat and wait for a teacher to attend to you.

Section 1: Knowledge is out of a total of <u>20 marks</u>
Section 2: Application is out of a total of <u>20 marks</u>
Section 3: Thinking is out of a total of <u>14 marks</u>
Section 4: Communication is out of a total of <u>13 marks</u>

SPH3U Final Exam
Bond Academy

Name:

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Knowledge /20	Thinking /14	Application /20	Communication /13

Section 1: Knowledge [20 marks]

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
Q9	Q10	Q11	Q12	Q13	Q14	Q15	

***Please fill out your answers (a, b, c or d) in the table above. **ANSWERS NOT PROVIDED IN THE TABLE WILL NOT BE MARKED.**

Multiple choice [15 marks]: Choose the most correct answer from the options provided.

------- 1) Mechanical waves
a. require a medium in which to travel
b. are pretty gnarly
c. can travel through a vacuum
d. none of the above

------- 2) Gold melts at 1063°C. It takes 3250 J of energy to melt 50.0 g of gold at this temperature. What is the specific latent heat of fusion of gold?
a. 75.0 kJ/kg
b. 65.0 kJ/kg
c. 85.0 kJ/kg
d. 95.0 kJ/kg

------- 3) Newton's third law of motion states that an object will continue either being at rest or moving at a constant _____ unless acted upon by an external non-zero _____.
a. velocity, net force
b. net force, velocity
c. acceleration, net force
d. none of the above

------- 4) When a force acts in the direction of motion of an object, the work done is
a. negative
b. zero
c. positive
d. none of the above

------- 5) For work to be done,
a. a force must act on the object
b. the object must change position
c. there must be a component of the force parallel to the direction of the motion
d. all of the above

-------- 6) A hyena running at a velocity of 18 m/s [S] slows down uniformly to a velocity of 4.0 m/s [S] in 5.0 s. What is the displacement of the hyena during this time?

a. 40 m
b. 55 m
c. 30 m
d. 56 m

-------- 7) When someone says that an object is exhibiting uniform motion, it means

a. the object is traveling at a constant acceleration
b. the object is wearing a Bond uniform
c. the object is traveling at a constant velocity
d. none of the above

-------- 8) Magnetic field lines always travel _____ to _____ outside a magnet and _____ to _____ inside a magnet.

a. south to north, north to south
b. north to north, south to south
c. north to south, north to south
d. north to south, south to north

-------- 9) By what factor would the sound intensity increase if the sound intensity level in our classroom increased from 68 dB to 77 dB?

a. 9
b. 8
c. 10
d. 4

-------- 10) A source with a frequency of 15 Hz produces water waves that have a wavelength of 7.3 cm. What is the speed of the wave?

a. 1.1 m/s
b. 110 m/s
c. 0.11 m/s
d. 11.0 m/s

-------- 11) Audible sounds for humans are in the range of

a. 0.02 kHz-20 kHz
b. 0.02 kHz-20000 Hz
c. 20 Hz – 20 kHz
d. all of the above

-------- 12) What is the wavelength of a sound of frequency 225 Hz that is produced in air at a temperature of 20.0°C?

a. 2.00 m
b. 1.53 m
c. 24 m
d. 1.60 m

-------- 13) A 500.0 g mass of water at 4.00°C is allowed to warm to 23.0°C. What is the amount of thermal energy absorbed by the water?

a. 3.98 kJ
b. 39.8 kJ
c. 3980 J
d. none of the above

-------- 14) Which of the following is a renewable energy resource?

a. wind power
b. tidal power
c. hydroelectric power
d. all of the above

-------- 15) As a roller coaster accelerates from rest down a sloped track from a height of 100 m

a. E_K increases and E_P increases
b. E_K decreases and E_P increases
c. E_K increases and E_P decreases
d. E_K decreases and E_P decreases

Short Answer [5 marks]

16) What are <u>three</u> ways that thermal energy can be transferred from one place to another? [3K]

17) What is negative work? Give an example of negative work being done on an object. [2K]

Section 2: Application [20 marks]

18) A 0.65 kg beach ball is thrown straight up with a speed of 8.0 m/s from a point 2.0 m above the ground. Assume there is no air resistance.

a. Calculate how far up the ball will go. [3A]
b. At what speed will the ball eventually hit the ground? [3A]

19. The siren of a fire truck has a frequency of 670 Hz. If the truck is traveling towards you at 35.5 m/s, what do you perceive to be the frequency of the siren? The speed of sound in air is 344 m/s. [3A]

20) Find v_x and v_y for the following vectors. [3A]
a. A steamboat traveling at 20 km/h [W 45°N]
b. A plane flying at 250 km/h [E 25° S]
c. A biker on the road traveling 15 km/h due North

21) Draw free body diagrams for the following situations. [3A]
a. A 1540 kg truck with rubber tires is skidding on wet concrete with all four wheels locked.
b. An apple falls to the ground in a vacuum.
c. A skydiver is falling through the air after having jumped out of a plane.

22) A roller coaster train and its passengers have a combined mass of 856 kg. The train comes over the top of the first hill, 85.0 m above the ground, with a speed of 0.300 m/s. The train goes down the first hill and up to the crest of the second hill, 64.0 m above the ground. Ignore the effects of frictional forces. What is the kinetic energy of the train at the top of the second hill? (Hint: think law of cons. of energy!) [5A]

Section 3: Thinking [14 marks]

23) A tuning fork with a frequency of 256 Hz is held above a closed air column while the column is gradually increased in length. At what lengths for this air column would the first four resonant points be found, if the speed of sound is 344 m/s? [5T]

24) If 1.35 kg of crushed glass (specific heat capacity 500 J/(kgK)) AT 23.3 °C are mixed with 2.15 kg of dry sand at 156 °C, the final temperature of the mixture is 119 °C. Find the specific heat capacity of this type of dry sand . [5T]

25) A 70 kg student is standing on a scale in an elevator on earth. What will be the reading on the scale when the elevator is [4T]
a. moving down at constant speed?
b. accelerating 4.9 m/s^2 [up]?
c. accelerating 3.4 m/s^2 [down]?
d. at rest at a floor?

Section 4: Communication [13 marks]

26) Using what you know about sound waves, explain under which conditions as well as why a shock wave occurs. [4C]

27) Ms Rivkind notices that someone forgot to turn on the thermostat in her house and exclaims "BRR…WHO LET THE COLD IN??". Based on what you have learned in thermodynamics, explain what is wrong with this statement. [4C]

28) Sketch a position vs time graph for each statement below. Assume right is positive. [5C]

a. object accelerating to the right
b. object accelerating to the left
c. object traveling at a constant velocity left
d. object at rest
e. object traveling at a constant velocity right