R. I. S. B.

BANGALORE

FIRST PRELIMINARY EXAMINATION 2019-20

STD: X **MARKS: 80**

SUB: PHYSICS **TIME: 2Hrs.**

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.*
- *The intended marks for the questions or parts of questions are given alongside the questions.*
- *Section I is Compulsory. Answer any four questions from Section II.*

SECTION – A [40 Marks]

Answer all questions

Q I. **[5×2=10]**

1. In block and tackle system of pulleys how can we increase the efficiency?
2. Classify the following into levers as class I, class II or class III:

   a. Spade used to turn the soil.

   b. Bar to lift the load.

3. Which radiations can be detected by thermopile and how these radiations can be affected by earth's atmosphere?
4. Give two ways of increasing the magnetic field of an electromagnet.
5. A cannon ball of mass 500g is fired with a speed of 15 m/s. Find

   a. its kinetic energy and

   b. its momentum.

Q II. **[5×2=10]**

1. When the distance between the electrodes is increased what happens to the e.m.f of a cell? Why?

2. Why centrifugal force is a fictitious force.

3. The energy of an electron is 4.0×10^{-19}J. Express it in eV.

4. A machine in which the displacement of load is more than displacement of effort. What will be its velocity ratio? Whether it acts like a force multiplier or not.

5. Name the radiations:

   a. That are used in vitamin D in food of plants.

   b. Whose wavelength range is from 800 nm to 10^6nm.

Q III. **[5×2=10]**

1. What are the factors on which the following characteristics of a musical note depend?

   a. Intensity

   b. Timbre

2. How does a trawler man catch fish in deep water?

3. A mass m_1 of a substance of specific heat capacity c_1 at temperature t_1 is mixed with a mass m_2 of other substance of specific heat capacity c_2 at a lower temperature t_2. Deduce the expression for t of the mixture.

4. Draw a circuit diagram to explain the ring system of house wiring.

5. State the function of split ring.

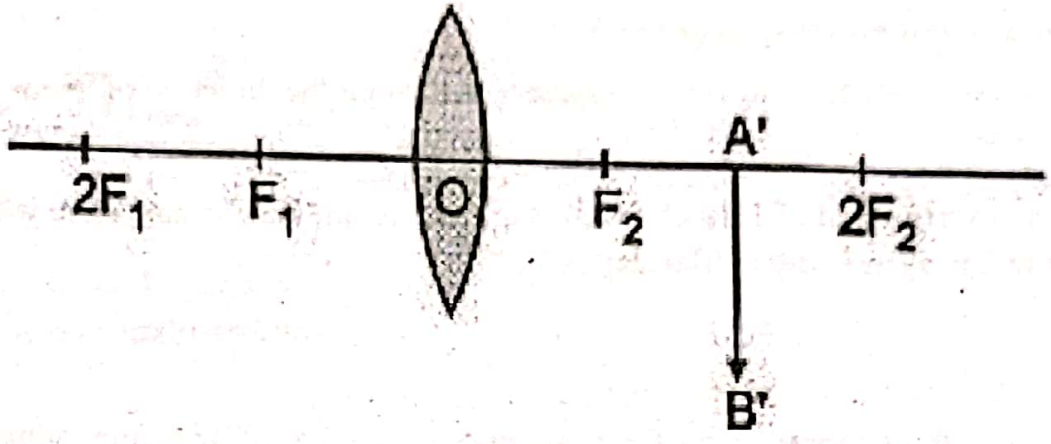
Q IV. **[5×2=10]**

1. State one industrial use of alpha and beta radiation.

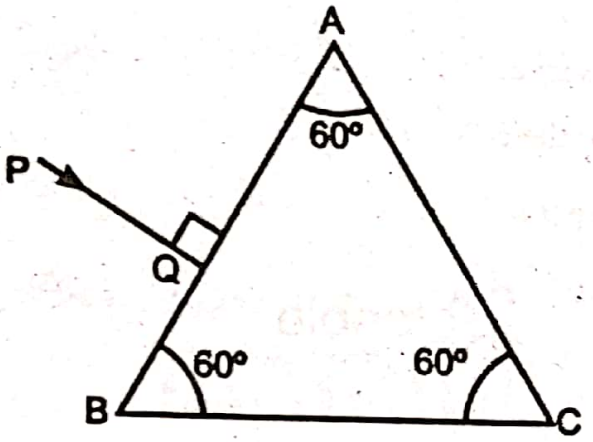
2. Draw a displacement- time graph for two waves A and B such that the amplitude of wave A is two times that of wave B.

3. A radioactive substance is powdered. What change would you expect to take place in the nature of its radioactivity? Give a suitable reason.

4. Complete the ray diagram by using two rays.



5. Copy the diagram given below and complete the path of light ray till it emerges out of the prism. The critical angle of the prism is 42°. In your diagram mark the angle wherever necessary.



SECTION – B [40 Marks]

Answer any 4 questions

Q V. A.

1. Rajan is surprised when he see water boiling at 115^0C in a container. Give reasons as to why water can boil at the above temperature. [2]

2. Write the relation between heat capacity and specific heat capacity. [1]

B.

1. Which coil of a step up transformer is made thicker and why? [2]

2. State Lenz's law. [1]

C. A block and tackle system has V.R =5 [4]

1. Draw a neat labeled diagram of a system indicating the direction of its load and effort.

2. Rohan exerts a pull of 150kgf. What is the maximum load he can raise with this pulley system if its efficiency is 75 %.

Q VI. ✓

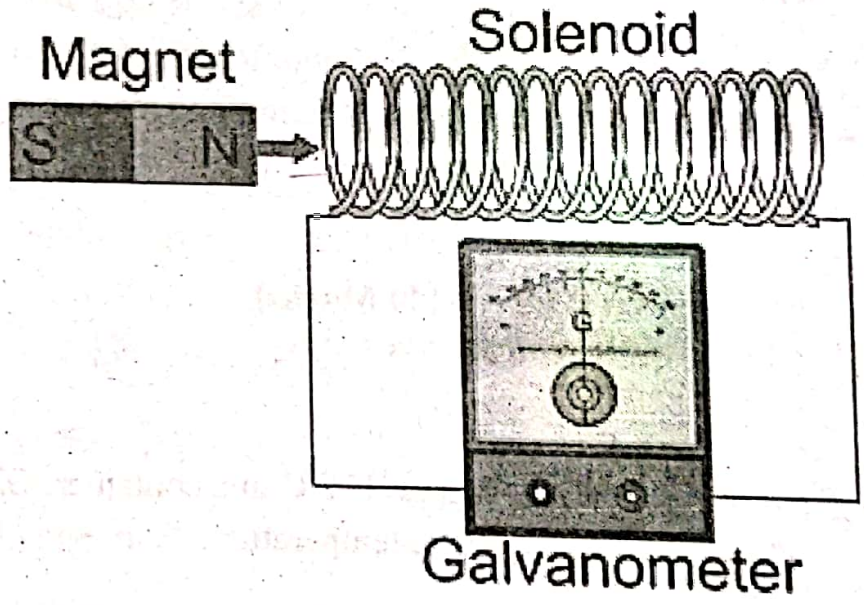
A. What length of copper wire of specific resistance $1.7 \times 10^{-8} \Omega$ m and radius 1mm is required so that its resistance is 1 Ω. [3]

B. Draw a graph between displacement and time for a body executing the damped vibrations. Give two examples of it. [3]

C. In the figure what will you observe [4]

1. When the magnet is dropped into the coil.

2. The no of turns of the coil is increased.



3. What will be the direction of current flowing through the coil when the magnet is dropped in? (Clockwise or anticlockwise).

4. State the law which explains this observation.

Q VII. A.

1. Which type of energy is possessed by A spinning top. [1]

2. A truck weighing 5×10^3 kgf and a cart weighing 500kgf are moving with the same speed. Compare their Kinetic energies. [2]

B. [3]

1. When we strike the keys of piano various strings set in to vibration each at its own natural frequency. Why?

2. When a body is executing the forced vibrations it will be acted upon by how many different forces.name those forces.

C. A cell supplies a current of 1.2 A through two resistors each of 2 Ω connected in parallel. When the resistors are connected in series, it supplies a current of 0.4 A. calculate: [4]

a. the internal resistance.

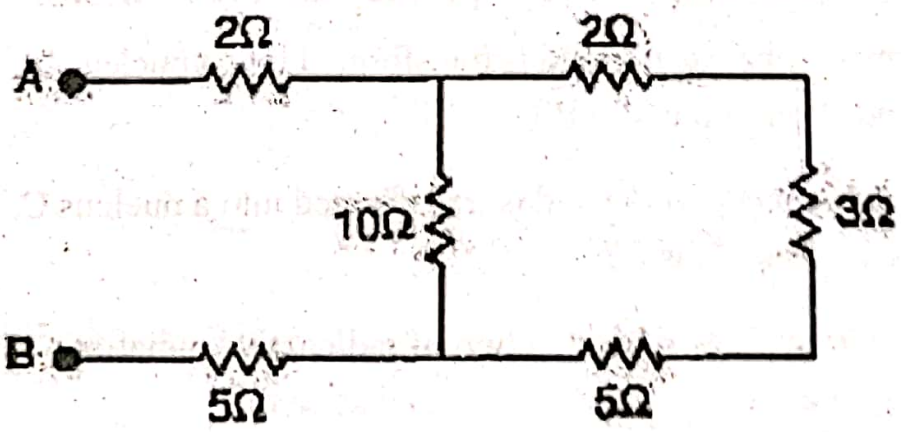
b. e.m.f of the cell.

Q VIII.

A. A liquid of mass 100g at 120°C is poured in water at 20°C, when the final temperature recorded is 40°C If the specific heat capacity of liquid is 0.8 $Jg^{-10}C^{-1}$, calculate the initial mass of water. [3]

B. [3]

1. Six resistances are connected together as shown in the figure. Calculate the equivalent resistance between the points A and B.



2. If we increase the area of a wire what happens to its specific resistance.

C. [4]

1. By drawing the graph show the wave form of violin.

2. When a troop crosses a suspension bridge, the soldiers are asked to break their steps. Why?

Q IX. A. An object is placed at a distance of 20cm in front of a concave lens of focal length 10 cm. Find: [3]

1. The position of image and

2. The size of image in relation to the object.

B. [3]

1. Name the device which is used to increase the voltage at the generating station.

2. At what frequency is A.C. supplied to residential houses.

3. Name the wire in a house hold electrical circuit to which the switch is connected.

C. Show the relation between Refractive index and critical angle and explain how critical angle is depending on the temperature. [4]

Q X. A. Derive an expression for combination of resistors in series. [3]

B. A man fires a gun and hears its echo after 5s. The man then moves 310 m towards the hill and fires his gun again. This time if he hears the echo after 3 s, calculate the speed of sound. [3]

C. An atomic nucleus A is composed of 84 protons and 128 neutrons.

1. The nucleus A emits alpha particle and is transformed into a nucleus B. What is the composition of nucleus B?

2. The nucleus B emits a beta particle and is transformed into a nucleus C. what is composition of nucleus C? [2]

3. By drawing the diagram show the deflection of radioactive radiations when it is placed in magnetic field and name those radiations. [2]

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