GREENWOOD HIGH
TERM EXAMINATION – 1
SEPTEMBER 2019
SUBJECT – PHYSICS

Grade 10
Date: 12/09/2019

Time: 2 Hours
Max. Marks: 80

Answers to this paper must be written on the paper provided separately
*You will **not** be allowed to write during the first 15 minutes.*
This time is to be spent in reading the question paper
The time given at the head of this paper is the time allowed for writing the answers.

SECTION I (40 Marks)
Attempt all questions from this Section

Question 1

(a) A boy weighing 40 kgf climbs up a stair of 30 steps each 20 cm high in 4 minutes and a girl weighing 30 kgf does the same in 3 minutes. Compare

i. The work done by them
ii. The power developed by them [2]

(b) With reference to the terms Mechanical Advantage, Velocity Ratio and efficiency of a machine, name and define the term that will not change for a machine of a given design. [2]

(c) A boy uses blue colour of light to find the refractive index of glass. He then repeats the experiment using red colour of light. Will the refractive index be the same or different in the two cases? Give a reason to support your answer. [2]

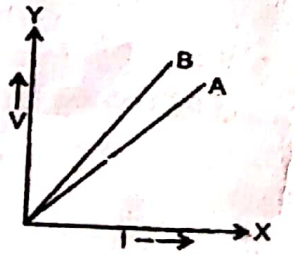
(d) State the dependence of angle of deviation

i. On the refractive index of the material of the prism
ii. On the wavelength of light [2]

(e) Explain the motion of a planet around the sun in a circular path. [2]

Question 2

(a) The V-I graph for a series combination and for a parallel combination of two resistors is shown the figure below.



Which of the two A or B represents the parallel combination? Give a reason for your answer. [2]

(b) Calculate the quantity of heat produced in 20 Ω resistor carrying 2.5 A current in 5 minutes. [2]

(c) How is a fuse connected in an electric circuit? State the purpose of using a fuse in a circuit. [2]

(d) The primary coil of a transformer has 800 turns and the secondary coil has 8 turns. It is connected to a 220 V a.c. supply. What will be the output voltage? [2]

(e) State two factors that affect the lateral displacement of light as it passes through a rectangular glass slab. [2]

Question 3

(a) Name the factors affecting the turning effect of a body. [2]

(b) i. Define equilibrium.

ii. In a beam balance when the beam is balanced in a horizontal position, it is in ---------- equilibrium. [2]

(c) How is work done by a force measured when the force:

i. Is in the direction of displacement

ii. Is at an angle to the direction of displacement. [2]

(d) State the energy changes in the following while in use:

i. Burning of a candle

ii. A steam engine [2]

(e) i. A scissor is ---------- multiples

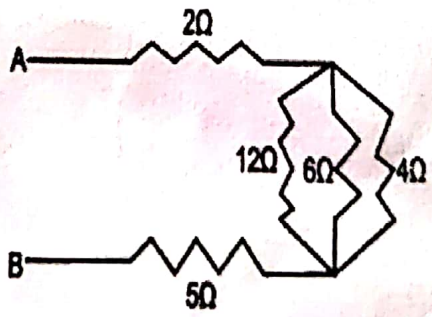
ii. 1 kWh = --------- J [2]

Question 4

(a) A boy exerts a force of 150 N in pulling a cart at a constant speed of 10 ms^{-1}. Calculate the power exerted. [2]

(b) Why does a current carrying, freely suspended solenoid rest along a direction? State the direction in which it rests. [2]

(c) Find the equivalent resistance between points A and B. [2]



(d) Give two similarities between an A.C generator and a D.C motor. [2]

(e) State *two* circumstances when one may get an electric shock from an electric gadget. What preventive measure must be provided with the gadget to avoid it. [2]

SECTION II (40 Marks)

Attempt any four questions from this section

Question 5

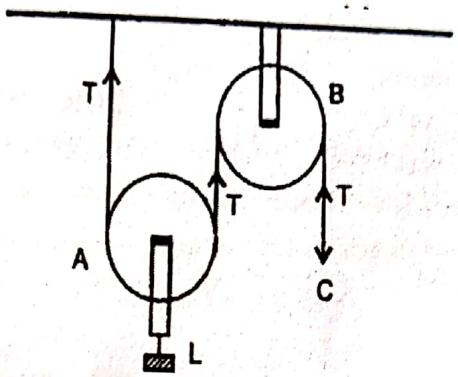
(a) A stone of mass 'm' is rotated in a circular path with a uniform speed by tying a strong string with the help of your hand. Answer the following questions.

i. Is the stone moving with a uniform or variable velocity?

ii. Is the stone moving with uniform acceleration? In which direction does the acceleration act?

iii. What kind of force acts on the hand and state its direction?

(b) From the diagram given below, answer the questions that follow: [3]



i. What kind of pulleys are A and B?

ii. State the purpose of pulley B.

iii. What effort must be applied at C to just to raise the load L = 20 kgf? [3]

(c) Draw a labelled diagram of a d.c. motor showing its main parts. And state the principle on which it works. [4]

Question 6

(a) Answer the following:

i. What is the principle of method of mixtures?

ii. What is the other name given to it?

iii. Name the law on which the principle is based. [3]

(b) Some ice is heated at a constant rate, and its temperature is recorded after every few seconds, till stem is formed at 100^0C. draw a temperature time graph to represent the change. Label the two-phase changes on graph. [3]

(c) A copper vessel of mass 100 g contains 150 g of water at 50^0C. How much ice is needed to cool it to 5^0C?

Given: Specific heat capacity of copper = 0.4 $Jg^{-1} K^{-1}$

Specific heat capacity of water = 4.2 $Jg^{-1} K^{-1}$

Specific latent heat of fusion of ice = 336 Jg^{-1} [4]

Question 7

(a) Answer the following:

i. Which particles are responsible for current in conductors?

ii. How does the colour code of wires in a cable help in a house wiring?

iii. It is dangerous to connect the switch in the neutral wire. Explain your answer.

[3]

(b) Answer the following:

i. Name the transformer used in the power transmitting station of a power plant.

ii. What type of current is transmitted from the power station?

iii. At what voltage is this current available to our household? [3]

(c) Answer the following:

i. Write a relationship between angle of incidence and angle of refraction for a given pair of media.

ii. When a ray of light enters from one medium to another having different optical densities it bends. Why does this phenomenon occur?

iii. Write two conditions where light ray does not bend when entering from one medium to another medium.

[4]

Question 8

(a) Pranav puts a pencil into a glass container having water and is surprised to see the pencil in a different state.

i. What change is observed in the appearance of the pencil?

ii. Draw a ray diagram showing how the eye sees the pencil. [3]

(b) Answer the following:

i. Name the physical quantity measured in terms of horse power.

ii. A nut is opened by a wrench of length 20 cm. If the least force required is 2N, find the moment of force needed to loosen the nut.

iii. Explain in brief why the work done by a fielder when he takes a catch in a cricket match is negative. [3]

(c) A block and tackle system has V.R = 5

i. Draw a neat labelled diagram of a system indicating the direction of its load and effort.

ii. A boy exerts a pull of 150 kgf. What is the maximum load he can raise with this pulley system if its efficiency is 75%? [4]

Question 9

(a) Answer the following:

i. Water in lakes and ponds do not freeze at once in cold countries. Give a reason in support of your answer.

ii. State the effect of an increase of impurities on the melting point of ice.

iii. The specific heat capacity of lead is 130 $Jkg^{-1}K^{-1}$. What do you mean by this statement?

[3]

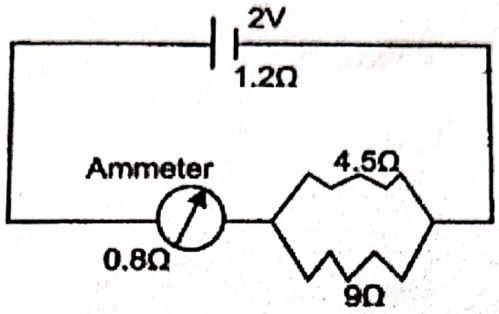
(b) The relationship between the potential difference and the current in a conductor is stated in the form of a law.

i. Name and state the law.

ii. What does the slope of V-I graph for a conductor represent?

iii. Name the material used for making the connecting wire. [3]

(c) A cell of emf 2 V and internal resistance 1.2 Ω is connected with an ammeter of resistance 0.8 Ω and two resistors of 4.5 Ω and 9 Ω as shown in the diagram below.



i. What would be the reading on the Ammeter?

ii. What is the potential difference across the terminals of the cell? [4]

Question 10

(a) A geyser is rated '1500 W, 250 V'. This geyser is connected to 250 V mains. Calculate:

i. The current drawn,

ii. The energy consumed in 50 hours, and

iii. The cost of energy consumed at Rs. 4.2 per kWh. [3]

(b) Answer the following:

i. State the principle of moments.

ii. On a see-saw, two children of masses 30 kg and 50 kg are sitting on one side of it at distances 2 m and 2.5 m respectively from its middle. Where should a man of mass 74 kg sit to balance it? [3]

(c) Answer the following:

i. Name and state the principle of a simple a.c. Generator. What is its use?

ii. State Fleming's right-hand rule.

iii. State two advantage of an electromagnet over a permanent magnet. [4]