FEDERAL REPUBLIC OF SOMALIA

GRADE 12 EXAMS, 2024

PHYSICS

OFFICE OF EXAMINATIONS AND CERTIFICATION

SomExams

Ministry of Education, Culture & Higher Education

National Examinations and Certifications Office

Form Four National Examinations.

June, 2024

SUBJECT: PHYSICS

TIME: 2 HOURS

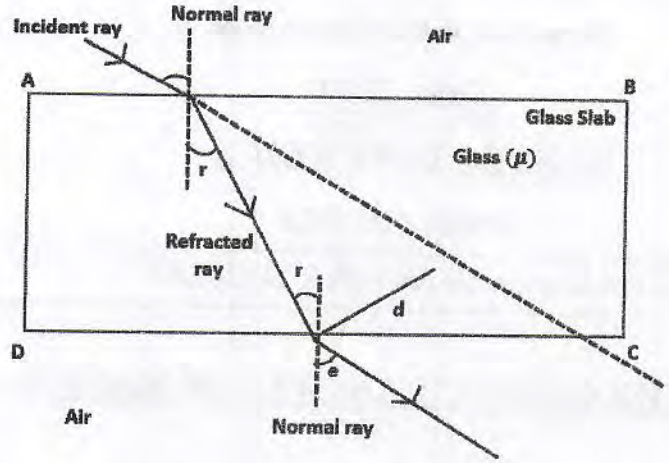
INSTRUCTIONS: Answer all questions in the ANSWER BOOKLET

PART ONE : CHOOSE THE CORRECT ANSWER (40 MARKS)

1. The SI-unit of frequency is:
   a) Second b) Meter c) Hertz d) meter per second
2. A Lens which is always used as magnifying glass is
   c) Convex b) Concave c) combination of a and b d) double concave
3. A light of wavelength 500nm in air passes through any other medium which has a wavelength of 400nm, the refractive index of the medium is
   a) 0.8 b)1 c) 1.25 d) 1.5
4. The number of anti-nodes in the diagram below are

   a) 5 Anti nodes b) 7 Anti nodes c) 3 Anti nodes d) 4 Anti node
5. If a simple pendulum is transported to the moon it will go
   a) Faster b) Slower c) Remains the same d) stationary
6. When a green light is incident on a red opaque object the red pigment appears.
   a) Green b) blue green c) red and green d) Dark
7. The maximum voltage of an alternating current is 75V, the instantaneous voltage that has an angle of 35^0 is:
   a) 34V b) 43V c) 340V D) 0.46V
8. A transistor has ..... Pn junction(s):
   a) One b) Two c) Three d) Four

9. The figure Below shows refraction through glass slab. This type of refraction is called:



a) Lateral displacement
b) Total internal reflection
c) irregular reflection
d) diffuse reflection

10. There is a Law which dictates how a changing magnetic flux through loop induces an electromotive force in the loop this law is called
a) Faraday's law b) Lenz's law c) Hooke's law d) Snell's law

11. The two most frequently used semiconductor materials are
a) Germanium and silicon
b) Arsenic and gallium
c) Copper and carbon
d) Glass and nichrome

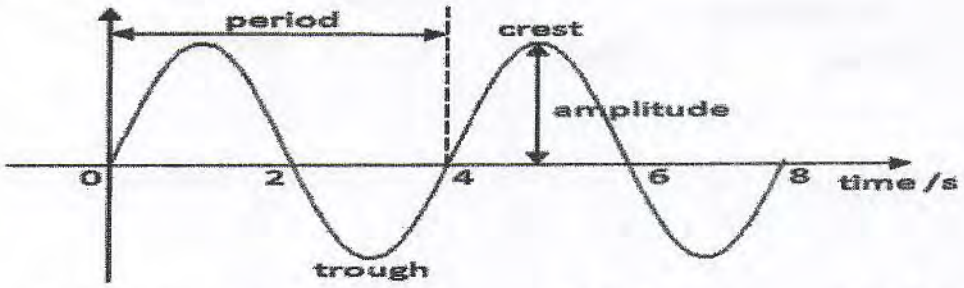
12. Rainbow is formed due to:
a) Refraction of light
b) Reflection of light
c) Dispersion of light
d) Diffraction of light

13. Plane mirror always produces a virtual image of the..... as the object:
a) Large size b) Small size c) Same size d) zero size

14. A student stands 4m away from a plane mirror. The distance between the student and his image is:
a) 2 m b) 4m c) 8m d) 16m

15. Which one of the following electromagnetic spectrum has the least frequency?
a) Microwave b) infrared c) ultraviolet d) Gamma rays

16. The frequency of the following figure is:



a) 0.25 Hz b) 4 Hz c) 8 Hz d) 0.5 Hz

17. The nucleus of certain element contains 6 protons and 8 neutrons the atomic number of that element is

a) 6 b) 8 c) 2 d) 14

18. Which one of the following frequencies is an Ultrasonic viBration?

a) Below 20Hz b) 20Hz – 20KHz c) Above 20Khz d) 10MHz

19. If the velocity of air at 0^0 is 330m/s. The velocity of sound in air at 30^0 Will be

a) 360 m/s b) 350 m/s c) 348 m/s d) 330 m/s

20. The audible reflection of sound is known as:

a) Pitch b) harmonics c) Echo d) frequency

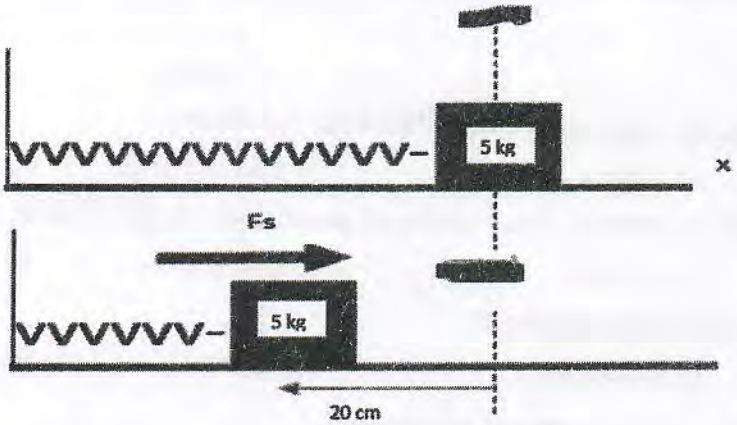
Part Two: Match the FalLowing Questions (10 marks)

No.	Column A	Answer	N0.	Column B
1.	Waves that propagate through material medium		a)	Helium nuclei
2.	Time taken to make one complete cycle		b)	Vibrating material
3.	A lens which has ability to converge rays of light		c)	Concave
4.	The value of Planks constant (h)		d)	Reflection
5.	The speed of light in air (c) is equal to		e)	Convex
6.	Bending of light rays is considered as		f)	Period
7.	If the power of the lens is negative then it is considered as		g)	Mechanical
8.	Angle of incidence is always equal to the angle of		h)	3×10^8 m/s
9.	Alpha particle emission is similar to		i)	$6.63 \times 10^{-34} Js$
10.	Sounds are produced by		j)	Refraction

Part three: Direct questions and problems [50 marks]

Section One: Oscillatory motion

1. Define Amplitude and state its SI-Unit. .....[2 marks]
2. A 5kg mass is connected to a spring produces a displacement of 20 cm as shown in the figure below.



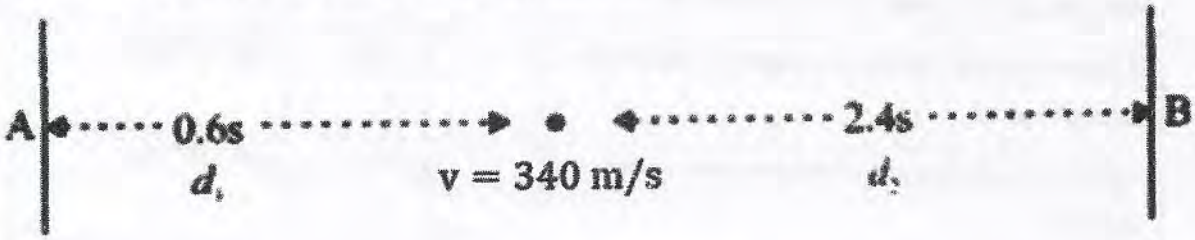
Calculate the spring constant. (Use $g = 9.8\ m/s^2$).....[3 marks]

Section Two: Wave motion

1. Differentiate Between Mechanical wave and electromagnetic wave.....[2 marks]
2. Somali National Television (SN.TV) produces signal waves of frequency 200,000 HZ and wavelength of 1500m. Calculate the speed of the waves...[3 marks]

Section Three: Sound Waves

1. Can Sound Travel through a vacuum (empty space)? Explain your answer....[3 marks]
2. Ali stands between two parallel tall buildings A and B and fires a gun. He hears two successive echoes after 0.6sec and 2.4 sec as appears in the diagram below.



a) What is the distance between Ali and building A?.....[3 Marks]
b) What is the distance between Ali and building B?.....[3 Marks]
c) What is the distance between building A and building B?.....[2 Marks]

Section Four: Reflection of light

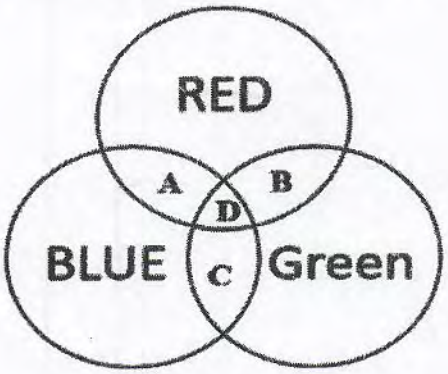
1. An object 5cm high is placed at a distance of 10cm from a convex mirror of radius 30cm. find:
   a) The position of the image.....[3 marks]
   b) The nature of the image..... [1 mark]
   c) Size of the image .....[2 marks]

Section Five: Refraction of Light.

1. State Snell's law of refraction .....[3 marks]
2. An eye specialist prescribes a lens of focal length 25cm to a person for his glass. What is the power of the lens..... [3 marks]

Section Six: Dispersion of Light

1. If you look at the sky in a day without clouds, you can see it as blue in color, so why the sky is Blue?..... [3 marks]
2. The diagram below represents three overlapping circles of additive colors..... [2 marks]



a) What color would region C be.....

b) What color would region D be.....

Section Eight: Alternating current

1. The primary coil of a transformer is 10A. If the primary coil has 550 turns and the secondary has 2500 turns what current flows in the secondary coil.....[3 marks]

Section Nine: Basic electronics

1. List the types of transistors.....[2 marks]
2. Differentiate between extrinsic and intrinsic semiconductors.....[2 marks]

Section Ten: Modern physics

1. Blue light has a wavelength of $7.7 \times 10^{14} HZ$ *and* Planck's constant is $6.63 \times 10^{-34}\ js$. Calculate the energy of the light. [3 marks]

Section ELeven: Nuclear Physics

1. Find the half-life of $^{13}_{7}N$ if its decay constant is 1.16×10^{-3} decay/second.....[2 marks].