GREENLAWNS SCHOOL, WORLI

TERMINAL (term I)

PHYSICS

STD: X Marks: 80

Date: /09/2019 Time: 2hrs

**Section I**

**(Attempt all questions of this section)**

**Question 1**

**a.** When an arrow is shot form a bow, it has kinetic energy in it. Explain briefly from where does it get its kinetic energy? **[2]**

**b.** An electrical heater is rated 4 kW, 220 V. Find the cost of using this heater for 12 hours if one kW h of electrical energy costs Rs. 3.25. **[2]**

**c.** Of the three connecting wires in a house-hold circuit:

(i) Which two of the three wires are at the same potential?

(ii) In which of the three wires should the switch be connected? **[2]**

**d.** What quantity of heat will be produced in coil of resistance 80 ohm if current of 3 A is passed through it for 4 second? **[2]**

**e**. Diagram shows a glass prism placed in minimum deviation position. A ray of monochromatic light is incident on its face AB. Copy the diagram and show the refracted ray and the emergent ray. Mark the angle of deviation. **[2]**

IMAGE0094.TIF

**Question 2**

**a.** Can two agents doing the same work have the same power? **[2]**

**b.** Explain why scissors for cutting cloth may have blades much longer than the handles; but shears for cutting metals have short blades and long handles. **[2]**

**c.** State the amount of work done by an object when it moves in a circular path for one complete rotation. Give a reason to justify your answer. **[2]**

**d.** How do the frequency and amplitude affect a musical sound? **[2]**

**e.** The electrical gadgets used in a house such as bulbs, fans, heaters, etc, are always connected in parallel, not in series. Give two reasons for connecting them in parallel. **[2]**

**Question 3**

**a.** Draw a ray diagram to illustrate the determination of the focal length of a convex lens using an auxiliary plane mirror. **[2]**

**b.** Name the type of single pulley that can act as a force multiplier. Draw a labeled diagram of the above named pulley. **[2]**

**c.** Calculate the height through which a body of mass 0.5 kg. should be lifted if the energy spend for doing so is 1.0 joule. (g = 10 m s-2) **[2]**

**d.** The diagram given below shows an object O and its image I. Copy the diagram and draw suitable rays to locate the lens and its focus. Name the type of lens in this case. **[2]**

IMAGE0108.TIF

**e.** An observer stands at a distance of 850 m from a cliff and fires a gun. After what **[2]**

time-gap will be hear the echo if sound travels at a speed of 350 m s-1 in air?

**Question 4**

**a.** Name and define the physical quantity represented by dioptre. **[2]**

**b.** To use a machine as a force multiplier, what type (class) of lever should preferably be used? Draw a sketch of such a lever. **[2]**

**c.** (i) If a monochromatic beam of light undergoes minimum deviation through an

equiangular prism, how does the beam pass through the prism, with respect to its base?

(ii) If white light is used in the same way as in (i) above, what change is expected in the emergent beam? **[2]**

**d.** The diagram shows a point source of light S, a convex lens L, and a plane mirror M.

These are placed such that rays of light, from S return to it after reflection from M.

IMAGE0071.TIF

(i) What is the distance OS called?

(ii) To which point (left of S, on S, or right of S) will the rays return, if M is moved . **[2]**

**e.** The crowbar is a type of lever as shown: **[2]**

IMAGE0040.TIF

A crowbar of length 150 cm has its fulcrum at a distance of 25 cm from the load. Calculate mechanical advantage of the crowbar.

**Section II**

**(Attempt any four questions)**

**Question 5**

**a.** The critical angle for the glass of which the equilateral prism ABC is made, is 60o. A ray

of light incident on the side AB of the prism is refracted along DE such that the angle it

makes with the side AC is 150o. Also, ∠EDB = 90o. Copy the diagram.

IMAGE0090.TIF

**(i)** Draw the path of the ray incident on the side AB. (which travels along DE.)

**(ii)** Show the path along which the ray DE travels from the point E onwards and through the side BC. **[3]**

**b.** What rays exist beyond the visible-red end of the electromagnetic spectrum? State one use and one method of detecting these rays. **[3]**

**c.** **(i)** Which of the two wires of similar dimensions, of copper or nichrome, would

you use for the electric heater element? Give reasons to justify your answer.

**(ii)** Two fuse wires of the same length are rated 5 A and 20 A. Which of the two

fuse wires is thicker and why? **[4]**

**Question 6**

**a.** An object is placed in front of a lens between its optical centre and focus. The image

formed is virtual, erect and diminished.’

(i) Name the lens which forms this image.

(ii) Draw a ray diagram to show the formation of an image with the above characteristics. **[3]**

**b.** (i) What is the main energy transformation that occurs in :

(1) Photosynthesis in green leaves?

(2) Charging of a battery?

(ii) Write an expression to show the relationship between mechanical advantage, velocity ratio an deficiency for a simple machine. **[3]**

**c.**  (I) The diagram given below shows the path of a ray of light through a rectangular

glass block placed in a liquid of uniform density.

IMAGE0082.TIF

(i) Does the light speed up or slow down in glass?

(ii) Give reasons for your answer.

(II) What is the angular deviation of the emergent ray from the glass block with respect to the incident ray?

(III) Show with the help of a ray diagram the path of the ray when incident normally

on the first surface of the glass block, through the block and the liquid.  **[4]**

**Question 7**

**a.** Water in a pond appears to be only three quarters of its actual depth.

(i) What property of light is responsible for this observation?

(ii) Illustrate your answer with the help of a ray diagram. **[3]**

**b.** When a tuning fork, struck by a rubber pad, is held over a length of air column in a tube, it produces a loud sound for a fixed length of the air column.

(i) Name the above phenomenon.

(ii) How does the frequency of the loud sound compare with that of the tuning fork?

(iii) State the unit for measuring loudness.  **[3]**

**c.** i Four resistances of 2.0 Ω each are joined end to end to form a square ABCD.

Calculate the equivalent resistance of the combination between any two adjacent corners.

ii In a three-pin plug, why is the earth pin made longer and thicker than the other

two pins? **[4]**

**Question 8**

**a.** Give one use each of the electromagnetic radiation given below:

(i) Microwaves

(ii) Ultraviolet radiations

(ii) Infra-red radiations. **[3]**

**b.** (i) State Snell’s law.

(ii) Calculate the velocity of light in a glass block of refractive index 1.5.

(Velocity of light in air = 3 x 108 m s-1) **[3]**

**c.** In the given diagram, a source of light S is placed at the bottom of a beaker containing water.

IMAGE0124.TIF

(i) Copy the diagram and show the path of rays, marked with arrows, after they meet the water-air boundary.

(ii) Does the ray, marked with one arrow, undergo refraction

(iii) Name the phenomenon exhibited by the ray marked with three arrows.

(iv) State the condition s necessary for the phenomenon in (iii) above. **[4]**

**Question 9**

**a.** (i) State the purpose of a fuse in an electric circuit. Name the material used for making

a fuse wire.

(ii) Mention two factors on which the internal resistance of a cell depends. **[3]**

**b.** A pulley system has a velocity ratio of 4 and an efficiency of 90%. Calculate:

(i) The mechanical advantage of the system.

(ii) The effort required to raise a load of 300 N by the system. **[3]**

**c.** Given below is the circuit diagram in which three resistances 1Ω, 2 Ω and 3 Ω are connected to a cell of e.m.f. 2 V and internal resistance 0.5 Ω.

IMAGE0161.TIF

(i) Calculate the total resistance of the circuit.

(ii) What is the reading of the ammeter?

(iii) What will be the ammeter reading if an exactly similar cell is connected in series with the given cell? **[4]**

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