PHYS 117 2020 Final Assessment (16472059)

Current Score: 0/16 **Due:** Tue, Apr 7, 2020 11:59 PM CST

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	Total
Points	0	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/16

Description

This set of 1 statement of commitment to academic integrity and 16 questions is the final assessment for PHYS 117 2020 at the University of Saskatchewan.

Instructions

For each of the following questions, write the complete solution, including a diagram, using the problem-solving method discussed in class. **Keep extra decimal places throughout your calculations, and then round-off your final answer to three significant figures.** Submit your answer to each question in WebAssign.

When you are finished the entire assessment, scan your written work for all the questions and submit the PDF file using the link in the Blackboard site for your lecture section.

Your submissions in both WebAssign and Blackboard are due no later than 11:59 PM on Tuesday, April 7th.

If you are unsure of anything please go to "Course Materials" in Blackboard and review the item "Final Assessment Reminders and Clarifications".

1. 0/0 points P117-2020-FA-01-v1 [4636257]

On my honour, I pledge that I will not give or receive aid during this assessment. I recognize that it is my responsibility to uphold academic integrity and agree to follow the rules of this assessment and the guidelines laid forth in my institution's policies.

○ Yes, I understand and agree. ✗

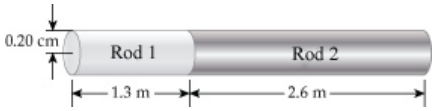
2. 0/1 points P117-2020-FA-02-v1 [4636181]

Arterial blockages are described by the reduction in blood flow rate that they cause. Suppose that a blood clot has reduced the flow rate in an artery to 15.3% of its normal value and the average pressure difference per unit length along the artery has increased by 33.0%. Calculate the factor by which the radius of the artery, r_o, has changed. You may assume that the viscosity of the blood does not change.

r = ✗ 0.582 r_o

3. 0/1 points P117-2020-FA-03-v1 [4636187]

A cylindrical rod with a radius of 0.200 cm consists of two sections (a section of cast iron that is 1.30 m long and a section of aluminum that is 2.60 m long) as shown in the diagram below.

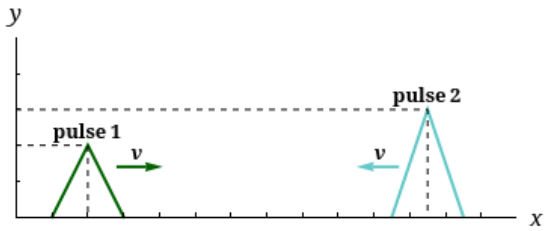


Calculate the change in length of the rod when a tensile force of 4.30×10^3 N is exerted on it. The Young's modulus values are $Y_{\text{cast iron}} = 99.9 \times 10^{10}$ N/m^2 and $Y_{\text{aluminum}} = 7.01 \times 10^{10}$ N/m^2.

✗ 1.31 cm

4. 0/1 points P117-2020-FA-04-v1 [4636191]

Two pulses are moving toward each other with the same speed v = 22.4 cm/s. The diagram below shows the instantaneous positions of the pulses at time t = 0.



The scale of the horizontal axis (x) is 4.00 cm per division and the scale of the vertical axis (y) is 5.00 cm per division. (At t = 0, the peak of pulse 2 is exactly on a half-unit of the horizontal axis.)

(a) Calculate the location where the superposition of the two pulses has maximum amplitude.

[ ] ✗ 27 cm

(b) Calculate the time when the superposition of the two pulses has maximum amplitude.

[ ] ✗ 0.848 s

(c) Calculate the maximum amplitude of the superposition of the two pulses.

[ ] ✗ 25 cm

5. 0/1 points P117-2020-FA-05-v1 [4636192]

One type of non-invasive blood flow measuring device measures the beat frequency between the original ultrasound wave emitted by the device and the ultrasound wave reflected from the oncoming blood cells.

Suppose that the frequency of the ultrasound emitted by the device is 6.73 MHz, the speed of ultrasound through human tissue is 1540 m/s, and the speed of the oncoming blood is 43.2 cm/s.

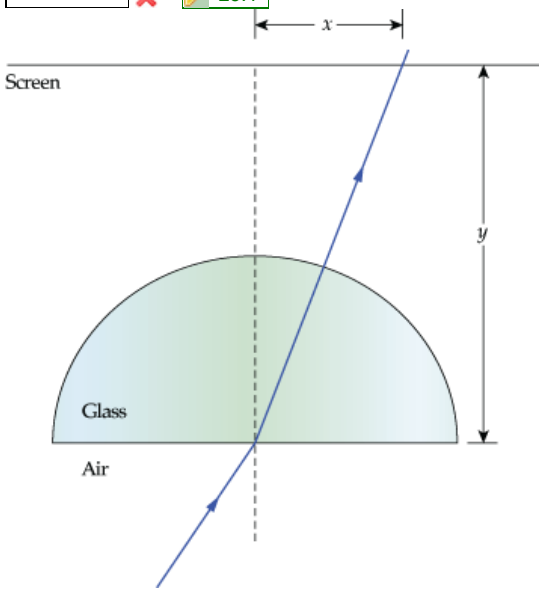
Calculate the beat frequency. **Keep as many decimal places as your calculator will allow throughout your calculations, and then round-off your final answer.**

[ ] ✗ 3780 Hz

6. 0/1 points P117-2020-FA-06-v1 [4636194]

The refractive index of a semicircular glass disk is n_g = 1.66. A light ray enters the glass at the midpoint of the flat side, as shown in the diagram. Calculate the angle of incidence in air so that the ray will be perpendicular to the semicircular surface when it leaves the glass and will strike the screen at x = 4.60 cm and y = 17.4 cm.

[ ] ✗ 25.1 °



7. 0/1 points P117-2020-FA-07-v1 [4636197]

Two lenses, one converging and the other diverging, have the same magnitude of focal length, 39.4 cm. A light bulb is used as an object.

(a) Which lens should be used to produce a focussed image of the light bulb on a screen several meters away.

- ○ converging
- ○ diverging

✗

(b) Calculate the distance from the lens at which the screen should be placed so that the image of the light bulb on the screen is a factor of 2.45 larger than the light bulb.

[ ] ✗ 1.36 m

8. 0/1 points P117-2020-FA-08-v1 [4636201]

Light with a wavelength of 616 nm is incident on a pair of slits. Calculate the required distance between the two slits so that the interference pattern has its first **minimum** at an angle of 0.307°, as measured from the direction of the incident light.

[ ] ✗ 5.75e-05 m

9. 0/1 points P117-2020-FA-09-v1 [4636203]

The distance from the eye lens (i.e. cornea-lens system) to the retina of a particular eye is 2.00 cm. The power of the eye lens when it is relaxed is 56.2 D.

(a) Calculate the far point of the eye.

[ ] ✗ 0.161 m

(b) If a corrective lens is to be placed 1.80 cm from the eye, calculate the power of the corrective lens that will allow the eye to focus on distant objects.

[ ] ✗ -6.98 D

10. 0/1 points P117-2020-FA-10-v1 [4636206]

Cars have a reservoir to catch radiator fluid that may overflow when the engine is hot. A radiator is made of copper and is completely filled to its 19.0-L capacity when it, and the radiator fluid in it, are at 17.0°C. Calculate the volume of radiator fluid that will overflow when the radiator and fluid reach a temperature 95.0°C. The fluid's volume coefficient of expansion is 401×10^{-6}/°C and the volume coefficient of expansion of copper is 51.0×10^{-6}/°C.

[ ] ✗ 0.519 L

11. 0/1 points P117-2020-FA-11-v1 [4636210]

172 g of hot coffee at 78.7°C and some cold cream at 7.50°C are poured into a 115-g cup that is initially at a temperature of 22.0°C. The cup, coffee, and cream reach an equilibrium temperature of 61.0°C. The material of the cup has a specific heat of 0.2604 kcal/(kg·°C) and the specific heat of both the coffee and cream is 1.00 kcal/(kg·°C). Assuming that no heat is lost to or gained from the surroundings, calculate the mass of cream that was added.

[ ] ✗ 35.1 g

12. 0/1 points P117-2020-FA-12-v1 [4636212]

The surface area of the human body is 1.65 m^2 and the average thickness of the tissue between the core and the outside of the skin is 1.00 cm. The thermal conductivity of tissue is 0.200 J/(s·m·°C). For a core internal temperature of 37.0°C and an outside-of-skin temperature of 33.8°C, calculate the rate of heat conduction out of the human body.

[ ] ✗ 106 W

13. 0/1 points P117-2020-FA-13-v1 [4636215]

Electrons from a material whose work function is 2.35 eV are ejected by 487-nm photons. Once ejected, calculate the minimum time it takes these electrons (in ns) to travel 4.15 cm.

[ ] ✗ 158 ns

14. 0/1 points P117-2020-FA-14-v1 [4636220]

The accelerating electric potential (i.e. voltage) applied to a particular x-ray tube is 14.7 kV. Calculate the shortest wavelength (in nm) of x-rays that can be produced.

[ ] ✗ 0.0844 nm

15. 0/1 points P117-2020-FA-15-v1 [4636227]

Calculate the number of neutrons in a bromine nucleus, which has a radius of approximately 5.38×10^{-15} m. The atomic number of carbon is 6, the atomic number of chlorine is 17, and the atomic number of bromine is 35.

[ ] ✗ 55 neutrons

16. 0/1 points P117-2020-FA-16-v1 [4636231]

(a) For the nuclei $^{11}_{5}B$ and $^{11}_{6}C$, calculate the difference in binding energy per nucleon (in MeV). The atomic mass of $^{11}_{5}B$ is 11.009305 u and the atomic mass of $^{11}_{6}C$ is 11.011434 u.)

[ ] ✗ 0.251 MeV

(b) This difference in binding energy is due to which of the following?

- ○ Greater electron attraction for the $^{11}_{6}C$ atom
- ○ Greater electron repulsion for the $^{11}_{6}C$ atom
- ○ Greater neutron repulsion for the $^{11}_{6}C$ nucleus
- ○ Greater proton repulsion for the $^{11}_{6}C$ nucleus
- ○ Greater proton attraction for the $^{11}_{6}C$ nucleus
- ○ Greater neutron attraction for the $^{11}_{6}C$ nucleus

✗

17. 0/1 points P117-2020-FA-17-v1 [4636234]

In the radioactive decay $^{240}_{94}Pu \rightarrow {}^{A}_{Z}U + {}^{4}_{2}He$ identify the mass number and the atomic number of the U nucleus.

(a) the mass number

[ ] ✗ 236

(b) the atomic number

[ ] ✗ 92

Assignment Details

Name (AID): **PHYS 117 2020 Final Assessment (16472059)**
Submissions Allowed: **1**
Category: **Exam**
Code:
Locked: **Yes**
Author: **Zulkoskey, Brian (** bwz856@mail.usask.ca **)**
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Which graded: **Question Part**

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Before due date
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