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PREPARATORY EXAMINATION : 2021-22

SUBJECT: PHYSICS SCIENCE PAPER 1

Date: 17-02-2022 **Max marks – 40**

Grade – X **Time – 1½ hrs.**

INSTRUCTIONS:

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 answers. **Section A** is **all questions compulsory**. Attempt **any three** questions from **Section B**. The intended marks for questions or parts of questions are given in brackets [ ]

Section - A
Attempt *all* questions

Question 1 **[10]**

1) The radiation which travels with speed of light
   a) alpha(α)
   b) beta(β)
   c) gamma(γ)
   d) ultrasonic wave

2) When the thickness of base of a cooking pan increases,
   a) specific heat capacity of the cooking pan increases.
   b) specific heat capacity of the cooking pan decreases.
   c) thermal capacity of the cooking pan increases.
   d) thermal capacity of the cooking pan decreases.

3) In a beta emission, the daughter product is an_____ of a parent atom.
   a) isotope
   b) isobar
   c) isotone
   d) isomer

4) In which of the following cases e.m.f is not induced?
   a) A current is started in a wire held near a loop of wire.
   b) A magnet is moved away from a loop of wire.
   c) A magnet is moved through a loop of wire.
   d) A loop of wire is held near a magnet.

5) The nuclear radiation which gets deflected towards positively charged plate in an electric field is ____.
   a) alpha
   b) beta
   c) ultraviolet
   d) gamma

6) By increasing the surface area of vibrating body, its
   a) loudness decreases.
   b) loudness increases.
   c) pitch increases.
   d) pitch decreases.

7) Boiling point of a liquid decreases by
   a) addition of impurities to it.
   b) increase in pressure.
   c) boiling the liquid in a pressure cooker.
   d) boiling the liquid at high altitudes.

8) The law which relates the potential difference and current in a conductor is
   a) Lenz's law
   b) Ohm's law
   c) Faraday's law
   d) Fleming's law

9) Force acting on a current carrying wire placed in a magnetic field is independent of
   a) strength of the magnetic field.
   b) current flowing in the wire.
   c) mass of the wire.
   d) length of the wire within the magnetic field.

10) Alloy of tin and lead is used as the material of fuse wire because it has
   a) high melting point and high specific resistance.

b) low melting point and low specific resistance.
c) low melting point and high specific resistance.
d) high melting point and low specific resistance.

Section – B (30 Marks)
Attempt any three questions from this section

Question - 2

i) Two liquids P and Q have specific heat capacities in the ratio 1:9. They are supplied with same amount of heat. **(3)**

a) If their masses are same, then which liquid will show a greater rise in temperature?
b) Which liquid is useful as a heat reservoir to avoid the juice bottles from freezing?
c) Give reason for your answer in part b.

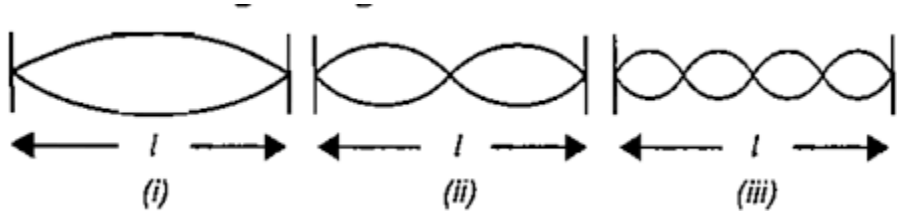
ii) a) A switch is not touched with wet hands while putting it on or off. Give reason **(3)**

b) What is the disadvantage of connecting a switch to a neutral wire?

iii) A heater of power 4000 W raises the temperature of 2 kg of liquid from 19 °C to 43 °C in 1 minute.
Find (a) heat capacity and
(b) specific heat capacity of liquid. **(4)**

Question 3

i) The diagram below shows three different modes of vibration of the same string of a given length. **(3)**



a) Which vibration will produce a feeble sound and why?
b) Which vibration will produce a low pitch sound?
c) Which vibration has the longest wavelength?

ii) a) What is Lenz's law? **(3)**

b) Explain how Lenz's law show the conservation of energy in the phenomenon of electromagnetic induction.

iii) A nucleus $^{24}X_{11}$ undergoes beta decay. **(4)**

a) What will be the number of protons of the daughter nucleus Y?

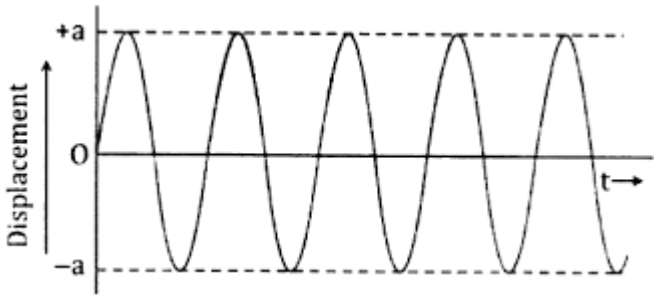
b) From which part of the atom do these radiations come?

c) Write a nuclear reaction showing the emission of this particle.

d) Daughter nucleus Y further emits gamma radiation. What happens to the mass number of daughter nucleus?

Question – 4

i) The diagram below shows the displacement – time graph of a vibrating body. **(3)**



a) Name the kind of vibrations.

b) Where can a body execute such vibrations?

c) Why a tuning fork vibrating in air cannot produce such vibrations?

ii) An electrical appliance is rated 4kW,250V. **(3)**

a) Find the current drawn by the appliance.

b) Can the appliance be used in a circuit which contains fuse of current rating 20A.

c) Give reason for your answer in part b.

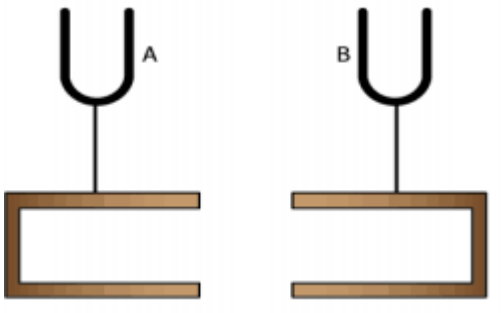
iii) a) Define radioactivity. **(4)**

b) Explain why radioactivity is a nuclear phenomenon.

c) Name two radiations emitted in radioactivity that are deflected by magnetic field.

Question - 5

i) The following figure shows two tuning forks A & B of the same frequency mounted on two separate sound boxes with their open ends facing each other. The tuning fork A is set into vibration. **(3)**



a) What type of vibrations is observed in tuning fork B?
b) Give reason for the answer in part a.
c) What type of vibrations takes place in tuning fork B when its length is increased?

ii) Diseases such as cancer, leukemia can be cured in few situations by radio therapy. **(3)**

a) Name a radioactive isotope used in radio therapy.
b) Name the form of radiation used in radio therapy?
c) Why is alpha radiation not used in radio therapy?

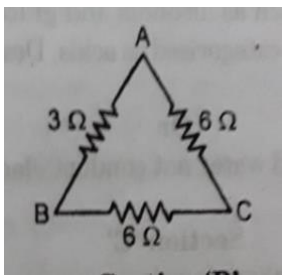
iii)a) A house uses 4 bulbs of 100 W each & 3 fans of 60 W each. If the bulbs and fans are used for an average of 8 hours each day, calculate the electrical energy consumed in 30 days in kilowatt-hour.

b) Express the energy obtained in joule

c) If the cost per unit is 5 rupees, find the total amount of electric bill to be paid per month (30 days). **(4)**

Question - 6

i) a)Calculate the equivalent resistance between the points A and B. **(3)**



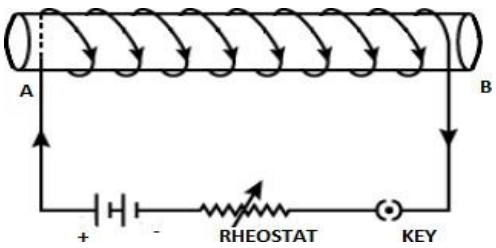
b) If a cell of emf 4.8 V with negligible internal resistance is connected across AB in the above figure, then find the current drawn from the cell.

ii) a) Define Calorimetry. **(3)**

b) Why material of low specific heat is used in a calorimeter?

c) Why inner and outer surfaces of vessel are polished in a calorimeter?

iii) The following figure shows a solenoid wound around a soft iron bar AB **(4)**



a) What are the magnetic poles at A and B?

b) How will the polarity at ends A and B change on reversing the direction of current?

c) Why soft iron is used as a core in the given figure?

d) State one way of increasing strength of the electromagnet so formed?

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