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Haramaya University

College of Natural and Computational Sciences

Department of Physics

General Physics (phys1011) Final Exam

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Time Allowed: 3:00hrs

Maximum pts.: 50pts

800

Name: _____

ID. No.: _____ Section: _____ Campus: _____

Demographic data to Exam

Instructor: Berhanu ☐ Bamlak ☐ Dereje ☐ Eshetu ☐
Selamawit ☐ Tadesse ☐ Tekhleweyni ☐ Wudalew ☐ Yerosen ☐

General directions

- ❖ WRITE YOUR NAME, SECTION AND PUT(✓) IN THE BOX AFTER THE NAME OF YOUR INSTRUCTOR
- ❖ The exam paper contains 9 pages including the cover page and 2 attached papers
- ❖ Don't detach the attached papers
- ❖ Show the necessary steps clearly, neatly and to the most simplified form
- ❖ Write your answer on the answer sheet
- ❖ Any attempt of cheating results severe punishment
- ❖ Don't use your cellphone
- ❖ Use back of the page if necessary
- ❖ Use calculator if necessary

For instructor's use only

Part I (22.5pts)	Part II (6pts)	Part III (5.5pts)	Part IV (16pts)	Total (50pts)

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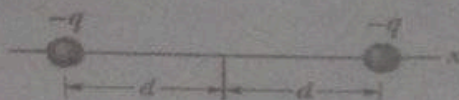
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Part I: Multiple Choice questions: For the following questions choose the appropriate answer. (1.5pts each)

1. Kirchhoff's loop rule is a result of
 - A. The law of conservation of energy
 - B. The law of conservation of charge
 - C. The law of conservation of current
 - D. All of the above
2. Which one of the stress causes the volume deformation on an object?
 - A. Volume stress
 - B. Shear stress
 - C. Tensile stress
 - D. None
3. Two point charges attract each other with an electric force of magnitude F . If the charge on one of the particles is reduced to one-third its original value and the distance between the particles is doubled, what is the resulting magnitude of the electric force between them
 - A. $\frac{1}{12}F$
 - B. $\frac{1}{3}F$
 - C. $\frac{1}{6}F$
 - D. $\frac{3}{4}F$
4. The temperature at which water behaves abnormally and used to define relative density or specific gravity is at
 - A. 0°K
 - B. 4°C
 - C. 100°C
 - D. 20°C
5. In a transverse wave, the motion of the particles is ____ the wave's direction of propagation.
 - A. along
 - B. perpendicular to
 - C. opposite from
 - D. parallel to
6. In the first law of thermodynamics
 - A. Temperature of an objects in thermal contact is introduced
 - B. The total energy of the system is always constant
 - C. Nature always favors reversible process
 - D. Introduce state variables such as entropy
7. If the amplitude of a wave is doubled, what will be the maximum velocity of the wave with no other changes made to the wave?
 - A. Halved
 - B. doubled
 - C. Quadrupled
 - D. Tripled
8. A wave has a speed of 10 m/s and a frequency of 10 Hz. What is its wavelength?
 - A. 0.1 m
 - B. 1 m
 - C. 10 m
 - D. 100 m
9. Three equal resistances when combined in series are equivalent to 90Ω . Their equivalent resistance when combined in parallel will be _____.
 - A. 270Ω
 - B. 30Ω
 - C. 810Ω
 - D. 10Ω

10. Consider two equal point charges separated by some distance $2d$ as shown in the figure below. Which of the following statements is not true about the net electric field?



- A. the net electric field is maximum between the two charges
 B. The net electric field becomes zero at midway between the two charges.
 C. The field will never be zero to the left and right of the charges.
 D. All
11. The heat required per unit mass of a substance to produce a phase change at constant temperature is called _____.
 A. Latent Heat B. Phase Change C. Specific heat capacity D. None
12. If the density kept constant the pressure of fluid increased with increasing
 A. Volume B. Base area C. Mass D. Depth
13. Given that 1 cal (about 4.2 J) of heat is required to raise the temperature of 1 g of water by 1°C , what will be the final temperature when 50.0 calories of heat are added to 5 g of water at 25°C ?
 A. 22.6°C B. 27.4°C C. 35.0°C D. 15.0°C
14. Which one is false about the r/ship between the coefficients of thermal expansion?
 A. $\beta = 2\alpha$ B. $\gamma = 3\alpha$ C. $\beta = 2\gamma/3$ D. $\gamma = 2\beta/3$
15. If a substance is hot, its particles will move
 A. Faster than the cooler object C. Slower than the cooler object
 B. as the cooler object D. Faster or slow than the cooler object

Part II: Fill the Blank spaces (6pts)

1. Write the mathematical equations for the first law of thermodynamics for the following processes (1.5 pts.)
 A. Isochoric process= _____
 B. Isobaric process = _____
 C. Isolated process= _____
2. Electrical resistivity depends on _____, _____ and _____. (1.5 pts.)

3. The maximum displacement of a vibrating body from its mean position is called _____
(1pts.)
4. _____ is the temperature value where degree Fahrenheit and Celsius scales meet. (1pts.)
5. _____ is a disturbance from equilibrium condition that propagates carrying energy and momentum through space without the transport of matter. (1pts.)

ANSWER SHEET

Part I: Choose the best answer for the following questions (1.5pt each)

1. 2. 3. 4. 5.
6. 7. 8. 9. 10.
11. 12. 13. 14. 15.

Part II: Fill the Blank spaces (6pts)

1. A. _____ B. _____ C. _____
2. _____ and _____
3. _____
4. _____
5. _____

Part III: Write the answer for the following questions(5.5pts)

1. State the Zeroth law of thermodynamics? (1pt)

2. list at least three characteristics of SHM? (1.5pts)

3. List at least three characteristics of waves. (1.5pts)

4. Explain the difference between heat capacity and specific heat capacity. (1.5pt)

Part IV: WORK OUT (16 pts.)

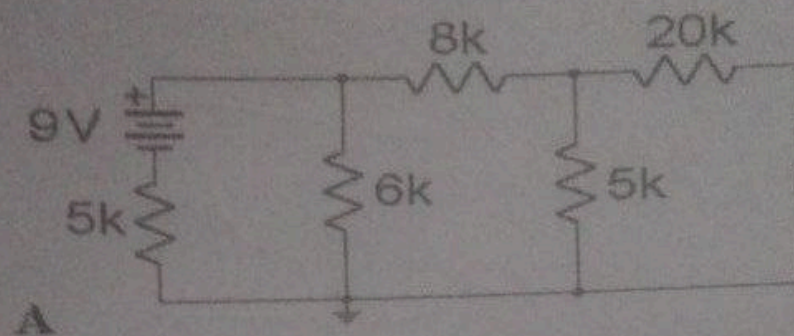
1. An insulated cup contains 75.0g of water at 24.00°C. A 26.00g sample of metal at 82.25°C is added. The final temperature of the water and metal is 28.34°C. What is the specific heat of the metal?

2. The position of mass of $m=4\text{kg}$ SHM is given by
$$x = 4\cos(2\pi t + \pi)$$
 Calculate
a. Frequency

b. Velocity and acceleration at $t=0\text{sec}$

- Discontinuity
- Similarity

3. Consider the circuit shown in figure below. Where k stands for kilo-ohm, and find the



i. Total resistance?

ii. Current through the battery?

4. The ammeter shown in figure below reads 2.00 A. Find I_1 , I_2 and \mathcal{E} (where $\mathcal{E} = \text{V}$).

