

FEDERAL REPUBLIC OF SOMALIA

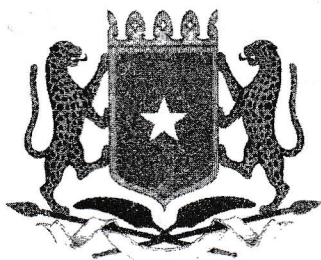
GRADE 12 EXAMS, 2020

PHYSICS



OFFICE OF EXAMINATIONS AND CERTIFICATION





FEDERAL REPUBLIC OF SOMALIA
MINISTRY OF EDUCATION CULTURE AND HIGHER EDUCATION
OFFICE OF EXAMINATIONS AND CERTIFICATION

Somali Certificate for Secondary Education

| | |
|---------------------|----------------|
| Subject: | Physics |
| Grade: | 12 |
| Exam Year: | 2020 |
| Total Marks: | 100 |
| Allowed Time | 2 hours |

Please read all the instructions carefully before attempting the questions:

- Write your full name, roll number and school name in English on the space provided on your answer booklet.
- Write all your answers on the answer booklet. Answers on the question paper will not be marked.
- Write legibly in dark blue pen **only**.
- Answer all questions as provided in the question paper.
- All rough work must be on the answer booklet. Any work outside of the answer booklet will not be marked.
- Adhere to examination regulations and allowed time.

Check that your examination question paper has 6 printed pages excluding the cover page.

Part A: Multiple-Choice Question (40 Marks)

Choose the correct answer and write it in the answer booklet.

1. A motion of an object that regularly returns to a given position after a fixed time interval is

| | | | |
|-----------------|-----------------|--------------------|-------------|
| Periodic motion | Harmonic motion | Oscillatory motion | Wave motion |
|-----------------|-----------------|--------------------|-------------|

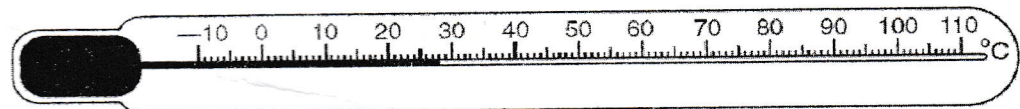
2. The maximum potential energy of vibrating mass attached to a spring is at an equilibrium when at a:

| | | |
|----------------|---------------|------------------|
| Lower position | Rest position | Extreme position |
|----------------|---------------|------------------|

3. Waves transfer:

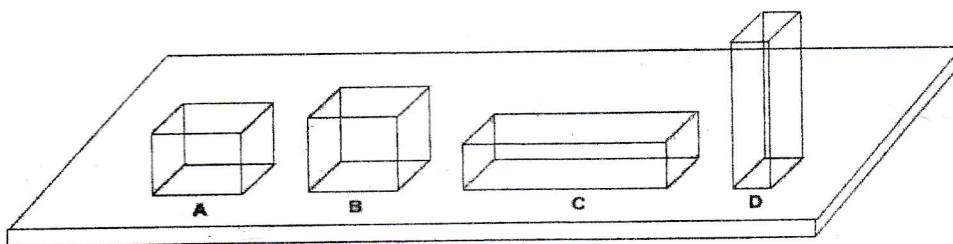
| | | | |
|-----------|-------|--------|--------|
| Molecules | Atoms | Energy | Matter |
|-----------|-------|--------|--------|

4. Ahmed measures the room temperature during a sunny day using the thermometer below. The reading of the thermometer is



| | | | |
|------|-------|------|------|
| 30°C | 20 °C | 28°C | 25°C |
|------|-------|------|------|

5. All of the four objects A, B, C and D have the same weight. Which one produces the greatest pressure on the table?



| | | | |
|---|---|---|---|
| D | A | C | B |
|---|---|---|---|

6. Radio Mogadishu broadcasts on a frequency of 90MHz with a speed of 3×10^8 m/s. The wavelength will be:

| | | | | |
|-------|-------|-------|------|--------|
| 3.33m | 3.33m | 2.22m | 4.44 | 10.10m |
|-------|-------|-------|------|--------|

7. In hospitals, doctors use machines that utilize a sound wave for imaging unborn babies (fetuses). This type of sound wave is:

| | | | |
|------------|-------|------------|---------------|
| Infrasonic | Sonic | Ultrasonic | Audible sonic |
|------------|-------|------------|---------------|

8. A person sees his/her image in a plane mirror because the mirror

| | | | |
|---------------|-----------------------|-----------------|----------------|
| Absorbs light | <u>Reflects light</u> | Transmits light | Diffuses light |
|---------------|-----------------------|-----------------|----------------|

9. When a newspaper is seen through a lens, its print appears larger. The nature of the lens is:

| | | | |
|---------------|------------|-----------|---------|
| <u>Convex</u> | Converging | Parabolic | Concave |
|---------------|------------|-----------|---------|

10. Identify the primary colours of light?

| | | | |
|-----------------|--------------------|---------------------|-------------------------|
| Red, blue, cyan | Red, green, violet | Yellow, green, blue | <u>Red, green, blue</u> |
|-----------------|--------------------|---------------------|-------------------------|

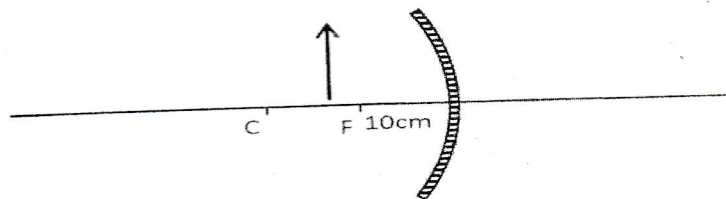
11. Light is a form of energy produced by a _____

| | | | |
|-----------------|--------------------|---------------------|--------------------|
| Luminous object | Transparent object | Non-luminous object | Translucent object |
|-----------------|--------------------|---------------------|--------------------|

12. When we shine a yellow light on a red card, the reflected color will be:

| | | | |
|------|-----|-------|------|
| Blue | Red | Green | Cyan |
|------|-----|-------|------|

13. An object is placed at a distance of 20cm from a concave mirror whose focal length is 10cm. The distance of image is



| | | | |
|------|------|--------|-------|
| 30cm | 60cm | 150 cm | 20 cm |
|------|------|--------|-------|

14. What is the focal length of the combination of two thin lenses of power +5D and -2D placed in contact with each other?

| | | | |
|-----|--------|--------|----|
| -3m | 33.33m | -0.33m | 3m |
|-----|--------|--------|----|

15. The process of causing small nuclei to stick together into a larger nucleus is known as

| | | | |
|--------|---------|---------------|-------------|
| Fusion | Fission | Radioactivity | Mass defect |
|--------|---------|---------------|-------------|

16. Which of the following about the Gamma ray is true?

| | | | |
|------------------------------|------------------------------|--------------------------------|----------------------------|
| It carries a positive charge | It carries a negative charge | It is an electromagnetic waves | It is similar to electrons |
|------------------------------|------------------------------|--------------------------------|----------------------------|

17. The image produced by a concave lens is:

| | | | |
|-----------------------------|----------------------------|-------------|--------------------------------------|
| Always virtual and enlarged | Always virtual and smaller | Always real | Sometimes real and sometimes virtual |
|-----------------------------|----------------------------|-------------|--------------------------------------|

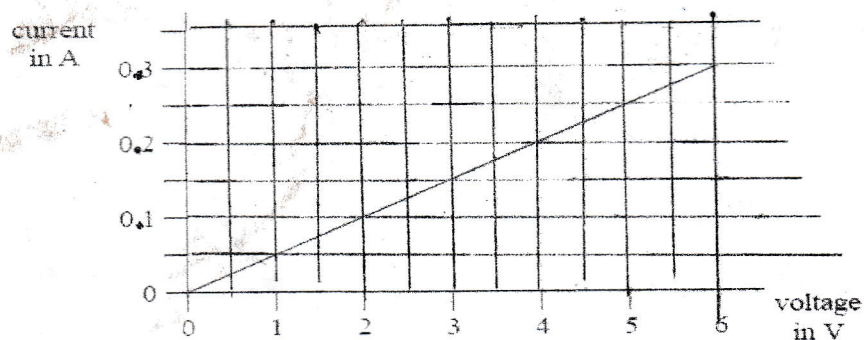
18. An object placed at 2m from a plane mirror is shifted by 0.5m away from the mirror. What is the distance between the object and its image?

| | | | |
|----|------|----|----|
| 2m | 1.5m | 5m | 3m |
|----|------|----|----|

19. Which of the following describes a change of frequency?

| | | | |
|--------|----------|-------|-------|
| Echoes | Loudness | Beats | Pitch |
|--------|----------|-------|-------|

20. A student investigates how the current in a resistor varies with voltage. The student plots a graph of his/her result.



When the potential difference is 4v, the current is:

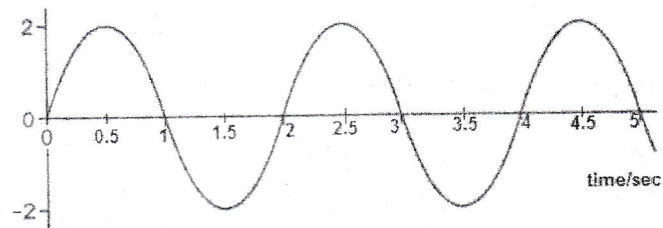
| | | | |
|------|------|------|------|
| 0.2A | 0.3A | 0.1A | 0.4A |
|------|------|------|------|

PARTB: Structured Questions(60 marks)

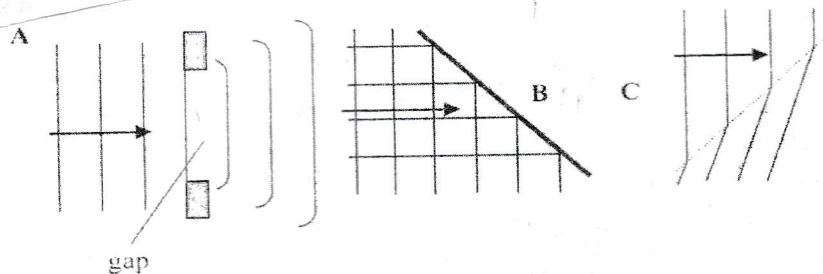
Answer all the questions and write your answers in the answer booklet.

21. Waves

- a) The diagram below shows transverse wave



- b) Find
- the amplitude of the wave (1 mark)
 - the frequency of the wave..... (1 mark)
- c) Differentiate between transverse and longitudinal waves (2 marks)
- d) Fatima shakes a rope which forms a wave whose wavelength is 10cm and its frequency is 20Hz. What is the speed of the wave?----- (2 marks)
- e) Diagrams A,B, and C show the behavior of waves



| | | | | |
|------------|------------|-------------|--------------|--------------|
| Refraction | reflection | Diffraction | Polarization | interference |
|------------|------------|-------------|--------------|--------------|

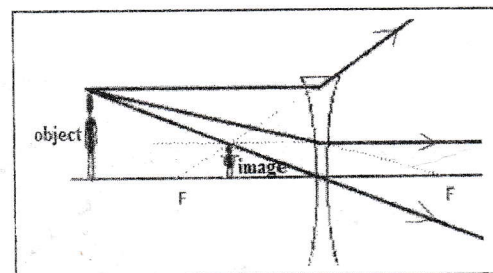
Use the above table and diagram to complete the following blanks, and write your answers in the answer booklet:

- A is----- (1 mark)
 - B is----- (1 mark)
 - C is----- (1 mark)
- f) What is the difference between a node and an antinode? - (2 marks)

22. Refraction of light:

- a) What is Snell's law of refraction? (2 marks)

b) The diagram shows an object and its image formed by a lens.



i) What type of lens is shown in the diagram?.....(2 marks)

ii) Is the image real or virtual?.....(2 marks)

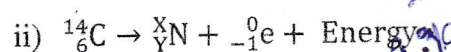
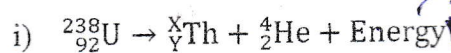
c) An object is placed 15cm from a convex lens of a focal length of 10cm. Find the position of the image..... (2 marks)

d) A ray of light strikes the surface of a material at an angle of 45° such that the angle of refraction is 30° . Calculate the refractive index of the material..... (2 mark)

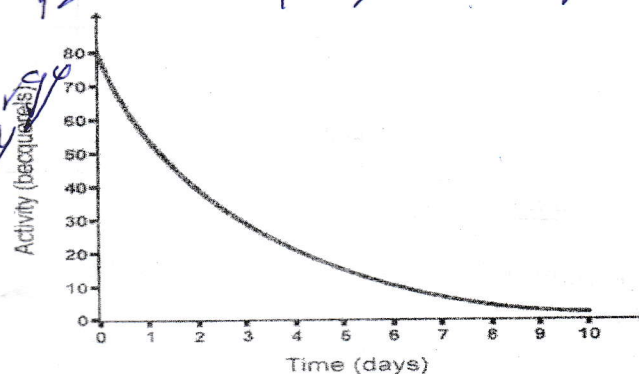
23. Nuclear physics:

a) Define the term "isotopes" *atom with same number of protons but different num of neutron* (2 marks)

b) Find the missing value of the following reactions



c) The graph shows how the activity of radioactive sample varies with time.



i) From the graph above, what would the activity of the sample become after 6 days?(2 marks)

ii) Explain the meaning of "half-life" (2 marks)

Use the words in the box below to fill the blanks below, and write it on the answer booklet.

Gamma rays

Beta particles

Alpha particles

d) Which has the most penetrating power? (1 marks)