

GREENLAWNS SCHOOL, WORLI
PRELIMINARY EXAMINATION
PHYSICS

STD: X

Marks: 80

Date: 13/01/2019

Time: 2hrs

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.

Attempt all questions from Section A and any four questions from Section B.
The intended marks for the questions or parts of questions are given in the brackets [].

SECTION A (40 Marks)
Attempt all questions.

Question 1

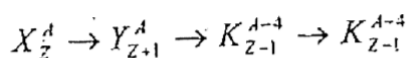
- a. Name the force required for uniform circular motion state its direction [2]
- b. Can a centre of gravity situated outside the body give an example. [2]
- c. What is the work done by gravitational force on the moon that revolves around the earth? [2]
- d. What is meant by the term moment of force? if the moment of force is assigned a negative sign then will the turning tendency of the force be clockwise or anticlockwise. [2]
- e. Explain why one leans forward while climbing up a hill? [2]

Question 2

- a. Explain why standing passengers are not allowed on an upper Deck of a double decker bus. [2]
- b. What is the dissipation of energy? [2]
- c. A body of mass 50 kg and another body of mass hundred kg have equal momentum which body will have more kinetic energy? [2]
- d. A man climbs a slope other walks same distance on a level road which of the two expends more energy and why? [2]
- e. What changes can be made in class 2 lever to increase its mechanical advantage? [2]

Question 3

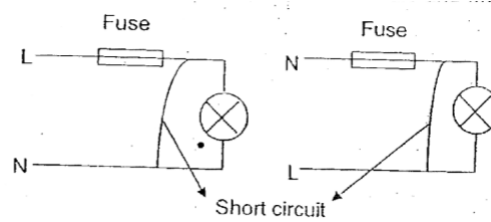
- a. Why do the faces of person sitting around the campfire appear to shimmer? [2]
- b. The radioactive decay of an element X to element Y and K is represented by the following equation.



- c. What is the sequence of the emitted radiations? (Rewrite the equation and show the type of emitted radiation above the arrow) [2]
- c. Can a transformer work when it is connected to a DC source? Explain giving correct

scientific reasons. [2]

- d. The circuits (a) and (b) below show a 'short circuit' between the live and the neutral wire. Which circuit is safe and why? [2]



- e. (i) How will you recognize the earth pin of a three pin plug? [1]
(ii) Under what conditions does an electric charge give rise to a magnetic field? [1]

Question 4

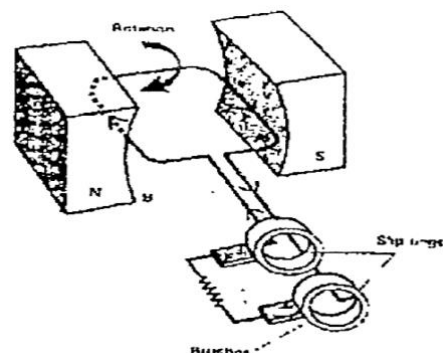
- a. Derive a relationship between kinetic energy and momentum of a moving body. [2]
b. A candle of height 12 cm is placed 30 cm in front of a convex of focal length 10cm. State the position, size and nature of the image. [2]
c. Which of the characteristics of a sound wave would change if there were a change in its:
(i) Amplitude (ii) Wave nature [2]
d. A child is wearing spectacles of power -2.5D
(i) What does the negative sign indicate?
(ii) Calculate the focal length of the lens of the spectacles. [2]
e. State what happens to the resistance of a wire :
(i) Its length is doubled
(ii) Its area is doubled . [2]

Section II (40 Marks)

Attempt any 4 questions from this Section

Question 5

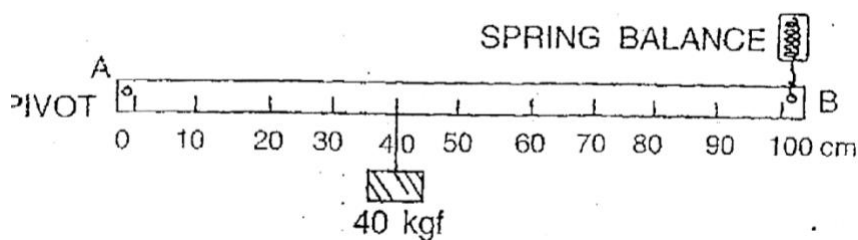
- a. (i) A person stands between two parallel walls which are 99 m apart and fires a gun. He hears two successive echoes after 0.2s and 0.4s . Calculate the velocity of sound and the distance of the person from the nearer cliff. [3]
(ii) What is meant by noise pollution? [3]
b. Shown alongside is an electrical device:
(i) Identify the part labelled X
(ii) What is the energy conversion seen in the device?.
(iii) What is the frequency of rotation of the coil for household supplies. [3]



- c. A refrigerator converts 100g of water at 20°C to ice at -10°C in 35 minutes. Calculate the average rate of heat extraction of the refrigerator in watt.
 Specific heat capacity of water = 4.2 J/kg °C.
 Specific heat capacity of ice = 2.1 J/g °C.
 Specific latent heat of fusion of ice = 336 J/kg. [4]

Question 6

- a. A geyser has a rating 2 kW, 240 V.
 (i) What is the electric energy consumed by it in kWh and joule if it is used for 90 minutes.
 (ii) The cost of electrical energy consumed at the rate of ` 4.50 kWh. Find the cost. [3]
- b. I. State the condition for each of the following:
 (i) A lens has both its focal length equal.
 (ii) A ray passes undeviated through the lens.
 II Define 'Scattering.' [3]
- c. A uniform metre rule AB is pivoted at end A at the zero mark and supported at the other end B by a spring balance when a 40 kgf is suspended at 40 cm mark. The rule stays horizontal. Find the reading in the spring balance when the rule is of
 (i) negligible mass, (ii) mass 20 kg [4]

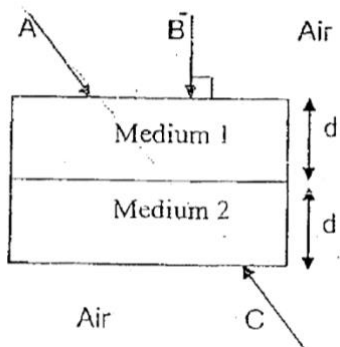


Question 7

- a. A flat coil ABCD rotates at a constant rate about an axis which is perpendicular to a uniform magnetic field.
 (i) Show graphically the variation of the induced e.m.f. during one complete rotation of the coil.
 (ii) What are the positions of the coil, relative to the magnetic field, when the e.m.f. has a maximum and minimum value? [3]
- b. (i) Define frequency of sound.
 (i) State three ways by which the frequency of transverse vibrations of a stretched string can be decreased. [3]
- c. A tuning fork of frequency 256 Hz is struck on a rubber pad and left to vibrate in air for some time.
 (i) Name the kind of vibrations it would exhibit.
 (ii) What kind of vibrations would a second tuning fork exhibit, if it were to be placed near the vibrating tuning fork and produce a loud sound? Explain.
 (iii) What would be the frequency of the second tuning fork? [4]

Question 8

- a. In the figure given below, two slabs of equal thickness are shown, The speed of light in medium '1' is less than the speed of light in medium '2'. Trace the path of the rays A, B and C incident from air on this composite slab in the manner shown below.



[You can draw separate diagrams for rays A, B and C.]

[3]

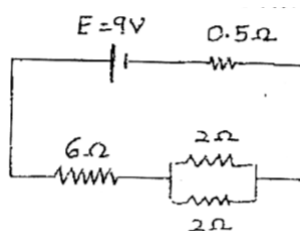
- b. An object is placed in front of a lens to produce a virtual, erect and diminished image. Draw a ray diagram to show the formation of the image.

[3]

- c. A cell of e.m.f 9 V with internal resistance 0.5Ω is connected to three resistors of 2Ω , 2Ω and 6Ω as shown alongside,

Calculate:

- The current flowing in the circuit.
- The current across the 6Ω resistor.
- The terminal voltage.

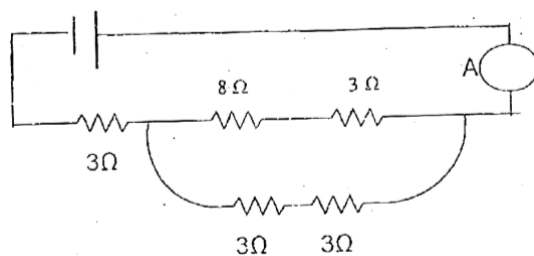


[4]

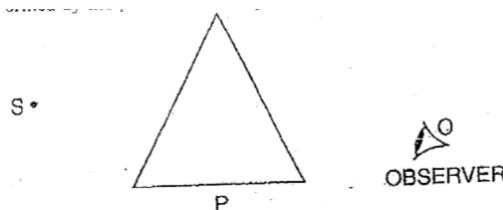
Question 9

- a. Calculate the current through the circuit and terminal voltage, if e.m.f. (ϵ) of the cell is 8V and internal resistance (r) of the cell is 2Ω .

[3]



- b. i. In the figure given below a monochromatic point source of light S is viewed by an observer O through a prism P. Complete the diagram to show the image formed by the prism as seen by the observer O. Label the image by letter 1.



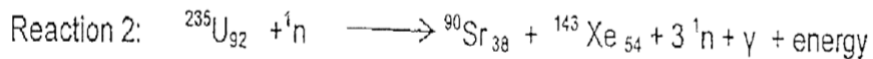
- ii. A lens forms an upright and magnified image of an object, name the lens.

[3]

- c. Draw a neat labelled diagram to show a block and tackle system of pulleys having a velocity ratio = 5. Calculate its efficiency if a load of 1000kgf can be lifted up by an effort of 250kgf. [4]

Question 10

- a. A straight wire lying in a horizontal plane carries a current from north to south.
(i) What will be the direction of the magnetic field at a point just underneath it?
(ii) Name and state the law used to arrive at the answer in part (i) [3]
- b. (i) Define specific latent heat of fusion of ice.
(ii) Why is salt added to ice during the making of kulphies by road side vendors?
(iii) How is the energy supplied to a substance during change of state utilised by it? [3]
- c. Given below are two nuclear reactions



- (i) Identify the type of nuclear reactions shown above.
(ii) State one point of difference between types of nuclear reactions mentioned by you.
(iii) How much energy will be released from the conversion of 1 a.m.u. of a substance?
(iv) What precautions should people handling radioactive materials take? (one point) [4]
