

FEDERAL REPUBLIC OF SOMALIA

GRADE 12 EXAMS, 2021

PHYSICS



OFFICE OF EXAMINATIONS AND CERTIFICATION



Somali Federal Ministry of Education, Culture & Higher Education

Form Four National Standardized Examinations.

MAY / JUNE 2021

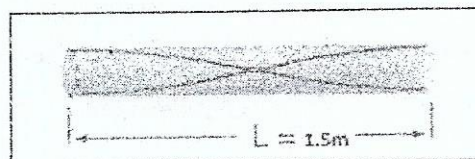
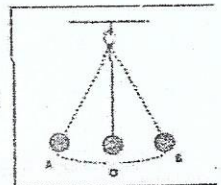
PHYSICS EXAMINATION

TIME 2 HOURS

INSTRUCTION: Answer all questions in the ANSWER BOOKLET

Part one: Circle the correct letter for the following answers _____ (40 marks)

- Which of the following waves is an example of electromagnetic wave:-
A. Sound wave B. String wave C. water waves D. Radio waves
- When the vibrations of the particles are perpendicular to the direction of wave motion is
A. Surface wave B. Longitudinal waves C. Transverse wave D. Seismic wave
- The speed of sound in air at a temperature of -40°C is
A. 370 m/s B. 290 m/s C. 350 m/s D. 306 m/s
- The forward and backward motion of an object from its mean position is
A. Periodic Motion B. Circular motion C. Oscillatory motion D. Linear motion
- A school bus emits sound of wavelength 0.5m and frequency 100 Hz, then its velocity is:-
A. 20 m/s B. 50 m/s C. 200 m/s D. 0.5 m/s
- The wavelength of fundamental harmonic of 1.5m long open pipe is:-
A. 1m B. 0.5m C. 3m D. 2.0m

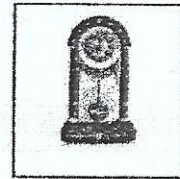


7. If the object is placed at a distance of 20cm in front of a plane mirror, the distance between the object and the image is

- A. 60cm B. 20cm C. 30cm D. 40cm

8. If a pendulum clock is taken on a mountaintop, its period will be

- A. Increased B. Decreased C. Unchanged D. Squared

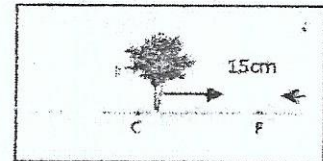


9. The measure of rigidity (stiffness) of a spring is

- A. Force constant B. Elastic limit C. Stress D. Strain

10. A tree is placed 15cm from a converging mirror of radius curvature 20cm. The distance of the image is

- A. 60cm B. 6cm C. 15cm D. 30cm



11. To detect an original diamond from fake diamond, we use

- A. Infra red light B. Ultraviolet light C. Green light D. Emitting light

12. In order to find the direction of inducing current we use

- A. Faraday's law B. Charles' law C. Lenz's law D. Ampere's law

13. The maximum voltage in an AC circuit is 35V and its angle is 45° . The instantaneous voltage is:-

- A. 50V B. 24.7V C. 17.5V D. 25.8V

14. Blue light has a frequency of $7.7 \times 10^{14} \text{ Hz}$. The energy of this photon is: (use $h = 6.6 \times 10^{-34} \text{ Js}$)

- A. $50.8 \times 10^{-21} \text{ J}$ B. $8.6 \times 10^{-49} \text{ J}$ C. $1.17 \times 10^{48} \text{ J}$ D. $5.1 \times 10^{-19} \text{ J}$

15. If the decay constant of a radioactive sample is $1.72 \times 10^{-4} \text{ decay/sec}$, its half-life is:

- A. 9024 sec B. 2.482 sec C. 2904 sec D. 4029 sec

16. An element of ${}_{54}^{141}\text{B}$. The number of neutrons is:-

- A. 54 B. 141 C. 87 D. 195

17. In forward biasing, the potential barrier is:-

- A. Increased B. Decreased C. Unchanged D. Variable

18. A 4H inductor is connected to a 120V and 60Hz-source; the inductive reactance is

- A. 754 Ω B. 767 Ω C. 574 Ω D. 1508 Ω

19. A 60cm long wire flows at 4m/s vertically over a strength of magnetic field at 3T.

The EMF induced in it is:-

- A. 0.72V B. 7.2V C. 720V D. 72V

20. A night vision device can see it in darkness by receiving a kind of radiation known as:-

- A. Ultraviolet rays B. infrared radiation C. Cosmic rays D. Gamma rays

Part two: Structured Questions _____ (60 marks)

Questions One: Oscillatory motion (13 marks)

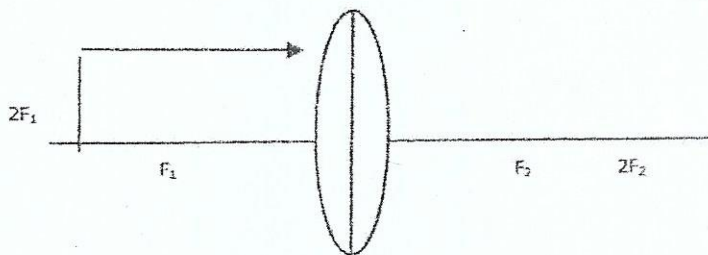
1. Zahra oscillates a swing and makes 100 complete cycles in 20 seconds.



- Find:
- Period _____ (2 marks)
 - Frequency _____ (2marks)
 - Angular frequency _____ (2 marks)
2. Define amplitude _____ (3 marks)
3. Ali stretched a spring at a distance of 20cm and held. What is the potential energy stored in the spring? (take $K=200N/m$) _____ (4 marks)

Question Two: Refraction of light _____ (18 marks)

- Define refraction of light _____ (4marks)
- When a ray of light strikes the surface of separation of two different media perpendicularly, then it does not suffer any _____(reflection, refraction) _____(2 marks)
- Below is a convex lens



- Complete the ray diagram to locate the position of image _____ (2 marks)
- What will be the characteristics of that image _____ (2 marks)
- What will be the use of this case _____ (2 marks)

4. Somali optic company produces two lenses, A and B, which have focal length of 50cm and -20cm respectively.
- What is the nature of lens A and Lens B? _____ (2 marks)
 - What is the power of lens A and Lens B? _____ (2 marks)
 - What is the power of combination if lenses A and B are held close together? _____ (2marks)

Questions Three: Wave motion (9 marks)

- State the types of waves _____ (4 marks)
- Radio Mogadishu produces waves of frequency of 90MHZ and wavelength 3.33m. calculate the speed of the waves _____ (3 marks)



- The frequency of a wave triples and its wavelength doubles. What happens to its speed?—(2 marks)

QUESTION FOUR: SOUND WAVES (10marks)

- Differentiate between infrasonic and ultrasonic sounds _____ (2 marks)
- Describe sound as a longitudinal wave _____ (2 marks)
- State properties of sound waves
- Sound travels slowest in-----faster in----- and fastest in----- (3marks)
- Amin Ambulance moves with the speed of 35m/s, its siren emitting sound at a frequency of 600Hz.

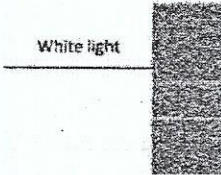
What sound is heard by Hassan standing at the Bakara Station as the ambulance

- approaches
 - recedes
- (Take $v=345\text{m/s}$). _____ (3 marks)



Questions Five: Dispersion of light _____ (10 marks)

1. Differentiate between primary and secondary colors. _____ (2 marks)
2. Halima has a green filter and shines a yellow light, what color will it transmit? _____ (3 marks)



3. Use the following words to complete the gaps

Red	Violet	Ultraviolet	Infrared rays	Gamma rays
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- a. Which colour of white light has the least deviation.....(1 marks)
- b. It is used to detect forgery of cheques or important documents(2 marks)
- c. It produces a heating effect(1 mark)
- d. A colour which has a maximum refraction(1 marks)

END