

NORTHERN EDUCATION DIVISION

2025 MSCE MOCK EXAMINATIONS



PHYSICS

PAPER I (100 Marks)

FRIDAY 22, March 2024

Subject number: M164/I

Time Allowed: 2 hours

8:00 am – 10:00 am

INSTRUCTIONS:

- a) Write your official name and class on top of every page.
- b) The paper contains two sections; **A** and **B**, on **11** printed pages. Please check.
- c) In section **A**, there are **10** short answer questions. While in section **B**, there are **three** descriptive questions.
- d) Answer all the questions in the spaces provided.
- e) Maximum number of marks for each answer is indicated against each question.
- f) Use of electronic calculators is allowed.
- g) In the table provided on this page, **tick** against the number of the question you have answered.
- h). Hand in your paper to invigilator when time is called to stop writing.

Question Number	Tick if Answered	Do not write in this column
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		

Section A (20 marks)

Answer **all** the **twenty** questions in this section. **Encircle** the letter corresponding to the correct answer in each question.

1. Which of the following is the SI unit for measuring charges?
 - A. Joule
 - B. Coulomb
 - C. Watt
 - D. Newton
2. Which of the following is the role of inclined planes in lifting heavy objects?
 - A. To reduce the effort required
 - B. To increase the load arm
 - C. To increase the effort required
 - D. To reduce the angle of action
3. Which of the following describes how an object is charged through induction?
 - A. By rubbing against another object
 - B. By bringing a charged object close without contact
 - C. By heating the object
 - D. By direct contact with a charged object
4. Which of the following prefixes represents 10^{-6} ?
 - A. milli- (m)
 - B. micro- (μ)
 - C. nano- (n)
 - D. centi- (c)
5. Which of the following questions can be investigated using scientific investigation?
 - A. How many giraffes live in Africa?
 - B. Who invented the first microscope?
 - C. Does the amount of salt in water affect its boiling temperature?
 - D. What is the meaning of life?

Figure 1 is a diagram showing particles of water changing from a liquid into solid form. Use it to answer questions **6** and **7**.

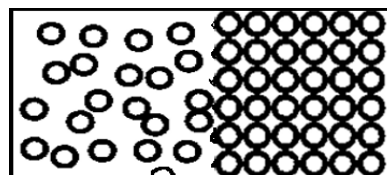


Figure 1

6. What process is represented by the arrangement?
 - A. Freezing
 - B. Deposition
 - C. Melting
 - D. Evaporation
7. At what temperature does water undergo the process represented in the diagram?
 - A. 100°C
 - B. 10°C
 - C. -30°C
 - D. 0°C
8. Which class of levers do wheelbarrows and bottle openers belong?
 - A. Third class
 - B. Second class
 - C. Fourth class
 - D. First class
9. A cell of 6 Volts is connected in series with 30 ohms resistors. What is the value of current through the resistor?
 - A. 180A
 - B. 6 A
 - C. 2A

D. 5 A

10. Which of the following factors does not affect the boiling point of water?

- A. Impurities in the water
- B. Altitude
- C. Atmospheric pressure
- D. Volume of water

11. Which of the following is the fastest mode of transfer of heat?

- A. Conduction
- B. Convection
- C. Radiation
- D. Reflection

12. If the angle between two plane mirrors is 60° what will be the number of images

- A. 2
- B. 3
- C. 5
- D. 4

13. The temperature of a body of -40°C in Kelvin scale is

- A. 313 K
- B. 233 K
- C. 272 K
- D. -40 K

14. Which of the following instruments is used to measure potential difference.

- A. Voltmeter
- B. Ammeter
- C. Thermocouple
- D. Galvanometer

15. A student got an electric shock and fell unconscious in the Physics laboratory. Which decision would you take to help the victim immediately?

- A. Call the physicist
- B. Call other students

C. Contact a medical doctor

D. Administer breathe exercise

Figure 2 below shows two forces, $F_1 = 10\text{N}$ and $F_2 = 10\text{N}$ acting on a car at rest. Use it to answer questions 16 and 17

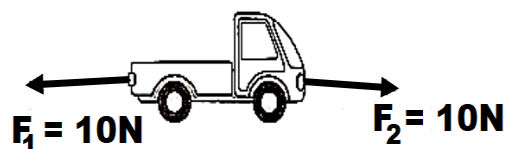


Figure 2

16. Find the value of the resultant force

- A. 1 N
- B. 20 N
- C. 0 N
- D. 100 N

17. What would be the effect of the force on the car?

- A. Change the speed of the car
- B. Change direction of the car
- C. Car remains at rest
- D. Car starts moving

18. What causes chalk to write on a chalkboard

- A. Force
- B. Friction
- C. Pressure
- D. Unbalanced force

19. A boy lifts a 70N weight box of sand onto a table 150 cm high. How much work is done by the boy?

- A. 105 J
- B. 2.14 J
- C. 10500J
- D. 750 J

20. Which of the following has a low rate of expansion?

- A. Gas
- B. Liquid

- C. Plasma
- D. Solid

Section B (50 marks)

Answer **all** the questions in this section in the spaces provided.

21. a. Define the term Physics

 _____ (1mark)

b. Identify the branch of physics related to each of the following technologies

i. Bicycle _____ (1 mark)

ii. Guitar _____ (1 mark)

c. Explain the reason why physics is science.

 _____ (2 marks)

22. Figure 3 is a graph showing behaviour of water as the temperature changes from 0C to 100C

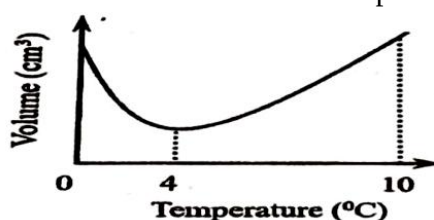


Figure 3

a. Name the behaviour of water shown in the graph

_____ (1 mark)

b. Give any **two** problems caused by this behaviour of water

 _____ (2 marks)

c. The mass of an empty beaker is 150 g. When filled with 500cm³ of liquid, its total mass becomes 650 g. Determine the density of the liquid

(3 marks)

23. a. Define heat capacity.

_____ (1 mark)

b. How much energy is needed to raise the temperature of 10 kg of water from 20°C to 35°C, given that the specific heat capacity of water is 4200 J/kg°C?.

(3 marks)

d. Give **two** application of specific heat capacity in everyday life.

_____ (2 mark)

24. a. Mention any **two** relationships between work and energy

_____ (2 marks)

b. Describe energy changes that occur when a candle lights.

_____ (3 marks)

25. Figure 4, is a diagram of a pulley system used to lift an object of mass 300 kg

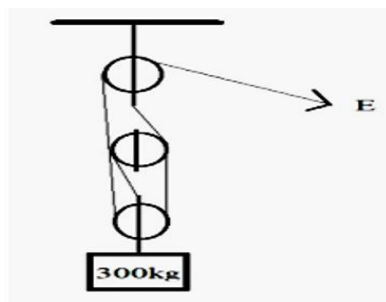
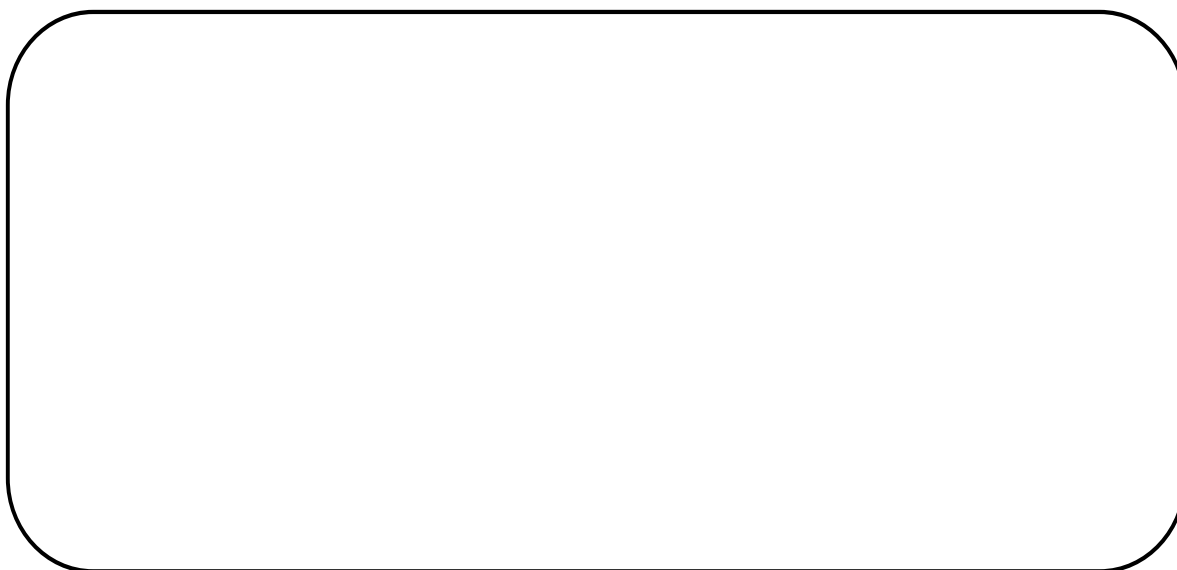


Figure 4

a. Calculate effort applied.



(3 marks)

b. Mention **two** ways of increasing mechanical advantage of the pulley system

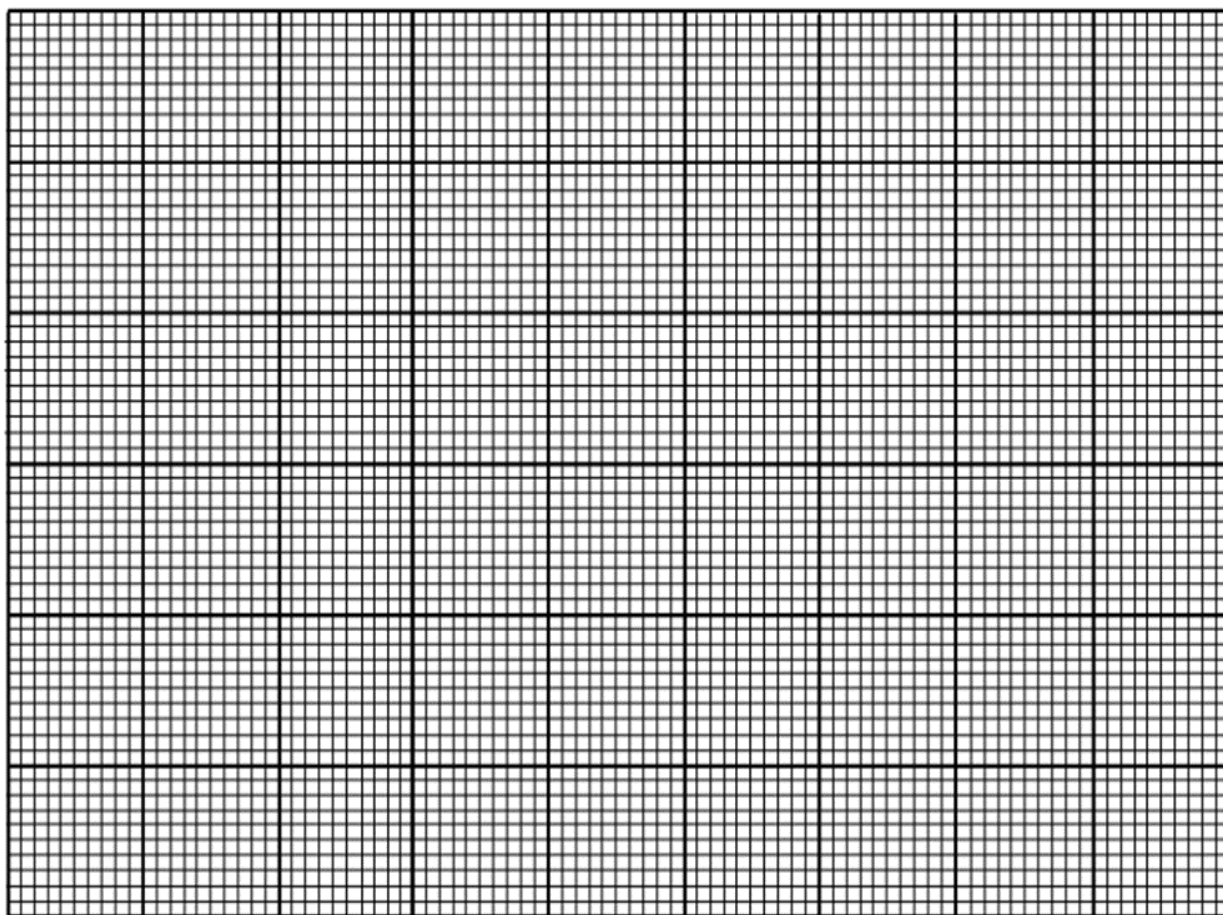
(2marks)

26. The table below shows results of an experiment that a student carried out to investigate the relationship between mass and weight

Mass (g)	Weight (N)
50	0.5
100	1
150	1.5
200	2
250	2.5

Draw a graph of **weight** against **mass** on the graph provided .

(5 marks)



27. a. Define electric circuit

(1 mark)

b. Figure 5 shows a circuit.

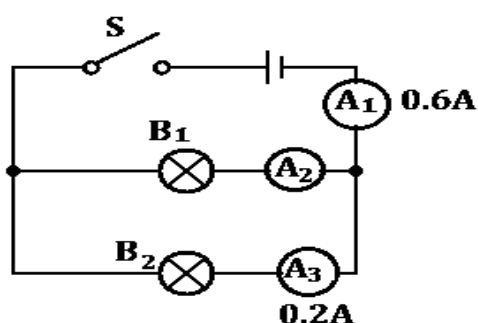


Figure 5

(i) If S is closed A_1 reads $0.6A$ and A_3 reads $0.2A$. What will be the reading of A_2

(2 marks)

(ii) Which bulb will be brighter?

_____ (1 mark)

(iii) Give a reason for your answer in 28. b. (ii)

_____ (1 mark)

28. a. State the law of magnetism

_____ (1 mark)

b. Describe **two** ways in which magnets can be destroyed

_____ (2 marks)

c. Draw the symbol of the following electrical components

Component	Symbol
Fuse	
Resistor	

(2 marks)

29. **Figure 6** shows a student placing a pencil into an empty container and observing it from position X.



Figure 6

- (i) What change will be observed in the appearance of the pencil when water is poured into the container?
- _____ (1 mark)
- (ii) Name the phenomenon illustrated in Question 22.b.(i)
- _____ (1 mark)
- (iii) Complete the diagram above by drawing light rays to show how the student's eye sees the pencil through the water. (3 marks)

30. a. Define radioactivity.

(1 mark)

b. State two ways how people working with radioactive substances protect themselves.

(2 marks)

Section C (30 marks)

Answer **all** questions in the spaces provided

31. a. Describe an experiment to show that an electric current produces a magnetic field.

[illegible]

b. Figure 7 below shows a container with water being heated from below

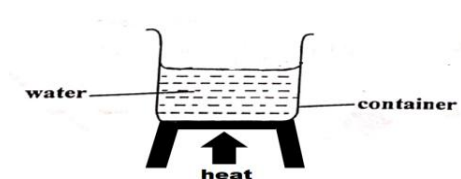


Figure 7

Explain how the water in the container heats up.

[illegible]

(4 marks)

- 32. a.** Using a well labelled diagram, describe how a gold leaf electroscope can be used to detect presence of charge on a body

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(6 marks)

- b.** Describe any **two** real life applications of thermal expansion.



(4 marks)

33. a. Explain one way that shows that matter is made up of tiny invisible particles.

(3 marks)

b. Describe an experiment to determine how length of the wire affects resistance using the following materials: **Nichrome wire of length 100 cm, connecting wires, 2 cells, ammeter and voltmeter**

(7 marks)

END OF QUESTION PAPER