

# City International School

## FIRST TERMINAL EXAMINATION – 2015 - 2016

Date : 11/08/2015

Std : X

Subject : Physics (Paper I)

Marks : 80

Time : 2hrs

Answers to this question must be written on the paper provided separately.

You will not be allowed to write during the first 15 minutes.

This time is spent in reading the question paper.

The time at the head of this paper is the time allowed for writing the answers.

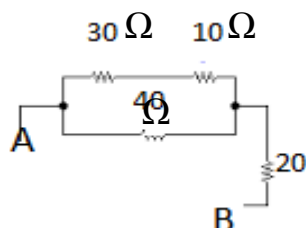
Attempt all questions from SECTION A and any four questions from SECTION B.

The intended marks for questions or parts of questions are given in the bracket. ( )

### SECTION A [40 MARKS]

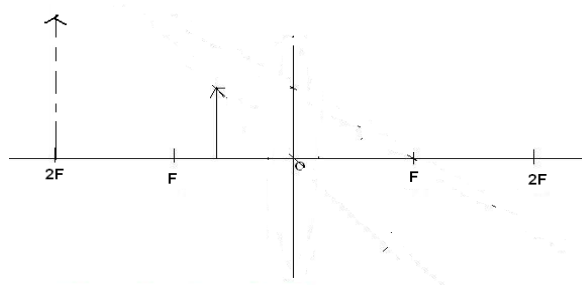
Attempt all questions

- Q. 1**
- a. State the factors affecting critical angle. (2)
  - b. With respect to a transformer state its: (2)
    - i. principle
    - ii. Types of transformers
  - c. Calculate the effective resistance between the points A and B in the circuit (2)



- d. With the help of a diagram show the graph of an ohmic conductor (2)
  - e. How is a direct current different from an alternating current? (2)
- Q. 2**
- a. State the factors affecting resistivity of a material. (2)
  - b. State the following: (2)
    - i. Size of image when object is placed at infinity in a convex lens
    - ii. Nature of image seen in a concave lens
  - c. How much heat energy is released when 5 g of water at 20°C changes into ice at 0°C? (Take Specific heat capacity of water = 4.2 Jg<sup>-1</sup>K<sup>-1</sup>, Specific latent heat of ice = 336 JK<sup>-1</sup>) (2)
  - d. Name the following. (2)
    - i. One source of ultraviolet radiation.
    - ii. One instrument to detect infrared radiations.

e. Complete the ray diagram.



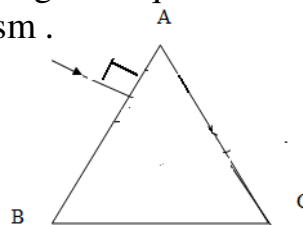
(2)

**Q. 3** a. i. Define kilowatt hour. (2)  
ii. Write its relation with the SI unit energy.

b. State the conditions necessary for hearing an echo distinctly. (2)

c. Two resistors of  $4\ \Omega$  and  $6\ \Omega$  are connected in series across a  $6\text{V}$  battery of negligible resistance of circuit. Calculate the current flowing through the battery. (2)

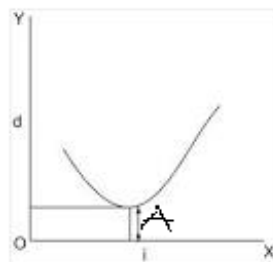
d. Complete the path of ray of light through an equilateral triangle. Show how it emerges out of the prism. (2)



e. What is the filament of a bulb made of? Why is this material preferred? (2)

**Q. 4** a. With the help of a neat labeled diagram show how a body performs free vibrations. (2)

b. i. In the following graph, what does 'A' indicate? (2)  
ii. State the observation for the reflected ray with respect to the base of the prism.



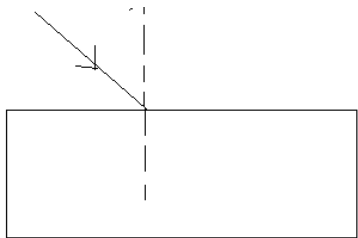
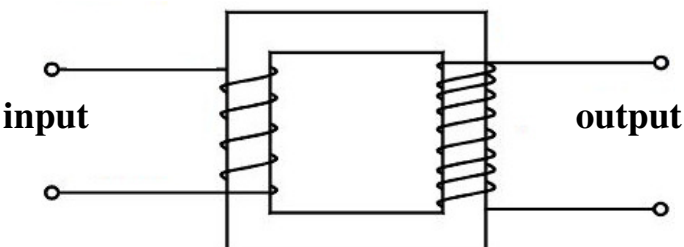
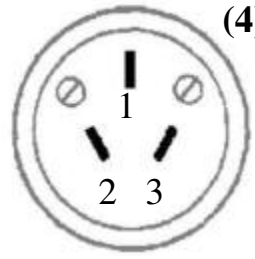
c. A virtual and highly diminished image is obtained when an object is placed at infinity in a lens. Draw a ray diagram to show such an image formed. (2)

d. i. State any one requisite for a good electron emitter. (2)  
ii. Define Radioactivity.

e. When ice in a frozen lake starts melting, its surrounding becomes very cold. Why? (2)

## SECTION A [40 MARKS]

Attempt any four questions from this section.

- Q. 5** a. i. Complete the path of the ray as it emerges out of the glass slab. (3)
- ii. Name the two rays parallel to each other.
- iii. How is this observation different from that of a prism?
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- b. An electrical appliance is rated 1500 W, 250 V. This appliance is connected to a 250 V mains, calculate : (3)
- i. The current drawn
- ii. The electrical energy consumed in 60 hours.
- iii. The cost of electrical energy consumed at the rate of Rs. 4.50 per kWh.
- c.  (4)
- i. Identify the above device
- ii. State the factors on which magnitude of emf in the output depends on.
- iii. If we want to run a 6W, 12 V bulbs with our main supply of 240 V. Calculate the turn ratio for this device.
- Q. 6** a. With respect to a fuse. (3)
- i. Define a Fuse
- ii. State the reason for connecting the fuse in the live wire.
- iii. Material used for making a fuse wire
- b. A string vibrates with a natural frequency of 256 Hz. (3)
- i. which of the tuning fork will readily vibrate with the string  
C - of frequency 512 Hz or D - of frequency 128 Hz.
- ii. State a condition for the above observation.
- iii. Define the above term identified.
- c. Look at the diagram carefully and answer the following question: (4)
- i. Define the component shown in an electric circuit.
- ii. To which part of the appliance is the terminal 1 connected? Why?
- iii. To which wire does the labeled part 3 connected to ?
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- Q. 7** a. i. State the condition for Resonance. (3)  
 ii. Write the characteristic of sound that is depended on its frequency.  
 iii. Complete the sentence: if the length is increased to three times by stretching the wire, its resistance becomes \_\_\_\_\_ of its previous value.

- b. Complete the following nuclear reaction: (3)  

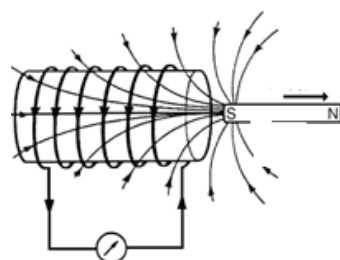
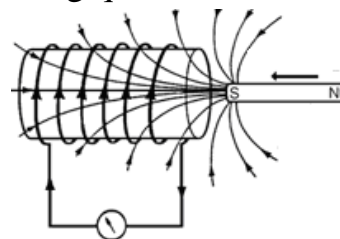
$${}_{92}\text{U}^{234} \xrightarrow{2\alpha} {}_B\text{X}^A \xrightarrow{\beta} {}_D\text{Y}^C \xrightarrow{\gamma} {}_F\text{Z}^E$$

State the atomic and mass numbers of X, Y, Z.

- c. With respect to a Cathode Ray Tube. (2)  
 i. State the value of the varying potential on the grid.  
 ii. Importance of the anodes.
- d. i. Write an expression to show the relation between the internal resistances, electromotive force, terminal voltage and current flowing in a circuit (2)  
 ii. Find the potential difference required to pass a current of 0.2 A in a wire of resistance  $20\ \Omega$ .

- Q. 8** a. Look at the diagram carefully and answer the following questions: (3)

- i. State the phenomenon seen in the diagram shown below  
 ii. Name the law based on the above phenomenon  
 iii. Which device uses the principle of the above phenomenon.



- b. Heat energy is supplied at a constant rate to 400g of ice at  $0^\circ\text{C}$ . The ice is converted to water at  $0^\circ\text{C}$  in 5 minutes. How much time will be required to raise the temperature of water from  $0^\circ\text{C}$  to  $100^\circ\text{C}$ ? (3)
- c. A real, inverted and highly magnified image is obtained at infinity in a convex lens (4)  
 i. State the position of the object.  
 ii. Draw a ray diagram to support your answer.  
 iii. State the application for such an image.

- Q. 9** a. A bucket absorbed by the contains 8 kg of water at  $25^{\circ}\text{C}$ . 2 kg of water at  $80^{\circ}\text{C}$  is poured into it. Neglecting the heat energy bucket, calculate the final temperature of water. (3)
- b. Explain why clouds appear white . (3)
- c. i. State the Ohms law. (4)  
ii. Draw a neat labeled circuit diagram to verify the law.  
iii. What does the slope of the graph indicate?
- Q. 10** a. A coin appears raised when viewed vertically above a swimming pool (4)  
i. Name the phenomenon responsible for this observation.  
ii. Define the above phenomenon.  
iii. State any two factors affecting the observation.
- b. Differentiate between heat capacity and specific heat capacity. (3 points) (3)
- c. A person standing between the two vertical cliffs and 640 m away from the nearest cliff shouted. He heard the first echo after 4 s and the second echo 3 s later. Calculate: (3)  
i. Speed of sound in air.  
ii. Distance between the cliffs.