PAWAR PUBLIC SCHOOL, BHANDUP						
Class	**Subject**	**Exam**	**Marks**	**Date**	**Duration**	**No. of Printed Pages**
X	**Physics**	**Prelim 2**	**40**	**01.02.2022**	**1 ½ hours**	**5**

Answers to this Paper must be written on the paper provided separately.
*You will **not** be allowed to write during the first **10** 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.

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

SECTION A

*Attempt **all** questions from this Section*

Question 1

Choose the correct answers to the questions from the given options. (Do not copy the question, Write the correct answer only.) **[10]**

(i) Vibration which takes place under the influence of an external periodic force:
(a) Damped vibration
(b) Forced vibration
(c) Natural vibration
(d) Free vibration

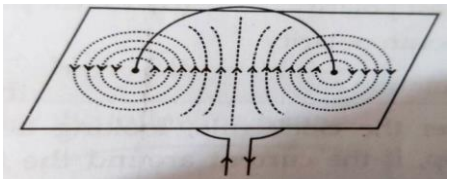
(ii) Identify the correct pair of isotones?
(a) $_{11}Na^{23}$ and $_{12}Mg^{23}$
(b) $_{6}C^{40}$ and $_{19}C^{39}$
(c) $_{20}Ar^{40}$ and $_{19}K^{39}$
(d) None of the above.

(iii) Which of the following is the correct descending order of ionizing power of the given radiations?
(a) $\alpha > \beta > \gamma$
(b) $\gamma > \beta > \alpha$
(c) $\beta > \alpha > \gamma$
(d) $\beta > \gamma > \alpha$

(iv) A metal with a mass of 1500 g has a heat capacity of 400 JK^{-1}. How much heat energy does it take to raise the temperature by 10℃?
(a) 6000 J
(b) 3000 J
(c) 5000 J
(d) 4000 J

(v) There is a copper sphere and iron sphere of the same volume. We need to provide different amounts of heat to bring their temperature to a specific level. Why?
(a) Their specific heats are different.
(b) Their respective densities are different.
(c) Their specific heats are the same.
(d) Both (a) and (b) are correct.

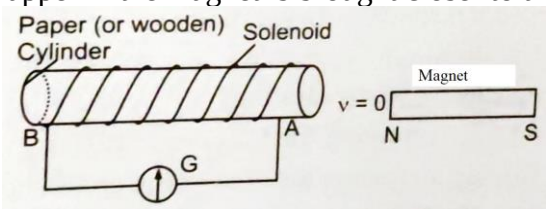
(vi) Consider the following figure and answer the following question:



The magnetic field lines at the loop's centre can be assumed to be _____.

(a) uniform.
(b) non uniform.
(c) clockwise.
(d) anticlockwise.

(vii) Which of the following will happen if the magnet is brought closer to the solenoid?



(a) The galvanometer will get deflected towards the right.
(b) The galvanometer will get deflected towards the left.
(c) The galvanometer fluctuates with equal frequency.
(d) The galvanometer will remain stationary.

(viii) Which one of the following statements is not correct?

(a) Fuse is connected in a live wire and it is made up of alloy of lead and tin.
(b) Potential of neutral and earth wire is always the same.
(c) Live wire has zero potential
(d) Ring system is used in house wiring.

(ix) Which of the following is not a characteristic of series combination of resistors?

(a) If one resistor is not functional, the circuit becomes open
(b) The voltage across each resistor always remains the same.
(c) The total resistance R is given by the formula $R = R_1 + R_2 + R_3$.
(d) The current through each resistor always remains the same.

(x) The piston of a truck makes 'to and fro' motion at a frequency controlled by the speed of the vehicle. Is it possible that some part of the engine vibrates vigorously due to resonance? If so, what's the reason behind it?

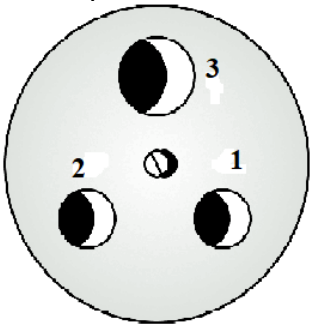
(a) It is not possible.
(b) It is possible only if the truck moves at maximum velocity.
(c) It is possible only if the truck moves with the same velocity of its engine parts.
(d) It is possible only if the truck's running velocity is such that the vibration frequency of some parts matches with the natural frequency of the piston.

SECTION B

*(Attempt **any three** questions from this Section.)*

Question 2

(i) The diagram shown below shows a three-pin socket marked as 1,2 and 3. **[3]**



(a) Identify and write live (L), neutral (N) and earth (E) against the correct number.
(b) To which part of the appliance is the terminal 3 connected?
(c) To which wire joined to 1 or 2, is the switch connected?

(ii) (a) Which characteristic of sound makes it possible to recognize a person by his voice without seeing him? **[3]**
(b) State the factor that determines the pitch of a note.
(c) State one factor that affects the loudness of a sound heard by a listener.

(iii) (a) Explain why alpha and beta particles are deflected in electric or a magnetic field, but gamma rays are not deflected in such a field. **[4]**
(b) Rewrite and complete the following nuclear change

$$^{218}Po_{84} \xrightarrow{\alpha} \text{---- Pb ----} \xrightarrow{\beta} \text{---- Bi ----}$$

Question 3

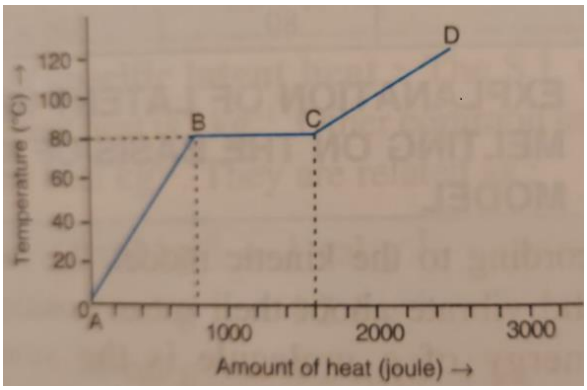
(i) (a) Draw a graph between displacement and time for a body executing natural vibrations. **[3]**
(b) Name one factor on which the natural frequency of a body depends.
(c) Why are strings of different thickness provided on a stringed instrument?

(ii) (a) Name the two laws that help to determine the direction of induced current in a conductor. **[3]**
(b) State the energy change that takes place in the phenomenon of electromagnetic induction.
(c) Name one electrical device which works on this principle.

(iii) (a) Calculate the number of alpha and beta particles emitted when an atom of $_{92}U^{238}$ decays to lead $_{82}Pb^{208}$ **[4]**
(b) What do you understand by radio isotopes?

Question 4

(i) A substance of mass 0.02 kg initially in solid state of 0℃ is heated. The graph showing the variation in temperature with the amount of the heat supplied is shown in the figure given below. **[3]**



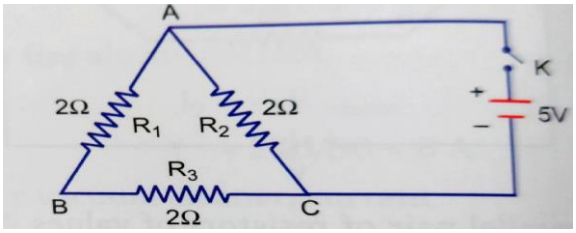
(a) Use graph to find the specific heat capacity of the solid substance and
(b) the specific latent heat of fusion of the substance in the liquid state.

(ii) (a) A fuse is always connected in the live wire of the circuit. Give reason **[3]**
(b) 'A fuse is rated 6A'. Can it be used with an electrical appliance of rating 5 k W, 200V. Justify your answer with mathematical working.

(iii) (a) A certain amount of heat Q will warm 1 g of material X by 3℃ and 1 g of material Y by 4℃. Which material has higher specific heat capacity? **[4]**
(b) Two metallic blocks P and Q having masses in ratio 2:1 are supplied with the same amount of heat. If their temperatures rise by same degree, compare their specific heat capacities and heat capacities.
(c) Why does stone lying in the Sun get heated up much more than water lying for the same duration of time?

Question 5

(i) In the given circuit diagram, the emf of the cell is 5V and its internal resistance is negligible. **[3]**



(a) Calculate the total resistance of the circuit.

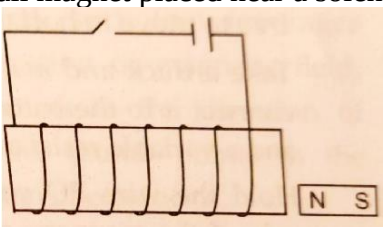
(b) Calculate the current flowing in the circuit.

(ii) (a) Which requires more heat: 10 g ice at 0℃ or 10 g water at 0℃ to raise its temperature to 20℃. **[3]**

(b) Explain your answer in part (a).

(c) Ice cream appears colder to the mouth than water at 0℃. Give reason

(iii) The diagram below shows a small magnet placed near a solenoid. **[4]**



(a) State whether the magnet is attracted or repelled, as the switch is pressed. Give a reason.

(b) State the rule, which will help you to find the answer of (a)

(c) Give one advantage of an electromagnet over a permanent magnet.