Write a digest on the contribution of Ancient Indian Knowledge towards pure science and applied science.

Ancient India was a land of sages and seers as well as a land of scholars and scientists. Research has shown that from making the best steel in the world to teaching the world to count, India was actively contributing to the field of science and technology centuries long before modern laboratories were set up. Many theories and techniques discovered by the ancient Indians have created and strengthened the fundamentals of modern science and technology.

Some of the contributions are :

1. The Idea of Zero
   Little needs to be written about the mathematical digit 'zero', one of the most important inventions of all time. Mathematician Aryabhata was the first person to create a symbol for zero and it was through his efforts that mathematical operations like addition and subtraction started using the digit, zero. The concept of zero and its integration into the place-value system also enabled one to write numbers, no matter how large, by using only ten symbols.

2. The Decimal System
   India gave the ingenious method of expressing all numbers by means of ten symbols – the decimal system. In this system, each symbol received a value of position as well as an absolute value. Due to the simplicity of the decimal notation, which facilitated calculation, this system made the uses of arithmetic in practical inventions much faster and easier.

3. Numeral Notations
   Indians, as early as 500 BCE, had devised a system of different symbols for every number from one to nine. This notation system was adopted by the Arabs who called it the *hind* numerals. Centuries later, this notation system was adopted by the western world who called them the Arabic numerals as it reached them through the Arab traders.

4. Chakravala method of Algorithms
   The chakravala method is a cyclic algorithm to solve indeterminate quadratic equations, including the Pell's equation. This method for obtaining integer solutions was developed by Brahmagupta, one of the well known mathematicians of the 7^{th} century CE. Another mathematician, Jayadeva later generalized this method for a wider range of equations, which was further refined by Bhāskara II in his Bijaganita treatise.

5. The Heliocentric Theory
   Mathematicians of ancient India often applied their mathematical knowledge to make accurate astronomical predictions. The most significant among them was Aryabhatta whose book, Aryabhatiya, represented the pinnacle of astronomical knowledge at the time. He correctly propounded that the Earth is round, rotates on its own axis and revolves around the Sun i.e the heliocentric theory. He also made predictions about

the solar and lunar eclipses, duration of the day as well as the distance between the Earth and the Moon.

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