GREENLAWNS HIGH SCHOOL
PHYSICS PRELIMINARY EXAMINATION 2023-24

STD. 10 **TIME: 2 HRS.**
DATE: 8/1/2024 **MARKS: 80**
NOTE:

1] Answer to this paper must be written on the paper provided separately.
2] You will not be allowed to write during the first 10 minutes. This time is to be spent in reading the paper.
3] The time given at the head of this paper is the time allowed for writing the answers. This paper has 4 pages (7 sides)
4] **Section A is compulsory. Attempt any 4 complete questions from Section B.**
5] The intended marks for a question or parts of questions are given in the brackets [ ].

SECTION A [40 MARKS]
ALL QUESTIONS IN THIS SECTION ARE COMPULSORY.

QUESTION 1

A]Choose the most correct answers to the questions from the given options:**[15]**

i)A body is said to be in equilibrium when,
a) it does not move b) it has equal forces on both the sides c) when the algebraic sum of moments of all forces acting on the body is zero
d) when it is acted upon by the gravity.

ii) 1 watt = _____
a) 1J/s b) 10^7 erg/s c) 1/746 H.P. d) all of the above

iii) An ideal single fixed pulley has
a) M.A. = 1, V.R. = 1, Efficiency = 1
b) M.A. = 2, V.R. = 1, Efficiency = 1
c) M.A. = 1, V.R. = 2, Efficiency = 1
d) M.A. = 2, V.R. = 2, Efficiency = 2

iv) The absolute refractive index of any medium is always _____
a) greater than 1 b) less than 1 c) equal to 1 d) infinity

Contd.....

v) A radioactive substance emits radiations

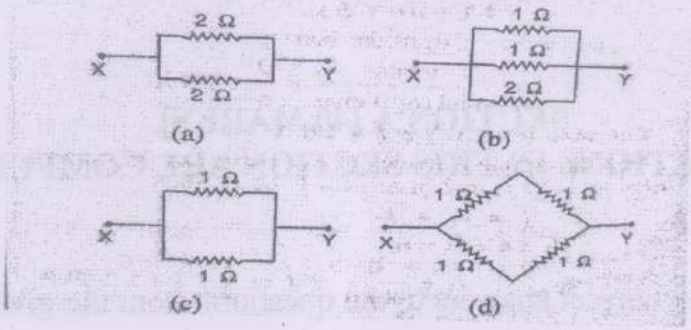
a) α, β and γ simultaneously b) in the order α, β and γ one by one

c) X-rays and γ rays d) α or β

vi) Which of the following is an ohmic resistor?

a) LED b) junction diode c) filament of a bulb d) nichrome wire

vii) Which of the following combinations have the same equivalent resistance between X &Y?



a) a & b b) b & c c) c & d d) a & d

viii) An electrical appliance has rating 100 W, 120 V. The resistance of an element of the appliance when in use is:

a) 1.2 Ω b) 144 Ω c) 120 Ω d) 12000 Ω

ix) The main fuse is connected in

a) live wire b) neutral wire c) both the live and earth wire

d) both the earth and neutral wire

x) In a step-up transformer

a) $N_S = N_P$ b) $N_S > N_P$ c) $N_S < N_P$ d) N_S & N_P are not important

xi) The specific heat capacity is maximum for

a) Water b) Ice c) Hydrogen d) Copper

Contd.....

xii) By reducing the amplitude of a sound wave, its
a) pitch increases b) loudness decreases
c) pitch decreases d) loudness increases

xiii) The particle used in nuclear fission for bombardment is
a) alpha particle b) proton c) beta particle d) neutron

xiv) kWh is a unit of
a) power b) force c) energy d) momentum

xv) A light ray does not bend at the boundary in passing from one transparent medium into the other transparent medium if the angle of incidence is
a) 180^0 b) 90^0 c) 0^0 d) 45^0

QUESTION 2

A] i) Is the torque a scalar or a vector quantity? [2]
ii) State a condition for producing the maximum torque on a body by a given force.
B] State two ways to increase the speed of rotation of a D.C. motor. [2]
C] i) If a lens is placed in water instead of air, how does its focal length change? [2]
ii) If the material remains the same then which lens, thick or thin has greater focal length?
D] A block and tackle system has 5 pulleys. Then in an ideal situation, [2]
i) how is load L related to the effort E?
ii) how is the distance d_E moved by the effort related to the distance d_L moved by the load?
(Give mathematical expression in each of the above cases.)
E] State the energy conversion in each of the following cases when in use: [2]
i) Nuclear reactor ii) When current is drawn from an electric cell
F] How does an increase in the temperature affect the specific resistance of a [2]
i) metal ii) semiconductor?
G] An object is placed at a distance of 16 cm in front of a convex lens of focal length 8 cm. [3]
i) What is the nature and the size of the image so formed?
ii) Where and at what distance from the lens the image is formed?
iii) What is the magnification of the image so formed?

Contd---

QUESTION 3

A] What are isobars? Give one example of mirror isobars. [2]

B] Calculate the mechanical advantage of a fire tongs if the load arm is 18 cm and the effort is applied at a distance of 4 cm from the fulcrum. [2]

C] A fuse is rated 8A. Can it be used with an electrical appliance of rating 5kW, 200V? Justify your answer. [2]

D] Why is the sky in the direction, other than the direction of the sun, is seen blue? [2]

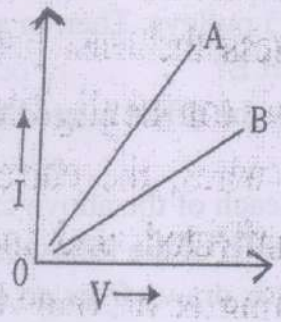
E] The apparent depth of a liquid in a vessel is 22.5 cm, when its real depth is 30 cm. Find the refractive index of the liquid. [2]

SECTION B (40 MARKS)
ATTEMPT ANY 4 COMPLETE QUESTIONS FROM THIS SECTION

QUESTION 4

A] Using a single pulley, draw a neat labelled diagram of an arrangement, whose M.A. and V.R. both are 2. Will it be used as a force multiplier, speed gainer or for change in direction? [3]

B] The figure given below shows the I-V graph for two conductors A and B. Study the graph and answer the questions that follow: [3]



i) Which conductor is ohmic?

ii) Which conductor has more resistance? Give reason to your answer.

Contd.....

C] Define:
i) Total internal reflection ii) Damped vibrations iii) SI unit of work [4]
iv) Radioactivity.

QUESTION 5

A] Write the position of the centre of gravity in a regular uniform [3]
i) hollow sphere ii) solid cone iii) rhombus
B] Draw a neat labelled diagram for image formation by using a suitable lens which finds an application in spectacles for short sighted person. [3]
C] Two resistors R_1 and R_2 of resistance 4 Ω and 8 Ω respectively are connected in parallel across a battery of p.d.16V. Calculate the electrical energy consumed in 1 minute in each resistor. [4]

QUESTION 6

A] A cube of ice of mass 10 g at 0°C is added into 100 g of water at 40°C. [3]
Calculate the final temperature of water when whole of the ice cube has melted.
Given: Specific latent heat of ice = 80 cal g^{-1}
Specific heat capacity of water = 1 cal g^{-1} $°C^{-1}$

B] i) Write the principle on which the A.C. generator works. [3]
ii) State the law which is used to find the direction of induced current in the A.C. generator.
iii) Write the frequency of alternating current in our household supplies.

C] Distinguish between Nuclear fission and Nuclear fusion on the basis of the following points: (Write your answer in tabular form) [4]
i) Temperature and pressure required for reactions to occur
ii) Nature of the materials required to start the reactions
iii) Nature and disposal of waste generated
iv) Energy released during the reactions for the same mass

Contd.....

QUESTION 7

A] A transformer is designed to give a supply of 4V to ring a house bell from 220V a.c. mains. The primary coil has 2200 turns. How many turns will be in the secondary coil? Also identify the type of a transformer. [3]

B] Give scientific reasons: [3]

i) The snow on the mountain does not melt all at once.

ii) The dolphins can detect their enemy and obstacle easily while swimming in the sea.

iii) The print on a paper appears to be raised when a glass slab is placed over it.

C] Name the following: [4]

i) The phenomenon observed when a light passes from a denser medium into a rarer medium at an angle of incidence greater than critical angle for a given pair of media.

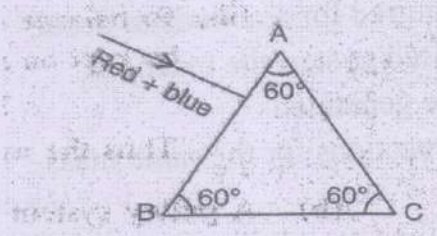
ii) The ratio of the work done on the load by the machine to the work done on the machine by the effort.

iii) The virtual force generated during the circular motion of an object about an axis.

iv) The energy possessed by a non-rigid body in the deformed state due to change in its size and shape.

QUESTION 8

A] The diagram given below shows a beam of light (red + blue) incident normally on an equilateral triangular prism. If the critical angle for the material of prism is 60^0 for the light of red colour and less than 60^0 for the light of blue colour, complete the diagram showing the path of light of each given colour emerging out of the prism. Mark in the diagram the angles wherever necessary. [3]



Contd.....

B] i) Name the emission from a radioactive substance whose ionising power is maximum. [3]

ii) State two properties of the emission mentioned by you in Q,8- B-i

C] [4]

i) A body of mass 800 g is moving with a speed of 20 ms^{-1}. A force acts on it which makes it to move with a speed of 40 ms^{-1}. Find the work done by the force on the body.

ii) Why is the calorimeter made up of copper? (Give 2 points)

QUESTION 9

A] i) Name the radiations which are used in photography at night and also in mist and fog. [3]

ii) Write one harmful effect of the radiations mentioned by you in Q.9-A-i

iii) How does the frequency of the radiations mention by you in Q.9-A-i get affected when they travel from one medium into the other medium?

B] i) What do you mean by the internal resistance of a cell? [3]

ii) How does the internal resistance of a cell get affected by the following factors:

a) Concentration of the electrolyte b) Temperature of the electrolyte

C] i) Which type of a transformer is used in televisions? [4]

ii) Define a superconductor.

iii) If a radioactive element P (A=238, Z=92) emits one alpha and two beta particles and get converted into a daughter element S, then write the atomic mass number and the atomic number of S.

BEST OF LUCK