Class 9th History

Lesson -3

Industrial Revolution

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1. Essay type questions

(a) What do you mean by Industrial Revolution ? What are the causes of this revolution ?

Ans : Meaning and definition :- The term ' Industrial Revolution' means 'a series of changes that brought about a transition from production by hand to production by machines, from small-scale production to large-scale production and from hand-made goods to machine-made goods'. Industrial Revolution was a series of fundamental changes in the methods and organisation of industrial production as a result of the application of science". Thus, we may define Industrial Revolution as, 'the name given to an economic revolution which began brought about fundamental changes in industrial production as well as in living, working, traveling, etc.as a result of the application of science'. Its main features were the following:

(i) Use of machines in production.

(ii) Production became scientific, organised and faster.

(iii) It was peaceful, gradual and evolutionary.

(iv) Development of factory system.

(v) Mass-scale production and division of labour.
The chief causes for the origin of industrial revolution are the following:

(i) Vast colonial empire :- By the latter half of the 18th cent. most of the European nations, particularly England had a chain of colonies all over the globe. These colonies provided three basics inputs for the industrial development of Europe, namely

(a) an abundant supply of raw-materials

(b) vast overseas market and

(c) excellent source of wealth

(ii) Application of science to industry :- During the 17th and 18th century, there has been a tremendous increase in the scientific knowledge. Men of intelligence and foresight soon began to apply newly acquired scientific knowledge to the industry with a view to produce more and earn more profit. Consequently the period witnessed a series of inventions in the realm of production of machine, power and transport and communication and these inventions totally revolutionised these fields.

(iii) Political stability :- The coming of Industrial Revolution was greatly facilitated by the establishment of considerable degree of political freedom, the break-up

of feudal system of land tenure and medieval guild system. During this period, Europe was fortunate to have stable government with efficient and far-sighted rulers who encouraged industrial development.

(iv) Availability of capital :- By the middle of 18th century, most countries of Europe particularly Great Britain had surplus wealth which needed adequate avenues for investment. Industrial expansion was the inevitable consequences of this accumulation of capital.

(v) Ample supply of Labour :- By the middle of the 18th century, most European countries had a huge stock of unemployed persons. This was the consequence of the break-up of the feudal agricultural set-up which freed hundreds from serfdoms, the mechanisation and improvements in agriculture which required less number of farmhands and the increased growth of population.

(vi) Need for better weapons :- The 17th and 18th century were full of European and colonial wars and rivalries. Cannons and muskets were no longer sufficient in the battlefields. England which had to withstand the attacks of Napoleon converted a great deal of her capital in bringing out huge stocks of weapons. Production of better weapons required better iron, power- engine and more machines. This was an added impetus for the birth of industrial revolution.

(vii) Availability of raw-materials :- Most of the European countries had an abundant supply of industrial development. England was more fortunate than her

counterparts in Europe in possessing these two natural resources in abundant supply. Besides, the deficiencies in the supply of these resources could be met by importing the same from their overseas colonies.

(b) Why did Industrial Revolution first start in Britain, but not in other countries ?

Ans : Industrial Revolution originated first in England and later spread to other European countries. There's were certain favorable social political and economic condition which encourage new discoveries and inventions which in turn, led to Industrial Revolution in England, The main causes for the Industrial Revolution to originate in England first are discussed as follows:

(i) Expertise in navigation: England was a small Island,so it was impossible for the people to get their necessities fulfilled except commercial transactions. Despite the flew, the people of England had an expertise knowledge in navigation. So the commercially expert English people laid more emphasis an the external world than the European which caused Industrial Revolution in England first.

(ii) Availability of mineral resources :- Great Britain was blessed with an abundant supply of coal and iron. There was no scarcity of this minerals in England. Besides, any shortfall in these resources could be met by importing the same from her colonies in America and India.

(iii) Investment of profits :- England possessed a highly successful network of banking, stock exchange and investment companies. It had abundant capital obtained from different sources, such as piracy , plunder, slave trading, commerce, etc. This vast capital yielded good amount of profits. The profits earned were thus invested to other sectors.

(iv) Development of production :- Due to the application of modern method in agriculture, the small farmers had to join as industrial labour unwillingly. This led to the formation of a labour class in the society and the necessity of installation of large-scale industries was realised. On the other hand, the problem of unemployment of the workforce arised. The combination of both work-force and large-scale industries resulted in a developed system of production.

(v) Improved transportation :- There was a poor transportation system in England. Despite of this, it marched ahead, since the English were expert in navigation. Thus, the English with the combination of innovative ideas and capital, manpower, raw materials and suitable market took a leading role in the Industrial Revolution.

(vi) Vast colonial empire :- England succeeded in establishing commercial link and vast colonies with many nations. Thus, the availability of raw materials in those nations and the existence of suitable market to sell those products of England helped in flourishing its industries.

(c) How was the agricultural sector affected by Industrial Revolution ?

Ans : Agriculture and industry are closely allied fields of human activity. Development in one affects the other. Therefore the spread of industrial revolution brought certain changes in the agricultural sector too. The industrial sector affected agricultural in the following manner:

(i) Increased cotton production :- The cotton textile industry was the first industry to be affected by Industrial Revolution. The quick development in spinning and weaving as a result of the various discoveries such as, the 'Flying shuttle' of John Kay, 'Spinning Jenny' of James Hargreaves, 'Water Frame' of Richard Arkwright, 'Spinning Mule' of Samuel Crompton, and the 'Powerloom' of Edmand Cartwright and the 'Cotton Gin' of Eli Whitney totally revolutionised this industry and made cotton textile production faster, cheaper and large-scale.

All these inventions led to high demand for cotton leading increased agricultural production of cotton. This definitely brought a lot of development in this sector and gave jobs to thousands of people which in turn increased people's standard of living.

(ii) Migration of agricultural labourers :- As industrial revolution spread, many factories emerged in different parts of the country. This led to emergence of new

industrial towns in every nook and corner of England. The emergence of new industrial towns led to the migration of village labourers to these cities. As a result, there was less farm-hand to work in the agricultural fields. This caused about low production and more and more lands were turned into pasture lands as it required less number of people to look after the animals such as sheep, cows, buffaloes, etc.

(iii) Brought certain technological changes :- Not only certain iron implements and better ploughing machines were produced as a result of the industrial revolution but also many other technological improvements took place in the agricultural sector. In 1840, a German scientists named Gusts Von Liebig discovered that the appropriate use of the chemical fertilizers such as potash, nitrogen, phosphorus etc.

could bring about better yield and improved production . Eli Whitney's invention named 'Cotton Gin' could separate seeds from cotton in a faster manner. Cyrus Mecornick invented the 'Mechanical Reaper'. Within a short time, machines for threshing and planting seedlings were invented. The use of water pumps run by steam power, petrol and electricity boosted agricultural production considerably. The proper use of these pumps made irrigation possible and vast tracts of dry land could be turned into agricultural lands.

(d) How did the Industrial Revolution contribute to the transportation sector ?

Ans : The Industrial revolution witnessed a number off great invention which revolutionized the various means of transport such as rail transport, water transport, road transport and air transport. These developments took place in the transportation sector because of the availability of hard iron, steel power, technical know-how,etc. which got developed during the Industrial Revolution.

Before the 18th century, the condition of roads in England was very bad. Metcalf, Telford and John Macadam introduced new methods of constructing roads. John Macadam, a Scottish engineer invented an entirely a new process of road making known as 'Macadamising process' and as a result of this invention a great deal of roads in England and in other parts of the world became motorable. The improvements of roads made it possible for faster stage coach service between towns and cities. During this period, several new canals were also constructed. The most notable was the Bridgewater canal built by Brindley.

However, the greatest invention in the field of transport was the invention of railway engine by George Stephenson.His first train named 'Rocket' covered a distance of 48km at the speed of 23 km per hour in engine were solved and it became eventually the most commonly used means of travel in England and in her colonies. The British introduced railways in her colonies. The British introduced railways in her colonies with a view to facilitate the transportation of raw-materials as well as the factory-made products of England. The idea

of rail transport soon caught the attention of the new world where rich industrialists began to invest in the construction of railway line. As a result, between 1830 and 1870 rail roads were constructed from East to west of United States of America connecting many towns and cities in the heartland of America. Similarly, Moscow and Vladivostok were connected with the construction of 6400 km Trans-Siberian railway in Russia. In Africa, the south African capital city of Johannesburg was connected with Cairo, the of Egypt in the north.

Eventually the railways became one of the easiest and cheapest means of travel.A revolution also took place in the field of water navigation. The first commercially successful type of steam boat was produced by an American named Robert Foulton. His steam boat 'Clermont' successfully sailed in the Hudson river over 240 km distance at a speed of 10 km per hour.

The first inter-ocean ship to be built was 'Serious' which crossed the Atlantic in 18 days. Soon after this, the construction of ships and steam boats continued on a high scale and water transport became a popular means of travel among the common people of America and Europe.

In the first half of the 20th century, a lot of development also took place in the motor-car manufacturing industry of America. The lead was given by an entrepreneur named Henry Ford who manufactured low-cost car which became very popular in America and Europe. Along with the development of car there also came

about the development of car there also came about the development of better tubes and types for the vehicles. Charles Good year invented the vulcanization of rubber by mixing it with sulphur . This enabled the cars to have better speed. The development of air transport took some time develop. The credit for introducing it to the world goes to the Wilbar and Orville Wright of America. Ever since their first successful flight in 1903, the air travel by way of airplanes also became a popular means of transport.

(e) Describe in detail about the evolution of textile cloth industry.

Ans : The first industry to be affected by the Industrial Revolution was the cotton textile industry. This was primarily due to the various inventions in this sector which completely revolutionized the cotton textile production. In 1733 John Kay invented the 'Flying Shuttle' which doubled the speed of weaving. In 1764, James Hargraves invented another mechanical device called the 'Spinning Jenny' which enabled a spinner to work even hundred spindles at a time.

The whole process was further improved by Richard Arkwright who developed the 'Water Frame' operated by water-power. In 1779, Samuel Crompton invented a machine named 'Spinning Mule' which combined the features of both the Spinning Jenny and Water Frame. A few years later, Rev. Edmand Cartwright invented the 'Powerloom' or the automatic loom a weaving machine worked by water power instead of hand. This invention

totally revolutionized the textile production. The 'Cotton Gin' of Eli Whitney further improved the cotton textile production. The overall result of these various inventions was that the production of cotton textiles became cheap and affordable which in turn led to higher demand for cotton items within the country and outside. When the demand becomes high the production level goes up considerably which further boosts trade and commerce in the country. Thus the industrial Revolution profoundly affected the scale of production as well as the quality of the cotton textile produced.

Several factors were responsible for the beginning of Industrial revolution in the cotton textile industry in England. During the letter half of the 18th cent. The production of cotton had become one of the foremost industries in England. The climate of England, was ideal for the cultivation of cotton and so the production of cotton in the country. Secondly, the British overseas colonies like India and America had an abundant supply of cheap raw-cotton. In fact, the cultivation of cotton had became a major agricultural activity in South America as it yielded better production.

But these countries, however, did not have factories to make use of the raw-cotton. Therefore , the bulk of the raw-cotton produced in these countries was imported to England. Thus this industry received greater attention than others and therefore a lot of new inventions occurred in this sector leading to improved production of cotton fabrics. During the early part of the 19th cent. a lot of developments also took place in the field of dyeing

and printing of cloth, bringing about in the process, high demand for cotton textiles. All these changes and developments happened as a result of the Industrial Revolution and the accompanying agricultural revolution.

(f) Describe the development of mine industry.

Ans : Industrial Revolution first started in the field of cotton textile industry. Parallel to the development in the textile sector , several other inventions brought far reaching changes in the field of mining particularly in the production of Iron and coal. Without the development of this sector, the revolutionary changes that occurred in other sectors off the industry during the 18th and 19th centuries would not have been possible. That is why the development in this sector profoundly affected other industries.

England was fortunate to have large deposits of iron. But unfortunately, the process of extracting pure iron ore was primitive. Initially, wood was used for the smelting process. Later, coil replaced it. Still later coke replaced coal.

The replacement of coal by coke was an important is step in the production of iron as coke could effectively and easily smelt iron. Darby invented the 'Blast Furnace' which used leather bellows. Henry Cort introduced a new technique called the 'Pudding Process' for the purification of pig iron. It enabled the production of tougher grade known as the wrought iron in large

quantities. In 1856, Henry Bessemer invented the 'Bessmer' process of making steel direct from cast iron. 'The invention of 'Safety Lamp' by Humphrey Debt made the working in coal mines safer. All these inventions and techniques led to the establishment of huge iron and steel factories in England manufacturing a variety of iron and steel products. The development of other sectors such as transport, communication, ship-building automobile industry, etc.

(g) Discuss the results of the industrial Revolution.

Ans : Industrial Revolution is considered to be one of the most significant events ofWorld history as it profoundly affected and influenced man's life, occupation, politics, commerce, trade, warfare, social living, etc. The industrial Revolution that began in England towards the beginning of the 18th century totally Android the face of the world and world never remained the same ever since it origin. Its main results are the following:

(i) Expansion of industries :- The immediate result of the industrial revolution was the expansion of the industries. The use of machines and the power-driven machines, the employment of large number of people necessitated the establishment of huge factories and workshops. The industries of cotton textile production, iron and steel, machine making, locomotives, ship-building, defence, communication,etc. made great progress.

(ii) Expansion of trade and commerce :- Large-scale production resulted in the improvements in trade and

commerce as bulk of the manufactured goods could not be absorbed by the home-markets and had to be exported to the vast colonial markets. This boosted international trade and commerce.

(iii) Increase of national wealth :- The inevitable result of the rapid expansion of trade and commerce was the accumulation of profits and wealth . Colonial trade brought rich profits. The National wealth of England and other European countries increased more than hundred fold.

(iv) Development of co-operative system :- One of the the positive results of Industrial revolution was the development of cooperative system by which many workers formed themselves into cooperative societies helping each other and running business and enterprise on a combined effort. The success of cooperative movement started by Robert Owen continued to be an inspiration for them.

(v) Development of transportation sector :- The fast moving train, motor car, ships , etc.replaced the slow moving vehicles. This helped in reduction of wastage of time and the cost of transportation.

(vi) Growth of cities :- Industrial Revolution caused the rise of several new industrial towns and cities.The uncontrolled growth of cities led to the depopulation of the villages and decline of agriculture.

(vii) Ruthless exploitation and misery :- Industrial Revolution improved the condition of the general populace. But the condition of the workers worsened . They had to live in small tenements where there no facilities for lighting, heating, sanitation and hygiene. They had to slog for hours in the factory. The pay was poor and the working conditions were miserable.

(viii) Rise of the working class as a political power :- The new proletariat created by the Industrial revolution generally realised their might and soon began to organise themselves into trade unions which demanded more political power. The 'Chartist' movement was the inevitable result of this movement. As result of this movement the workers got the voting right in 1867.

(ix) Reform of parliament :- The most important political result of the industrial revolution was the reform of British parliament. The growth of new towns, increase of population, the rise of capitalists and working class people necessitated the change in the old system of parliamentary representation. Hence three reform acts were passed by the British Parliament in this connection.

(x) Advancement of medical sciences :- Industrial Revolution brought a lot of advancement in the medical field. The discovery of X-ray, Radium, vaccines for different diseases, anesthesia, better surgical implements, etc.brought longer life and better health.

(h) How did the Industrial Revolution Revolution influence the political field ?

Ans : Industrial Revolution brought forth far-reaching consequences in every aspect of human life and activity. It affected of human life and activity.It affected not only the economic front but also the social and political fields as well. Some of the majors changes that industrial Revolution brought in the political sector are the following:

(i) Political power monopolized :- one of the major political consequences of Industrial Revolution was that the industrial capitalist soon monopolized political power. Using the money power, they captured seats off political power and control the government their advantage. The government under their pressure was forced to same loaded with beneficial to them. Most DoD been by lemons game to control by rich and the big capital it is who had become rich of an idea to the repaired expansion of red and Commerce road about by the industrial Revolution.

(ii) Rise of Labour is a political power :- The new proletariat or workers created by the industrial Revolution gradually realized their might and soon begin to organize themselves into my trade unions. The british workers got the permission for the formation of trade Unions in 1825 and the first national trade union was formed in 1834. The 'Chartist' movement which rose up towards the end of the 18 cent. was working class moment taxing for removal of social, political an

economic grievances of the workers. As a result of this movement, the workers got the voting rights in 1867. Eventually, the trade with Union became very powerful and they began to influence the policies of the government.

(iii) Reform of Parliament :- The most important political result of the Industrial Revolution however, the reform of British Parliament. The growth of new towns, that increase up population, The rise of Capitalist and working class people necessitated a change in the of parliamentary representation. Hence, three reform acts were enacted by the British Solomon which provided some political lights to the workers. The 'Chartist' movement which spearheaded the movement for parliamentary reform was responsible for the enactment of these reform acts.

(iv) Formation of communist government :- The suffering and the miserable status of the working class people led Karl Marx to write his famous book 'Das Capital' in which he highlighted the plight of the workers and the need to overthrow the capitalist and form a government of the workers so as to stop all exploitation of the workers. This led to the formation of the first communist government in Russia in 1917 under the leadership of Bolshevik party headed by Lenin. The success of communism governments in Eastern Europe and China bringing about tremendous political consequences in the world.

(i) Write about the evolution of co-operative system and its usefulness.

Ans : One of the developments that came up with the expansion of Industrial Revolution was the growth of cooperative system. The Industrial Revolution brought forth several labour problems. The labourers soon began to form trade unions and tried to acquire political power through the chartist movement. The next step in this sector was the development of the concept of cooperative system.

The cooperative system first started in England. A group of weavers started a collective venture by putting together the individual share of work. Later, they shared the profit of obtained from this common venture. Within short time, a number of cooperative societies came up in different parts of England. The cooperative society purchased goods from the manufacturers at a whole sale rate and later sold them to the members of the group at retail rate earning profit For the Society.

The profit gained from the the venture was later shared among members of the Society. In this respect, the contribution of Robert Owen cannot be forgotten. Although, he was an industrialists yet he established an ideal cooperative society in a place called Lanark for the welfare of the workers. He made the workers as part of the management and the profit earned in the production was shared between the workers and the management. His work proved to be a great success. Similar societies were setup in America under Robert Owen's guidance.

The cooperative first started among the textile workers and literally spread to add industrial workers. The success of the British cooperative movement was soon copied by other European countries. Within is short time, the idea to court on the cooperative men became quite strong in a other European countries. It achieved a high level of success in the Scandinavian countries. The cooperative System has the following usefulness:

(i) It will stop the exploitation of workers.

(ii) It improve the economic status of the workers.

(iii) It will lead to the overall Development of the worker.

(iv) It will boost production as the workers will contribute the very best.

(v) It will reduce the gap between the workers and the owners.

(vi) It will give a sense of dignity and the freedom to the workers.

(vii) It will help workers to acquire political power.

(viii) It will help to bring to light the various problems of workers.

(ix) It will help the rise and growth of trade unions.

(j) What are the contributions of Industrial Revolution in the field of education and medical science ?

Ans : One of the inevitable results of the spread of Industrial Revolution was the rise of certain technological developments in the field of education and medical science. In the beginning of the 19th century, several discoveries and inventions occurred in the field of medical field which revolutionised this field.

Anesthetics were discovered as a result of the study of chemistry and physics. Dr.Crawford,W Long in 1842 and Dr T.G Morton, a dentist of Boston successfully applied anesthesia in surgery in 1846. Joseph Lister and Louis Pasteur discovered pasteurization. Edward Gunner invented the vaccine for small pox. Meanwhile, German scientist named Robert Koche discovered the cause of cholera and this helped the discovery of proper medicine against a bacteria of cholera.

Another major Discovery that boost the medical field was the invention X-ray by Wilhelm Roentgen.It enabled better diagnosis and improved study of the internal system and bones. It boosted surgical operations a d treatment of various types of internal diseases and fractures. In 1898, Madam Curie helped by her husband, Pierre Curie discovered Radium. This discovery helped the cure of many diseases including that of cancer.

Industrial revolution also contributed to the development of music, arts, literature, games and sports, religion and

philosophy. One of the direct effects of industrial revolution was the development of materialistic philosophy. Communism owes its origin to the rapid expansion of the trade, commerce and industries Revolution. Karl Marx and Frederick Angels spoke about the exploitation of workers by capitalists and therefore wanted the workers to organize themselves into a powerful political force. Through their books 'Communist Manifesto' and 'Das Capitals', they highlighted the concept of communism and socialism.

Communism encouraged atheism and materialism and spoke of seeking happiness itself. They considered religion as opium of the people',A German philosopher F.E. Nietzsche, spoke of the 'death of God'.These developments also caused a wide study of social behaviour of man. The development of psychology is one of the results of this study. The main subject matter of this study is to explain the behaviour of human being. It tried to find out the reasons for the good and bad actions of people. Thus, we can say that the industrial revolution brought a revolution in the field of education and different branches of study.

2.SHORT ANSWER TYPE QUESTIONS :

(a) During the initial stage of industrial revolution what machines were invented for spinning and who had contributed in these inventions ?

Ans : The cotton textile industry was the first industry to be affected by the industrial Revolution. Several

inventions and discoveries during the initial stage of Industrial Revolution completely altered the very nature of this industry. The Flying shuttle' of John Kay (1733), 'Spinning Jenny' of James Hargreaves (1764),'Water Frame' of Richard Ark Wright (1768), 'Spinning Mule' of Samuel Crompton (1779),etc. were the main inventions which revolutionised this industry and made spinning of cotton faster, cheaper and large-scale.

(b) What were the contributions to the weaving sector ? Who were the contributors ?

Ans : Industrial Revolution was first witnessed in the textile sector. The early inventions such as Flying Shuttle, Spinning Jenny, Water Frame and Mule had helped the spinning of thread faster and in a more efficient manner. During the later period, a lot of innovations were made in the field of weaving. Edmand Cartwright created a revolution in weaving by introducing power looms in 1785. The invention of an engine called 'Gin' by Eli Whitney of America in 1793 also brought a lot of changes in the textile industry.

(c) What was the contribution of James Watt to the Industrial Revolution ?

Ans : James Watt's invention of Steam Engine using steam power is considered to be a revolutionary invention as it completely the entire process of industrial production, making it faster, better, safer and large scale. Formerly, the motive power for moving mechanical device consisted of human, animal and

water power. But these sources of power could not be easily used nor did it produce sufficient amount of power. Hence, the discovery of steam power was indeed revolutionary step.

(d) Discuss briefly that contribution of Industrial Revolution in the construction of Roads and canals.

Ans : That industrial Revolution witnessed in number of great inventions which revolutionised the means of transport. John Macadam, a Scottish engineer invented an entirety a new process of road making known as 'Macadamising process' and as a result of this invention, a great deal of roads in England and in other parts of the world became motorable. The improvements of roads made it possible for faster stage coach service. During this period, several new canals were also constructed. The most notable was the Bridgewater canal built by Brindley.

(e) What is cooperative system ?

Ans : The system by which industrial or agricultural enterprises are collectively owned by the workers themselves and the profits gained are shared by the members came to be known as the cooperative system. The first movement started in England among the weavers and later it spread to Europe and America. Robert Owen contributed a great deal towards the development of this movement both in England and in America.

(f) What is the need of trade unions ?

Ans : As the wealth of the capitalists increased as a result of the Industrial Revolution they began to exploit the workers. Therefore, in order to bargain for the rights of the workers , they organized themselves into trade unions.The main purposes the trade unions are the following:

(i)To demand workers 'rights such as just pay, shorter hours of work, proper conditions etc. from capitalists and industrialists.

(ii) To bring about over-all improvements in their working and living conditions.

(iii) To influence the decisions in their favour.

(g) How did the Industrial Revolution bring about changes in various Industrial fields ?

Ans : The term Industrial Revolution is a name given to the economic revolution which began in England in the latter half of the 18th century which brought about certain fundamental changes in the industrial field. It Influenced production, leaving, working, traveling, communication,etc. of man through its various discoveries and inventions. It made work easier, safer, faster and more efficient.

(h) Who were the inventors of X-ray ? For what purpose this is used ?

Ans : X-ray machine was invented by a German scientists named Wilhelm Roentgen. With the help of this machine the doctors can get pictures of the internal systems of the body. This has helped better diagnosis as well as helped various operations of internal parts of the body.

(i) What are the usefulness of Jethro-tool ?

Ans : A British man named Jethro Tull developed an agricultural machined 'Drill'. It was a machine to rows with proper gaps or canals in between. The planting of seeds in this manner helped the improvement in the production of agricultural crops.

(j) What are the techniques of construction of modern roads? Who had invented those methods ?

Ans : Before the 18th century, the condition of roads in England was bad. Metcalf, Telford and John Macadam introduced new methods of constructing roads. John Macadam, a Scottish engine invented an entirely new process of road making known as 'Macadamizing process' and as a result of this invention, a great ideal of roads in England and in other parts of the world became motorable.

(k) What was the contribution of Townshend ?

Ans : Lord Townshend introduced the concept of the rotation of crops which would keep the land engaged all the time without destroying its fertility. Through and

experiment he also proved that multiple cropping i.e., cultivating several items at the same time on the same plot also add to the fertility to the soil rather than diminishing its fertility. This enabled Farmers to grow feeder grasses for the Milch animals along with the usual crops. Availability of feeder grass for animals boosted animal farming greatly avoiding the killing of animals in Winter due to scarcity of food for them.

3. VERY SHORT ANSWER QUESTIONS

(a) What was the first invention in the agricultural sector ?

Ans : The first invention in the agricultural sector was Jethrol Tull's Drill.

(b) Who was the discoverer of radium ?

Ans : The discoveries of radium were Pierre Curie and Madam Curie.

(c) Who invented the 'Safety Lamp' ?

Ans : Humphrey Davy invented 'Safety Lamp'.

(d) Who was the person to suggest the term 'Industrial Revolution' ?

Ans : The person who suggested the term 'Industrial Revolution' was Arnold Toynbee.

(e) Who was the writer of 'Das Capital' ?

Ans : Karl Marx is the writer of 'Das Capital'.

(f) Who was Richard Ark Wright ?

Ans : Richard Ark Wright was the man who invented 'Water Frame' in 1768 which helped the spinning of cotton threads faster.

(g) What was discovered by Charles Good Year ?

Ans : Charles Good Year discovered the vulcanization process of rubber .

(h) Who invented 'Spinning Jenny' ?

Ans : James Hargraves invented 'Spinning Jenny'.

(i) Who invented 'Water Frame' ?

Ans : Richard Arkwright invented 'Water Frame'.