BUGESERA DISTRICT
END OF TERM TWO EXAMINATIONS, 2023/2024
SENIOR FOUR
SUBJECT: PHYSICS THEORY EXAM

COMBINATIONS:

PHYSICS-CHEMISTRY-MATHEMATICS	**(PCM)**
MATHEMATICS- PHYSICS- COMPUTER SCIENCE	**(MPC)**
PHYSICS –CHEMISTRY- BIOLOGY	**(PCB)**
MATHEMATICS –PHYSICS- GEOGRAPHY	**(MPG)**

DURATION: 3 HOURS.

INSTRUCTIONS:

1) **Do not open this question paper until you are told to do so.**
2) **Where necessary acceleration due to gravity,** $g = 9.81\ ms^{-2}$
3) **Use only a blue or black pen.**
4) **Section A consists of 70marks with multiple choice and short answer questions.**
5) **Attempt any THREE questions from section B. Each question consists of 10marks.**

SECTION A (70 marks)

PART I: MULTIPLE CHOICE QUESTIONS.

1. Which lens is thicker at the centre and thinner at the edges? **/4mrks**

a. Plane lens
b. Mirror
c. Concave lens
d. Convex lens

2.A ball of mass 0.2 kg falls from a height of 45m. On striking the ground it rebounds in 0.1sec with two-thirds of the velocity with which it struck the ground. Calculate the force on the ball due to the impact. **/4mrks**

a. 110N b. 10N c. 100N d. -10N

3. The point on the principal axis at the center of the lens is known as: **/4mrks**

a. Pole c. Optical center d. Power b. Focus

4) A force of 3N acts at 90^0 to a force of 4N. Find the magnitude and direction of their resultant? **/4mrks**

a. 25N and 90^0 b. 5N and 90^0 c. 5N and 45^0 d. 25N and 45^0

5) A 120V house circuit has the following light bulbs turned on; 40W,60W, and 75W. find the equivalent resistance of these lights. House circuits are so constructed that each device is connected in parallel with the others. **/5mrks**

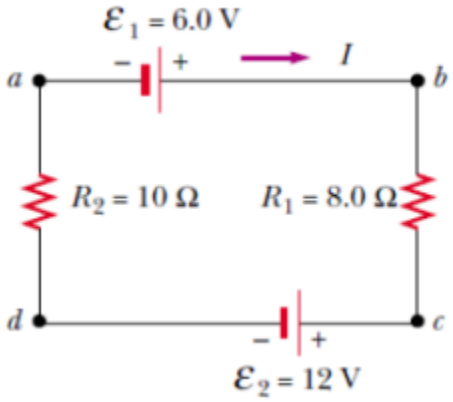
6) A certain farsighted person cannot see clearly objects closer to the eye than 75cm.Determine the power of the spectacle lenses which will enable for to read type at a distance of 25cm**.** **/4mrks**

7) Light is incident at a small angle on a thin prism of refracting angle $\mathbf{5^0}$ and refractive index **1.52**. Calculate the deviation of the light by prism. **/4mrks**

8) As a Student who learnt different types of telescope, Differentiate Astronomical telescope from terrestrial telescope? **/4mrks**

9) Differentiate Renewable sources of energy and Non-renewable sources of energy and states two examples for each? **/4mrks**

10) Find the current(I) passing through the circuit below: **/4mrks**



11) Discuss any **five** applications of a concave lens? **/5mrks**

12) A car of mass 1000kg is moving on the horizontal road with steady velocity of 10m/s has the total friction force of 4000N. Find the power due to engine? **/5Mrks**

13) Cite two examples in which a force is exerted on an object without doing any work on the object? **/5Mrks**

14) Find the power dissipated as heat in a generator of r=0.6ohms if 3A of current flows through it? **/4mrks**

15) i) A 2kg brick is moving at a speed of 6m/s. how large force F is needed to stop the brick in a

time of $7x10^{-4}$ s? **/4mrks**

ii) The spin-drier of a washing machine revolving at 900rev/min slows down uniformly to 300rev/min while making 50revolutions.

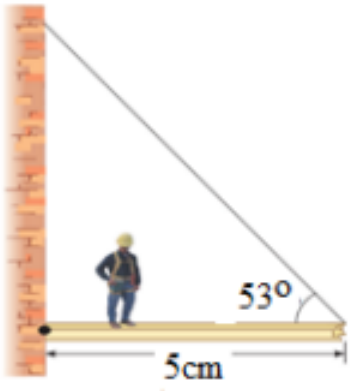
Find a) the angular acceleration and **b)** the time required to turn through these 50revolutions? **/6mrks**

SECTION B: ATTEMPT ANY THREE QUESTIONS: /30MARKS

16) a) Define Moment of force? **/2m**

b) Enumerate any two applications of moment of force? **/2m**

C) A uniform horizontal beam 5.00 m long and weighing $\mathbf{3 \times 10^2 N}$ is attached to a wall by a pin connection that allows the beam to rotate. Its far end is supported by a cable that makes an angle of 53^0 with the horizontal. If a person weighing $\mathbf{6 \times 10^2 N}$ stands 1.50 m from the wall, find the magnitude of the tension in the cable and the force *R* exerted by the wall on the beam? **/6Marks**



17)a) Define projectile motion? **/1mrks**

b) A cannon ball is fired skywards with an initial vertical velocity of 40 m/s and an initial horizontal velocity of 30 m/s. Ignore air resistance

i) What is the initial velocity of the ball? **/2mrks**

ii) How long does the ball take to reach its maximum height? Assume g=10m/s. **/2mrks**

iii) What is the maximum height reached by the ball? **/1mrks**

iv) How far does the ball land from the thrower? **/1mrks**

v) Discuss any two points where **projectile motion** can be applied in our real life? **/2mrks**

18) a) Explain the simple block diagram showing energy changes in hydroelectric power station? **/6mrks**

b) Summarize any four advantages and four disadvantages of hydroelectric power station?

/4Mrks

19) a) Explain the types of equilibrium of a body? **/2marks**

b) Explain any two factors affecting stability of bodies? **/2marks**

c) A system consists of the following masses in xy-plane; 4kg at coordinates ($x = 0, y = 5m$) $and\ 7kg\ at(\ 3m, 8m)\ and\ 5kg\ at(-3m, -6m)$. Find the position of its center of mass? **/3MRKS**

d) We have already seen that when a microscope is not in normal adjustment, the final image is formed at infinity i.e v = ∞. Suppose that an object of height **h** is at a given position from the objective lens, forming an image of height **h'**. show that the Angular magnification(**M**) of a compound microscope when is not in normal use is given by: $\boldsymbol{M = \frac{D}{fe}(\frac{vo}{fo} - 1).}$ **/3Mrks**

20) a) A proton traveling with speed 8.2 x 10^5 m/s collides elastically with a stationary proton in a hydrogen target. One of the protons is observed to be scattered at a 60°angle. At what angle will the second proton be observed, and what will be the velocities of the two protons after the collision? **/7mrks**

b) Differentiate elastic from inelastic collision in physics? **/3mrks**

GOOD LUCK!