



SIR ARTHUR LEWIS COMMUNITY COLLEGE
ACADEMIC YEAR (2024/2025) - SEMESTER TWO
END OF SEMESTER EXAMINATION

ALTERNATE

COURSE CODE : PHY002
COURSE TITLE : ELEMENTARY PHYSICS I
LECTURER(S) : MR CHAD ALEXANDER
DATE :
TIME :
DURATION : 2 HOURS
STUDENT ID # : _____

GENERAL INFORMATION AND INSTRUCTIONS

- Students must sign **IN** and **OUT** on the examination class list.
- Write your ID number on the question paper.
- This paper consists of **TWO** sections.
- **Section A** consists of **THIRTY** multiple choice questions. Candidates must answer **ALL** questions in this section.
- **Section B** consists of **SIX** questions. Candidates are only required to select **FIVE** questions to answer.
- Formulae used in obtaining solutions must first be stated.
- Number all questions attempted properly.
- All submitted work must be in ink/pen (preferably Blue or Black)

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO

SECTION A

Instruction: Answer all the questions in this section by circling the letter corresponding to the answer of your choice on the answer sheet provided.

1. Which of the following is **not** a fundamental quantity?
A time B current C weight D temperature
2. Which of the following is a vector quantity?
A power B speed C velocity D temperature
3. 503.4082×21.03 written to an appropriate number of significant figures is
A 10586.7 B 10600.0 C 10590.0 D 10500.0
4. The line of best fit is:
A any straight line on a graph
B the line that traces the general pattern of the points on the graph
C a line which must start from the origin of the graph
D none of the above
5. What is the reading on the measuring cylinder shown in Figure 1 below?

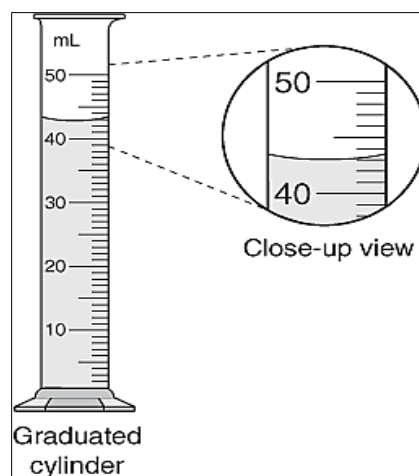


Figure 1

- A 40.3 cm³ B 43.0 cm³
- C 43.5 cm³ D 40.35 cm³
6. How many blocks of ice cream each 10 cm × 10 cm × 4 cm can be stored in the compartment of a deep freezer measuring 40 cm × 40 cm × 20 cm?
A 4 B 40 C 80 D 400

7. A measuring cylinder contains 75 cm^3 of water. When 100 glass beads are added to the water the volume increases to 140 cm^3 . What is the average volume of the glass beads in cm^3 ?

A 0.65 B 0.75 C 105 D 210

8. Figure 2 below shows a ball falling at terminal velocity through oil. The gravitational force acting on the ball is

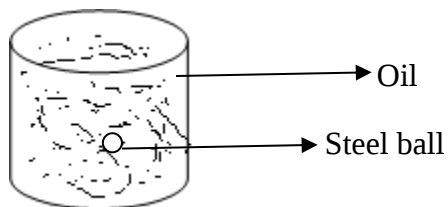
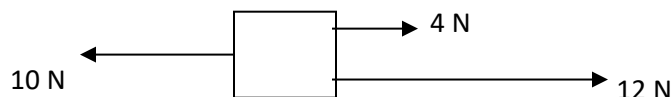


Figure 2

- A zero
B reduced by the upward force
C less than it would be in air
D exactly equal to the sum of the upward forces
9. Which of the following is most suitable for measuring the depth of a test tube?
- A metre rule
B spring balance
C micrometer screw gauge
D vernier calipers
10. An example of a force multiplier where the pivot is in the center of the object is
- A a wheelbarrow B a sweeping broom
C a pair of scissors D tweezers
11. What is the resultant of the forces acting on the object in the figure below?



A 16 N B 22 N
C 6 N D 12 N

12. Which of the following does not require a net force?
- A to change an object from a state of rest to a state of motion
 - B to maintain an object in motion with constant velocity
 - C to change the speed of an object without changing its direction of motion
 - D to change an object's direction of motion without changing its speed.
13. What resultant force produces an acceleration of 5 ms^{-2} in a car of mass 800 kg ?
- A 160 N B 320 N C 800 N D 4000 N
14. The mass of an object multiplied by its velocity is called its
- A moments B momentum C energy D power
15. Power can be defined as the rate of change of
- A velocity B energy
- C momentum D displacement
16. Figure 3 shows a velocity-time graph for a car.

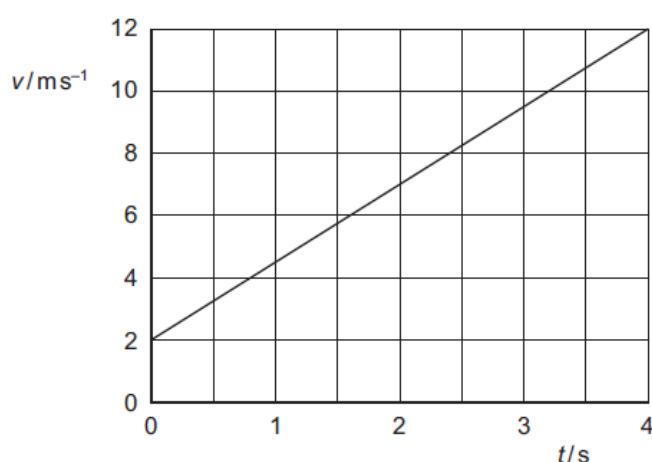


Figure 3

- What is the distance travelled between time $t = 0$ and $t = 4 \text{ s}$?
- A 2.5 m B 3.0 m C 20 m D 28 m
17. The value of a body's acceleration is given by:
- A the area under its displacement-time graph
 - B the area under its velocity-time graph
 - C the gradient of its displacement-time graph
 - D the gradient of its velocity-time graph
18. A car is brought to rest uniformly in 6 seconds. The initial velocity of the car was 24 ms^{-1} . What is the deceleration of the car in ms^{-2} ?
- A 0.25 B 4.0 C 96 D 144

19. Which of the following is best explained by radiation?
- A the flow of heat along a metal rod
 - B the movement of air masses in the atmosphere
 - C heat transfer from the sun to the Earth
 - D temperature above a flame is higher than the temperature at the side
20. A copper object has a volume of 0.470 cm^3 and a mass of 4.18 g . The density of copper in g cm^{-3} is:
- A 8.89 B 1.96 C 0.112 D 4.65
21. The heat required to raise the temperature of 1 kg of paraffin by 1 K is called its
- A latent heat
 - B specific heat capacity
 - C specific latent heat
 - D heat capacity
22. Which of A –D is correct concerning the kinetic energy and gravitational potential energy of an object which is falling freely under gravity?
- | | Kinetic energy | Gravitational potential energy |
|---|------------------|--------------------------------|
| A | increases | remains constant |
| B | increases | decreases |
| C | remains constant | increases |
| D | decreases | increases |
23. Which of the following is true of evaporation?
- A it occurs throughout the liquid at no definite temperature
 - B it occurs at the surface of the liquid at no definite temperature
 - C it occurs at the surface of the liquid at a definite temperature
 - D it occurs throughout the liquid at a definite temperature
24. A certain substance has a melting point of $28\text{ }^{\circ}\text{C}$ and a boiling point of $195\text{ }^{\circ}\text{C}$. At which of the following temperatures will the substance exist in the solid state?
- A $20\text{ }^{\circ}\text{C}$ B $70\text{ }^{\circ}\text{C}$ C $100\text{ }^{\circ}\text{C}$ D $200\text{ }^{\circ}\text{C}$

25. What is the lower fixed point on the centigrade scale?
- | | | | |
|---|----------------------|---|------------------------|
| A | absolute zero | C | triple point of water |
| B | melting point of ice | D | boiling point of water |
26. Perpendicular distance is defined as
- | | |
|---|--|
| A | the distance between the end of the ruler to the force |
| B | the distance from the force to the end of the ruler |
| C | the distance between the pivot to the force |
| D | None of the above |
27. Which of the following is best explained by convection?
- | | |
|---|--|
| A | the flow of heat along a metal rod |
| B | the movement of air masses in the atmosphere |
| C | heat transfer from the sun to the Earth |
| D | heat sinks are painted matt black |
28. The transfer of heat in solids occurs mainly by:
- | | |
|---|------------|
| A | conduction |
| B | convection |
| C | radiation |
| D | diffusion |
29. The boiling point of mercury is 357 °C. This is the same as:
- | | | | | | | | |
|---|------|---|-------|---|-------|---|-------|
| A | 84 K | B | 257 K | C | 457 K | D | 630 K |
|---|------|---|-------|---|-------|---|-------|
30. Water has a high specific heat capacity. As a result:
- | | |
|---|---|
| A | its temperature changes rapidly when it is heated |
| B | it is a good insulator |
| C | there is only a small change in temperature when it is heated |
| D | it has a high boiling point |

Total 30 Marks

SECTION B

Instruction: This section contains six (6) questions. Answer any five (5) questions on the foolscap paper provided.

1. Figure 4 below shows a device that switches off a domestic appliance when it reaches a desired temperature.

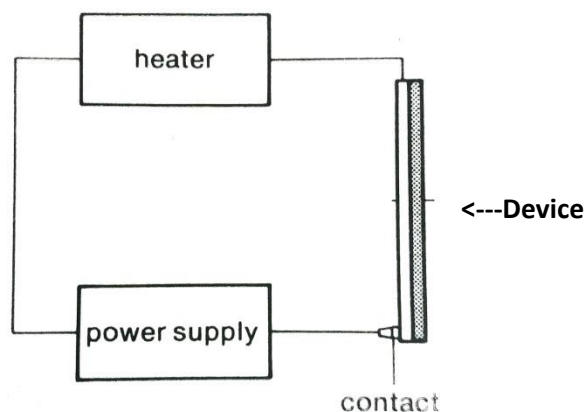


Figure 4

- (a) What is the device called? [1]
- (b) What TWO materials can be used to build this device? [2]
- (c) Explain why bending occurs when the device is heated [3]
- (d) Name a domestic appliance that makes use of this device and explain how it works to control the above circuit. [4]

[10 Marks]

2. (a) Figure 5 shows the stem of a Celsius thermometer marked to show initial and final temperature values.

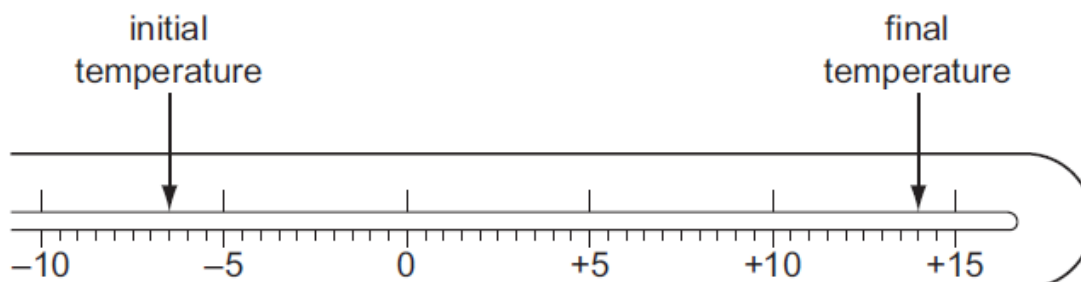


Figure 5

- (i) What are the initial and final temperature readings of the thermometer? [2]
 - (ii) What is the temperature **change** expressed to an appropriate number of significant figures? [3]
- (b) Express your temperature change in degrees Fahrenheit [3]
 - (c) State one advantage of making the bulb of the thermometer out of thin glass [2]

[10 Marks]

3.
 - (a) What is temperature? [2]
 - (b) Give two ways in which a clinical thermometer differs from the mercury thermometer you used in the lab. [2]
 - (c) Explain why the pressure of a gas in a closed container increases with temperature. [3]
 - (d) With the aid of a diagram, describe a simple experiment to demonstrate conduction in different materials. [3]

[10 Marks]

4.
 - (a) Identify one similarity and one difference between solids and liquids [2]
 - (b) Identify two differences between boiling and evaporation. [2]
 - (c) Define specific heat capacity. [2]
 - (d) What is the boiling point of water in degrees Celsius and Kelvin? [2]
 - (e) Explain how the boiling point of water can be changed. [2]

[10 Marks]

5. (i) Define the 'moment of a force' and state its SI unit. [2]

- (ii) Figure 6 below illustrates a human arm holding an egg. Would you consider this an example of a force multiplier? Explain your answer.

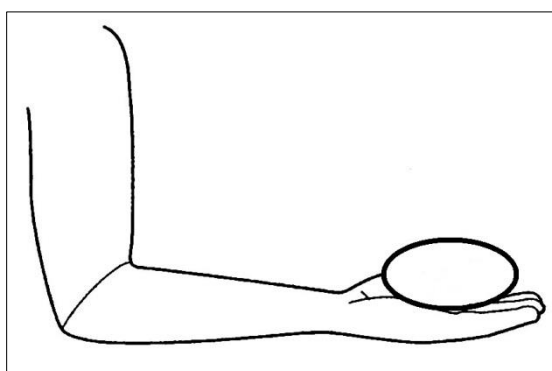


Figure 6

[3]

- (iii) After several unsuccessful attempts at trying to loosen a bolt with a wrench, a plumber looks into his tool kit for an alternative. There, he finds a hammer, a can of lubricant spray and a longer wrench. Using your knowledge of moments suggest the most suitable alternative for the plumber. [3]
- (iii) The plumber now applies an effort of 80N, 15cm away from the axis of the bolt. Calculate the moment of the force as the spanner just begins to turn. [2]

[10 Marks]

6. (a) Define work and give the name and symbol for an SI unit in which it is measured [3]
- (b) Define power and give the name and symbol for an SI unit in which it is measured [3]
- (c) Eugene conducted an experiment to measure his body power by running up a flight of steps. If each step has a height of 0.20m and there are 10 steps altogether,
- Calculate:
- (i) the work done in climbing all 10 steps given that his weight is 450N [2]
- (ii) his body power if he runs up the flight of steps in 5s. [2]
- [10 Marks]**

END OF EXAM