VIBGYOR HIGH

First Preliminary Examination
2019-2020
PHYSICS
Science Paper I

Max. Marks : 80

Grade : X

Time Allowed : 2 hours

Date : 05/12/2019

INSTRUCTIONS:

- 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.
- The intended marks for the questions or parts of questions are given alongside the questions.
- This question paper contains 4 printed pages.

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

Question 1

a   Define the term power. State it's S.I. unit.   [2]

b   A spanner has a long handle. Why?   [2]

c   An object placed in one medium when seen from the other medium, appears to be vertically shifted. Name two factors on which the magnitude of shift depends.   [2]

d   Draw a labelled diagram of a three pin socket.   [2]

e   What is the rest mass of a β-particle and γ-radiation?   [2]

Question 2

a   Draw a graph between displacement and time for body executing damped vibrations.   [2]

b   An electric kettle is rated 3 kW, 250 V. Give reason whether the kettle can be used in circuit which contains a fuse of current rating 13 A.   [2]

c   Two wires, one copper and other of iron are of the same length and same radius. Which will have more resistance? Give reason.   [2]

d   Arrange following electromagnetic radiations in decreasing order of their wavelengths: [2]

micro-waves, X-rays, infrared waves and radio waves.

e   A current through a 12 V tungsten filament lamp connected to 12 V accumulator of negligible resistance is 3 A.   [2]

Calculate 1) Resistance

2) Electrical energy consumed in 5 hours.

Question 3

a   A ray of light is incident normally on a plane glass slab. What will be   [2]

1) angle of refraction and 2) angle of deviation for the rays?

b   What is the difference between isotopes and isotones?   [2]

c   What do you understand from the given statement ?   [2]

" heat capacity of a vessel is 30 J K $^{-1}$ "

d   State right hand thumb rule.   [2]

e   When a white light ray falls on prism, name the phenomena which the ray   [2]

undergoes at its first surface.

Question 4

a   A bulb is rated 100W – 220V. Calculate the resistance of its filament while   [2]

glowing.

b   What is total internal reflection?   [2]

c   State the principle of Calorimetry. Name the law on which this principle is   [2]

based .

d   When an astronaut goes above the atmosphere of the earth in a rocket,   [2]

he sees the sky black and the earth appears blue. Give reason.

e   Why is fuse always connected to the live wire?   [2]

SECTION II (40 Marks)

Attemt any four questions from this section

Question 5

a 1. State the principle of moments.

   2. A nut is opened by a wrench of length 20 cm. If the least force
      required is 2 N, find the moment of force needed to loosen the nut. [3]

b Classify the lever given below as class - I,class -II and class – III

   1. Raising the weight of the body on toes. [3]

   2. Crow bar.

   3. Spoon used to open the lid.

c The diagram given below shows the position of an object OA in relation
   to a converging lens L whose foci are at F_1 and F_2. [4]
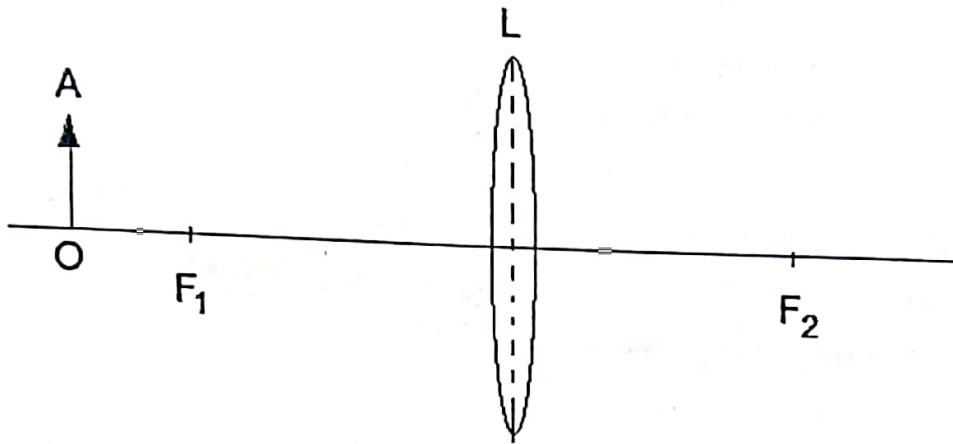
   1. Draw two rays to locate the position of image.

   2. State the position of image with reference to the lens.

Question 6

a A iron ball of mass 0.2 kg is added into 0.5 kg of water at 10°C. The [3]
   resulting temperature is 30°C. Calculate the temperature of hot ball.
   Specific heat capacity of iron = 336 J kg^{-1} K^{-1}
   Specific heat capacity of water = 4.2 x 10^3 J kg^{-1} K^{-1}

b Distinguish between radioactive decay and nuclear fission. [3]

c 1. Draw a neat labelled diagram of d.c. motor. [4]

   2. State the principle of d.c. motor.

Question 7

a 1. Define forced vibration and resonant vibration. [4]

   2. Explain briefly how resonance works in radio and TV receivers.

b What is kinetic energy? Derive an expression for the same. [4]

3

c Define the term uniform circular motion. Give direction of velocity at any instant in circular path. [2]

Question 8

a State Ohm's law. Give S.I. unit of resistance and conductance. [3]

b Mention three conditions necessary for an echo to be heard distinctly. [3]

c A pulley system has a velocity ratio 3 and an efficiency of 80%. Draw a labelled diagram of this pulley system. [4]

Calculate:

1. The mechanical advantage of the system.

2. The effort required to raise a load of 300 N.

Question 9

a State the energy changes in the following cases while in use: [3]

1. Microphone

2. Petrol engine of a running car

3. Electric toaster

b 1. What is e.m.f of a cell? [3]

2. Mention the factors which affects the e.m.f of a cell.

3. State the relation between e.m.f and terminal voltage of a cell.

c A lens forms the image of an object placed at a distance of 15 cm from it, at a distance of 60 cm in front of it. [4]

Find 1) Focal length 2) the magnification 3) the nature of image

Question 10

a Mention any three safety precautions to be taken while using electricity. [3]

b Draw a neat labelled ray diagram of deviation of light by prism. [3]

c 1. Name the principle on which a transformer works. [4]

2. Can a transformer work when it is connected to a d.c. source ?Give a reason.

3.Give any two uses of step down transformers.

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