



CAMPION SCHOOL, MUMBAI  
PRELIMINARY EXAMINATION

Std. X

Date : 09/01/2019

Sub : Physics

Time : 2 hours

Marks : 80

Answer 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 answer.

The intended marks for questions or parts of questions, are given in brackets [ ]

SECTION I

(All questions are compulsory)

Q1.

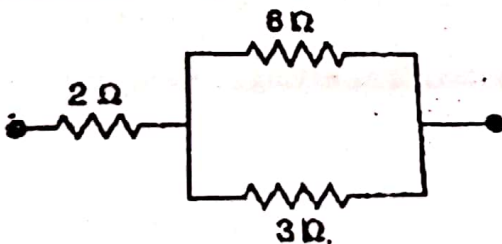
- a) Differentiate between infra - red rays and ultra - violet rays in terms of their [2]
  - i) Uses
  - ii) Action on photographic plate
- b) A boy uses blue colour of light to find the refractive index of glass. He then repeats the experiment with red colour of light. Will the refractive index be the same or different in the two cases? Give a reason to support your answer. [2]
- c) Can the absolute refractive index of a medium be less than 1? Give reason. [2]
- d) What happens to the image if the lower part of the lens is blackened? [2]
- e) What will be the colour of the sky if there was no atmosphere? Explain with reason. [2]

Q2.

- a) Write the conditions for formation of echo. [2]
- b) A public address (P.A.) system is used for a large gathering. Which character of the vibration in the output is increased? [2]
  - i) Frequency ii) Velocity iii) amplitude iv) Harmonics
- c) Why does atmospheric temperature fall after a hail storm? [2]
- d) Two resistors  $R_1$  and  $R_2$  are first connected in series and then in parallel across the same source. [2]
  - 1. In which case the current through the source is greater?
  - 2. In which case the rate of conversion of electrical energy to heat energy is more?
- e) Mention two factors on which the emf of a cell depends. [2]

Q3.

- a) In a three pin plug why the earth pin is made thicker and longer than the other two pins? [2]
- b) Calculate the equivalent resistance of the combination shown in figure [2]



- c) Define specific resistance and state its SI unit. [2]
- d) Give one important function each of the fuse and the switch. [2]
- e) A current of 4A flows through a 12 V car head light bulb for 10 minutes. How much energy transfer takes place during this time? [2]

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Q4.

- a) State two differences between heat capacity and specific heat capacity. [2]
- b) What are isobars? Give one example of Isobars. [2]
- c) Why is the ratio of velocities of light of wavelengths 4000 Å and 8000 Å in vacuum 1:1? [2]  
Which of the above wavelengths has a higher frequency?
- d) Two bodies of equal masses are kept at heights 20m and 30m respectively. Calculate the ratio of their potential energies. [2]
- e) Some hot water was added to three times its mass of cold water at 10°C and the resulting temperature was found to be 20°C. What was the temperature of hot water?

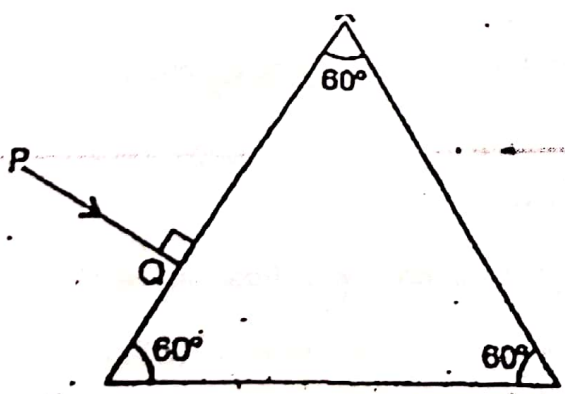
Section II  
(Attempt any four)

Q5.

- a) A radar is able to detect the reflected waves of an enemy's aeroplane after intervals of 0.02 milliseconds. If the velocity of the wave is  $3 \times 10^8$  m/s, calculate the distance of the plane from the radar. [3]
- b) Draw a graph between displacement and the time for a body executing free vibrations. Where can a body execute free vibrations? [3]
- c) A uniform half metre rule balances horizontally on a knife edge at 29 cm mark when a weight of 20 gf is suspended from one end. [4]
  - i) Draw a diagram of the arrangement.
  - ii) What is the weight of the half metre rule?

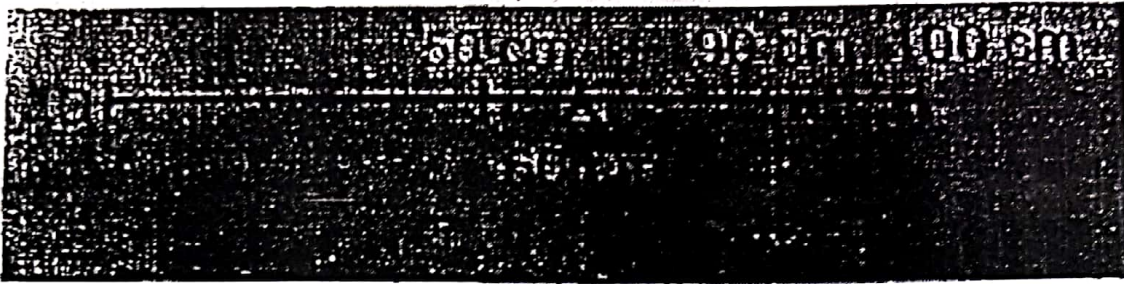
Q6.

a) Copy the diagram given below and complete the path of light ray till it emerges out of the prism. The critical angle of glass is less than  $42^\circ$ . Mark the necessary angles wherever needed. [3]



- b) A hot solid of mass 60 g at  $100^\circ\text{C}$  is placed in 100 g of water at  $18^\circ\text{C}$ . The final steady temperature recorded is  $20^\circ\text{C}$ . Find the specific heat capacity of the solid. [3]
- c) An electric bulb is marked 200 V and 100 W [4]
  - i) What do the markings mean?
  - ii) Another bulb is marked 50 W, 200 V. Which one has a coil of higher resistance?
  - iii) What will be the energy used by the 1<sup>st</sup> bulb if used 10 hrs a day for 10 day?
  - iv) What is the cost of the energy used if 1kWh is priced at Rs 1.60?

Q7. a) A uniform metre scale is kept in equilibrium when supported at 60 cm mark and a mass  $m$  is suspended from 90 cm mark as shown in the figure. State with reasons, whether the weight of the scale is greater than, less than or equal to the weight of mass  $m$ . [3]



b) A machine is operated by an effort of 80 N acting downward and moving through a downward displacement of 0.15 m. The load of mass 10 kg is raised up by 10 cm. Calculate the M.A., V.R., work input, useful work output and efficiency. ( $g = 10 \text{ m/s}^2$ ) [3]

c) Give two differences between the radioactive decay and nuclear fission. [4]  
 What is a nuclear fusion? Give one example and write its nuclear reaction.

Q8.

a) Trace the path of the ray through and inside the prism. Critical angle of the material of the prism w.r.t. air is  $45^\circ$  [3]



- b) i) State one important property of waves used for echo depth sounding. [1]  
 ii) A radar sends a signal to an aircraft at a distance of 30 km away and receives it back after  $2 \times 10^{-4}$  seconds. What is the speed of the signal? [2]
- c) i) Name the colour code of the wire which is connected to the metallic body of an appliance. [4]  
 ii) Draw the diagram of a dual control switch when the appliance is switched "on".  
 iii) In the transmission of power the voltage of power generated at the generating stations is stepped up from 11 kV to 132 kV before it is transmitted. Why?

Contd..4

Q9:

MOD. 3021000

a) 40 g of water at 60°C is poured into a vessel containing 50 g of water at 20°C. The final temperature recorded is 30°C. Calculate the thermal capacity of the vessel.

(Specific heat capacity of water = 4.2 Jg<sup>-1</sup>°C<sup>-1</sup>)

[3]

b) Find the equivalent resistance between points A and B.

[3]



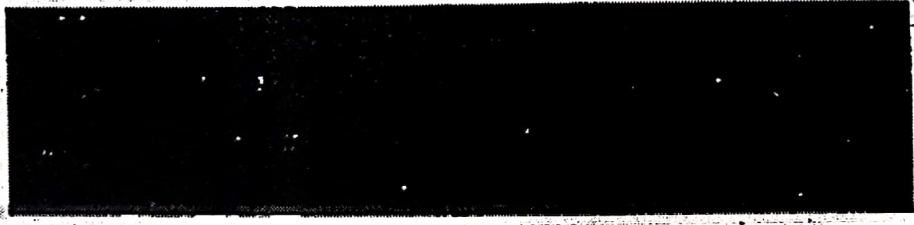
c) A ray of light is normally incident on one face of an equilateral glass prism. Answer the following:[4]

- i) What is the angle of incidence on the first face of the prism?
- ii) What is the angle of refraction from the first face of the prism?
- iii) What will be the angle of incidence at the second face of the prism?
- iv) Will the light ray suffer minimum deviation by the prism?

Q/10

a) Complete the following nuclear change:

[3]



b) State three points of difference between nuclear fission and nuclear fusion. [3]

c) i) A mass of lead is embedded in a block of wood. Radiations from a radioactive source incident on the side of block produce a shadow on a fluorescent screen placed beyond the block. The shadow of wood is faint, but the shadow of lead is dark. Give reason for the difference. [2]

ii) If the block of wood is replaced by a block of aluminium, will there be any change in the shadow? Give reason. [2]

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