NOTE OF UNIT: I

HISTORY OF AGRICULTURE

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Content

INSTRUCTION FOR THE ASSIGNMENT TO BE SUBMITTED FOR THIS UNIT

1. **Followings are the questions for assignment to be answered and submitted to the course teacher in the handwritten form compulsorily on or before 15th April, 2012.**
   Q.1. Write in brief history of agriculture.
   Q.2. Write History of agriculture in India.
   Q.3. Based on your knowledge write your views on the status and significance of agriculture in India.
2. **At the end of this unit, objective types of questions with correct answers in multiple choice forms have been given for the semester end examination.**

HISTORY OF AGRICULTURE

Time line of development of Agriculture

1. 9500 BCE (Earliest evidence for domesticated wheat)
2. 8000 BCE (Evidence for cattle herding)
3. 7000 BCE (Cultivation of barley; animals are domesticated)
4. 6500 BCE (Cattle domestication in Turkey)
5. 6000 BCE (Indus Valley grows from wheat to cotton and sugar)
6. 5500 BCE (Sumerians start organized agriculture)
7. 5400 BCE (Archaelogical proof for domestication of chicken)
8. 5400 BCE (Linearbandkeramik Culture in Europe)
9. 5000 BCE (Africa grows rice, sorghum)
10. 4000 BCE (Ploughs make an appearance in Mesopotamia)
11. 3000 BCE (Maize is domesticated in Americas)
12. 3000 BCE (Turmeric is harvested at Indus Valley).
13. 2737 BCE Tea is discovered
14. 2000 BCE 1st windmill in Babylon
15. 1000 BCE sugar processing in India
16. 500 BCE Row cultivation in China
17. Year 200 (Multi-tube seed drill invented in China)
18. Year 700 (Arab Agriculture Revolution)
19. Year 1000 (Coffee originates in Arabia)
20. Year 1492 (Columbian exchange changes agriculture)

21. Year 1599 1st Practical Green House is created
22. Year 1700 (British Agricultural Revolution)
23. Year 1700 (Charles Townshend popularizes)
24. 14/3/1794 (Cotton gin is invented)
25. Year 1800 (Chemical fertilizer began to be used)
26. Year 1837 (John Deere invents steel plough)
27. Year 1860 (Hay cultivation changes)
28. Year 1866 (Gregor Mendel describes Mendelian inheritance)
29. Year 1879 (Milking machine replaces hand milking)
30. Year 1892 (First practical gasoline-powered tractor)
31. Year 1900 (Birth of industrial agriculture)
32. Year 1930 (First aerial photos for agriculture)
33. Year 1930 (First plant patent is given)
34. Year 1939 (DDT becomes a rage)
35. Year 1944 (Green Revolution begins in Mexico)
36. Year 1972 (Organic movement starts taking roots)
37. 1996 (Commercial cultivation of genetically modified plants)

Common Era, abbreviated as **CE**, is a designation for the world's most commonly used year-numbering system. The numbering of years using Common Era notation is identical to the numbering used with "Before Christ / Anno Domini" (BC/AD) notation. Common Era is also known as and **Current Era**, with all three expressions abbreviated as **CE**. (Christian Era is, however, also abbreviated AD, for *Anno Domini*.) Dates before the year 1 CE are indicated by the usage of **BCE**, short for "**Before the Common Era**", "**Before the Christian Era**", or "**Before the Current Era**". Both the BCE/CE and BC/AD notations are based on a sixth-century estimate for the year in which Jesus was conceived or born, with the *common era* designation originating among Christians in Europe at least as early as 1615 (at first in Latin).

TIME LINE

Agriculture was developed at least 10,000 years ago, and it has undergone significant developments since the time of the earliest cultivation.

Independent development of agriculture occurred in northern and southern China, Africa's Sahel, New Guinea and several regions of the Americas.

Agricultural practices such as irrigation, crop rotation, fertilizers, and pesticides were developed long ago but have made great strides in the past century.

The Haber-Bosch method for synthesizing ammonium nitrate represented a major breakthrough and allowed crop yields to overcome previous constraints.

In the past century agriculture has been characterized by enhanced productivity, the substitution of labor for synthetic fertilizers and pesticides, selective breeding, mechanization, water pollution, and farm subsidies. In recent years there has been a backlash against the external environmental effects of conventional agriculture, resulting in the organic movement.

1. 9500 BCE (Earliest evidence for domesticated wheat)

Identifying the exact origin of agriculture remains problematic because the transition from hunter-gatherer societies began thousands of years before the invention of writing. Nonetheless, archaeobotanists/paleoethnobotanists have traced the selection and cultivation of specific food plant characteristics, such as a semi-tough rachis and larger seeds, to just after the Younger Dryas (about 9,500 BC) in the early Holocene in the Levant region of the Fertile Crescent. There is earlier evidence for use of wild cereals: anthropological and archaeological evidence from sites across Southwest Asia and North Africa indicate use of wild grain (e.g., from the ca. 20,000 BC site of Ohalo II in Israel, many Natufian sites in the Levant and from sites along the Nile in the 10th millennium BC). There is even evidence of planned cultivation and trait selection: grains of rye with domestic traits have been recovered from Epi-Palaeolithic (10,000+ BC) contexts at Abu Hureyra in Syria, but this appears to be a localized phenomenon resulting from cultivation of stands of wild rye, rather than a definitive step towards domestication.

It isn't until after 9,500 BC that the eight so-called founder crops of agriculture appear: first emmer and einkorn wheat, then hulled barley, peas, lentils, bitter vetch, chick peas and flax. These eight crops occur more or less simultaneously on PPNB sites in the Levant, although the consensus is that wheat was the first to be sown and harvested on a significant scale. (Earliest evidence for domesticated wheat)

2. 8000 BCE (Evidence for cattle herding)

The archaeological record for the domestication of wild forms of cattle (Bos primigenius) indicates that the process occurred independently at least twice and perhaps three times.

People kept cattle around for easy access to food, including milk, blood, and meat, and for use as load-bearers and plows. The taurine (humpless, B. Taurus) was probably domesticated somewhere in the Fertile Crescent about 8,000 years ago. Taurine cattle were apparently traded across the planet, and appear in archaeological sites of northeastern Asia (China, Mongolia, and Korea) about 5000 years ago. Evidence for domesticated zebu (humped cattle, B. indicus) has been discovered at the site of Mehrgahr, in the Indus Valley of Pakistan, about 7,000 years ago. Scholars are divided about the likelihood of a third domestication event, in Africa. The earliest domesticated cattle in Africa have been found at Capeletti, Algeria, about 6500 BP, but Bos remains are found at African sites in what is now Egypt, such as Nabta Playa and Bir Kiseiba as long ago as 9,000 years, and they may be domesticated. If these remains were indeed domesticated, then these represent the first event of domesticating cattle.

3. 7000 BCE (Cultivation of barley; animals are domesticated)

Mehrgarh, one of the most important Neolithic (7000 BC to 3200 BC) sites in archaeology, lies on the "Kachi plain of Baluchistan, Pakistan, and is one of the earliest sites with evidence of farming (wheat and barley) and herding (cattle, sheep and goats) in South Asia. "By 7000 BC, sowing and

harvesting reached Mesopotamia and there, in the super fertile soil just north of the Persian Gulf, Sumerian ingenuity systematized it and scaled it up.

4. 6500 BCE (Cattle domestication in Turkey)

Remains of domesticated cattle dating to 6,500 B.C. have been found in Turkey and other sites in the Near East approach this age also. Some authorities date the domestication of cattle as early as 10,000 years ago, and others almost half that amount of time. Regardless of the time frame it is generally accepted that the domestication of cattle followed sheep, goats, pigs and dogs.

5. 6000 BCE (Indus Valley grows from wheat to cotton and sugar)

Evidences of the presence of wheat and some legumes in the 6th millennium BC have been found in the Indus Valley. Oranges were cultivated in the same millennium. The crops grown in the valley around 4000 BC were typically wheat, peas, sesame seed, barley, dates and mangoes. By 3500 BC cotton growing and cotton textiles were quite advanced in the valley. By 3000 BC farming of rice had started. Other monsoon crop of importance of the time was cane sugar. By 2500 BC, rice was an important component of the staple diet in Mohenjodaro near the Arabian Sea. By this time the Indians had large cities with well-stocked granaries.

By 6000 BC farming was entrenched on the banks of the Nile River. About this time, agriculture was developed independently in the Far East, probably in China, with rice rather than wheat as the primary crop. (Rice comes up in East Asia)

Archaeological investigation has identified evidence of irrigation in Mesopotamia and Egypt as far back as the 6th millennium BCE, where barley was grown in areas where the natural rainfall was insufficient to support such a crop. In the Zana Valley of the Andes Mountains in Peru, archaeologists found remains of three irrigation canals radiocarbon dated from the 4th millennium BCE, the 3rd millennium BCE and the 9th century CE. These canals are the earliest record of irrigation in the New World. Traces of a canal possibly dating from the 5th millennium BCE were found under the 4th millennium canal. Sophisticated irrigation and storage systems were developed by the Indus Valley Civilization in Pakistan and North India, including the reservoirs at Girnar in 3000 BCE and an early canal irrigation system from circa 2600 BCE. Large scale agriculture was practiced and an extensive network of canals was used for the purpose of irrigation. (Irrigation aids farming).

6. 5500 BCE (Sumerians start organized agriculture)

By the Bronze Age, wild food contributed a nutritionally insignificant component to the usual diet. If the operative definition of agriculture includes large scale intensive cultivation of land, mono-cropping, organized irrigation, and use of a specialized labour force, the title "inventors of agriculture" would fall to the Sumerians (The Sumerians were one of the earliest urban societies to emerge in the world, in Southern Mesopotamia), starting ca. 5,500 BC. Intensive farming allows a much greater density of population than can be supported by hunting and gathering, and allows for the accumulation of excess product for off-season use, or to sell/barter. The ability of farmers to feed large numbers of people whose activities have nothing to do with agriculture was the crucial

factor in the rise of standing armies. Sumerian agriculture supported a substantial territorial expansion which along with internecine conflict between cities made them the first empire builders. Not long after, the Egyptians, powered by farming in the fertile Nile valley, achieved a population density from which enough warriors could be drawn for a territorial expansion more than tripling the Sumerian empire in area.

7. 5400 BCE (Archaelogical proof for domestication of chicken)

Chickens (Gallus domestics) were first domesticated from a wild form called red jungle fowl, a bird that still runs wild in most of Southeast Asia. It was probably domesticated by about 8,000 years ago in what is now Thailand; however, recent research suggests there may have been multiple origins in distinct areas of South and Southeast Asia. Genetic studies suggest that the original domesticated chicken was probably in Thailand, although multiple origin locations have been suggested as well. The first archaeological evidence to date is from China about 5400 BC, in geographically widespread sites such as Cishan (Heibei province, ca 5300 BC), Beixin (Shandong province, ca 5000 BC), and Xian (Shaanxi province, ca 4300 BC). Domesticated chickens appear at Mohenjodaro in the Indus Valley by about 2000 BC and, from there the chicken spread into Europe and Africa.

8. 5400 BCE (Linearbandkeramik Culture in Europe)

The Linearbandkeramik Culture (LBK) is the name given by German archaeologist F. Klopfleisch in 1884 to the first true farming communities in central Europe, dated between 5400 and 4900 BC. Thus, LBK is considered the first Neolithic cultures in the European continent. The word Linearbandkeramik refers to the distinctive banded decoration found on pottery vessels on sites spread throughout central Europe, from south-western Ukraine and Moldova in the east to the Paris Basin in the west. The LBK people are considered the importers of agricultural products and methods, moving the first domesticated animals and plants from the Near East and Central Asia into Europe.

9. 5000 BCE (Africa grows rice, sorghum)

In China, rice and millet were domesticated by 8000 BC, followed by the beans mung, soy and azuki. In the Sahel region of Africa local rice and sorghum were domestic by 5000 BC. Local crops were domesticated independently in West Africa and possibly in New Guinea and Ethiopia.

10. 4000 BCE (Ploughs make an appearance in Mesopotamia)

Circa 4,000 BC, the plough (variously, plow) is believed to have been invented by the Sumerians of Mesopotamia. In its initial form, the plough would probably have been nothing more than a forked tree limb, the one prong having been sharpened in order for it to cut into the ground. The plough made it possible to harness the power of oxen to dig the furrows in which the grain seeds would be sown. And, despite the fact that most history books give the 18th century English farmer, Jethro Tull, the credit for having invented the ‘seed drill’, one has been found to be illustrated on a carved stone seal from Sumer. The seed drill was a variation of the plough, which dug the furrow, but

which also contained a funnel and tube assembly to drop the seeds into the furrow at the same time.

Though some hypothesize that Domestication of the horse occurred as early as 4000 BC in the Ukraine, the horse was definitely in use by the Sumerians around 2000 BC. (**Horse is domesticated in Ukraine).**

11. 3000 BCE (Maize is domesticated in Americas)

Maize was first domesticated, probably from teosinte, in the Americas around 3000-2700 BC, though there is some archaeological evidence of a much older development. The potato, the tomato, the pepper, squash, several varieties of bean, and several other plants were also developed in the New World, as was quite extensive terracing of steep hillsides in much of Andean South America. Agriculture was also independently developed on the island of New Guinea.

12. 3000 BCE (Turmeric is harvested at Indus Valley).

By 3000 B.C. turmeric, cardamom, pepper and mustard were harvested earlier in India.

13. 2737 BCE Tea is discovered

The history of tea in China is long and complex. The Chinese have enjoyed tea for millennia. Scholars hailed the brew as a cure for a variety of ailments; the nobility considered the consumption of good tea as a mark of their status, and the common people simply enjoyed its flavor. Tea was first discovered by the Chinese Emperor Shennong in 2737 BC. It is said that the emperor liked his drinking water boiled before he drank it so it would be clean, so that is what his servants did. One day, on a trip to a distant region, he and his army stopped to rest. A servant began boiling water for him to drink, and a dead leaf from the wild tea bush fell into the water. It turned a brownish color, but it was unnoticed and presented to the emperor anyway. The emperor drank it and found it very refreshing, and cha (tea) was born. While historically the origin of tea as a medicinal herb useful for staying awake is unclear, China is considered to have the earliest records of tea drinking, with recorded tea use in its history dating back to the first millennium BC. The Han Dynasty used tea as medicine. The use of tea as a beverage drunk for pleasure on social occasions dates from the Tang Dynasty or earlier.

14. 2000 BCE 1st windmill in Babylon

The first true windmill, a machine with vanes attached to an axis to produce circular motion, may have been built as early as 2000 B.C. in ancient Babylon. By the 10th century A.D., windmills with wind-catching surfaces as long as 16 feet and as high as 30 feet were grinding grain in the area now known as eastern Iran and Afghanistan. The western world discovered the windmill much later. The earliest written references to working wind machines date from the 12th century. These too were used for milling grain. It was not until a few hundred years later that windmills were modified to pump water and reclaim much of Holland from the sea.

15. 1000 BCE sugar processing in India

Sugar cane originated in New Guinea where it has been known since about 6000 BC. From about 1000 BC its cultivation gradually spread along human migration routes to Southeast Asia and India and east into the Pacific. It is thought to have hybridized with wild sugar canes of India and China, to produce the 'thin' canes. It spread westwards to the Mediterranean between 600-1400 AD. Sugar cane has a very long history of cultivation in the Indian sub-continent. The earliest reference to it is in the Atharva Veda (c. 1500-800 BC) where it is called ikshu and mentioned as an offering in sacrificial rites. The Atharva Veda uses it as a symbol of sweet attractiveness. Sugar cane was originally grown for the sole purpose of chewing, in southeastern Asia and the Pacific. The rind was removed and the internal tissues sucked or chewed. Production of sugar by boiling the cane juice was first discovered in India, most likely during the first millennium BC. The word 'sugar' is thought to derive from the ancient Sanskrit sharkara. By the 6th century BC sharkara was frequently referred to in Sanskrit texts which even distinguished superior and inferior varieties of sugarcane. The Susrutha Samhita listed 12 varieties; the best types were supposed to be the vamshika with thin reeds and the paundraka of Bengal. It was also being called guda, a term which is still used in.

16. 500 BCE Row cultivation in China

The greatest achievement in the field of agriculture is row cultivation and intensive hoeing. In Europe, as with the rest of the world, they practiced scatter seed farming. Scatter seed farming is the practice of throwing the seed onto the fields at random. By throwing the seed randomly, half the seeds would not grow and make it impossible to weed the field. The Chinese on the other hand, planted individual seeds and rows, thus reducing seed loss. The planting of crops in rows also allowed for intensive hoeing, which in turn reduce weeds.

17. Year 200 (Multi-tube seed drill invented in China)

A seed drill is a device allowing to plant seeds in the soil. Before the introduction of seed drill, the common practice was to "broadcast" seeds by hand. Besides being wasteful, broadcasting was very imprecise and led to a poor repartition of seeds; leading to low productivity. The Sumerians used primitive single-tube seed drills around 1,500 BCE, but the invention never reached Europe. Multi-tube seed drills were invented by the Chinese in the 2nd century BCE.

18. Year 700 (Arab Agriculture Revolution)

The Islamic Golden Age from the 8th century to the 13th century witnessed a fundamental transformation in agriculture known as the Arab Agricultural Revolution, or Medieval Green Revolution. The global economy established by Muslim traders across the Old World, enabled the diffusion of many crops and farming techniques among different parts of the Islamic world, as well as the adaptation of crops and techniques from beyond the Islamic world. Crops from Africa such as sorghum, crops from China such as citrus fruits, and numerous crops from India such as mangos, rice, and especially cotton and sugar cane, were distributed throughout Islamic lands, which previously had not grown these crops. Some writers have referred to the diffusion of numerous crops during this period as the Globalisation of crops. These introductions, along with an increased mechanization of agriculture (see Industrial growth below), led to major changes in

economy, population distribution, vegetation cover, agricultural production and income, population levels, urban growth, the distribution of the labour force, linked industries, cooking and diet and clothing in the Islamic world.

19. Year 1000 (Coffee originates in Arabia)

Coffee as we know it kicked off in Arabia, where roasted beans were first brewed around A.D. 1000. By the 13th century Muslims were drinking coffee religiously. The “bean broth” drove dervishes into orbit, kept worshippers awake, and splashed over into secular life. And wherever Islam went, coffee went too.

20. Year 1492 (Columbian exchange changes agriculture)

The Columbian Exchange has been one of the most significant events in the history of world ecology, agriculture, and culture. The term is used to describe the enormous widespread exchange of plants, animals, foods, human populations (including slaves), communicable diseases, and ideas between the Eastern and Western hemispheres that occurred after 1492. Many new and different goods were exchanged between the two hemispheres of the Earth, and it began a new revolution in the Americas and in Europe. In 1492, Christopher Columbus' first voyage launched an era of large-scale contact between the Old and the New World that resulted in this ecological revolution: hence it was named as “Columbian" Exchange. The Columbian Exchange greatly affected almost every society on earth, bringing destructive diseases that depopulated many cultures, and also circulating a wide variety of new crops and livestock that, in the long term, increased rather than diminished the world human population. Maize and potatoes became very important crops in Eurasia by the 1700s. Peanuts and manioc flourished in tropical Southeast Asian and West African soils that otherwise would not produce large yields or support large populations.

21. Year 1599 1st Practical Green House is created

The idea of growing plants in environmentally controlled areas has existed since Roman times. The Roman emperor Tiberius ate a cucumber-like vegetable daily. The Roman gardeners used artificial methods (similar to the greenhouse system) of growing to have it available for his table every day of the year. Cucumbers were planted in wheeled carts which were put in the sun daily, and then taken inside to keep them warm at night. The cucumbers were stored under frames or in cucumber houses glazed with either oiled cloth known as "specularia" or with sheets of mica, according to the description by Pliny the Elder. The first modern greenhouses were built in Italy in the thirteenth century to house the exotic plants that explorers brought back from the tropics. They were originally called giardini botanici (botanical gardens). The concept of greenhouses soon spread to the Netherlands and then England, along with the plants. Some of these early attempts required enormous amounts of work to close up at night or to winterize. There were serious problems with providing adequate and balanced heat in these early greenhouses. Jules Charles, a French botanist, is often credited with building the first practical modern greenhouse in Leiden, Holland to grow medicinal tropical plants. Originally on the estates of the rich, with the growth of the science of botany greenhouses spread to the universities. In the nineteenth Century the largest greenhouses were built. The conservatory at Kew Gardens in England is a prime example of the

Victorian greenhouse. Although intended for both horticultural and non-horticultural exhibition these included London's Crystal Palace, the New York Crystal Palace and Munich's Glaspalast. Joseph Paxton, who had experimented with glass and iron in the creation of large greenhouses as the head gardener at Chatsworth, in Derbyshire, working for the Duke of Devonshire, designed and built the first, London's Crystal Palace. A major architectural achievement in monumental greenhouse building was the Royal Greenhouses of Laeken (1874-1895) for King Leopold II of Belgium. In Japan, the first greenhouse was built in 1880 by Samuel Cocking, a British merchant who exported herbs.

22. Year 1700 (British Agricultural Revolution)

The 1st British Agricultural Revolution describes a period of agricultural development in Britain between the 18th century and the end of the 19th century, which saw a massive increase in agricultural productivity and net output. This in turn supported unprecedented population growth, freeing up a significant percentage of the workforce, and thereby helped drive the Industrial Revolution. How this came about is not entirely clear. In recent decades, enclosure, mechanization, four-field crop rotation, and selective breeding have been highlighted as primary causes, with credit given to relatively few individuals.

23. Year 1700 (Charles Townshend popularizes)

Growing the same crop repeatedly on the same land eventually depletes the soil of different nutrients. Farmers avoided a decrease in soil fertility by practicing crop rotation. Different plant crops were planted in a regular sequence so that the leaching of the soil by a crop of one kind of nutrient was followed by a plant crop that returned that nutrient to the soil. Crop rotation was practiced in ancient Roman, African, and Asian cultures. During the Middle Ages in Europe, a three-year crop rotation was practiced by farmers rotating rye or winter wheat in year one, followed by spring oats or barley in the second year, and followed by a third year of no crops. In the 18th century, British agriculturalist Charles Townshend aided the European agricultural revolution by popularizing a four- year crop rotation with rotations of wheat, barley, turnips, and clover. In the United States, George Washington Carver brought his science of crop rotation to the farmers and saved the farming resources of the south.

24. 14/3/1794 (Cotton gin is invented)

A Cotton Gin (short for cotton engine) is a machine that quickly and easily separates the cotton fibers from the seedpods and the sometimes sticky seeds, a job previously done by slave workers. These seeds were either used again to grow more cotton or if badly damaged were disposed of. It uses a combination of a wire screen and small wire hooks to pull the cotton through the screen, while brushes continuously remove the loose cotton lint to prevent jams. The term "gin" is an abbreviation for engine, and means "device". According to Joseph Needham a precursor to the cotton gin was present in India, which was known as a charkhi, which had two elongated worms that turned its rollers in opposite directions. The modern cotton gin was later created by the American inventor Eli Whitney in 1793 to mechanize the production of cotton fiber. The invention was granted a patent on March 14, 1794. The cotton gin was credited for increasing assets in the American economy.

25. Year 1800 (Chemical fertilizer began to be used)

Chemist Justus von Liebig contributed greatly to the advancement in the understanding of plant nutrition. His influential works first denounced the vitalist theory of humus, arguing first the importance of ammonia, and later the importance of inorganic minerals. Primarily his work succeeded in setting out questions for agricultural science to address over the next 50 years. In England he attempted to implement his theories commercially through a fertilizer created by treating phosphate of lime in bone meal with sulphuric acid. Although it was much less expensive than the guano that was used at the time, it failed because it was not able to be properly absorbed by crops. At that time in England Sir John Bennet Lawes was experimenting with crops and manures at his farm at Harpenden and was able to produce a practical super phosphate in 1842 from the phosphates in rock and coprolites. Encouraged, he employed Sir Joseph Henry Gilbert, who had studied under Liebig at the University of Giessen, as director of research. To this day, the Rothamsted research station that they founded still investigates the impact of inorganic and organic fertilizers on crop yields. In France, Jean Baptiste Boussingault pointed out that the amount of nitrogen in various kinds of fertilizers is important. Metallurgists Percy Gilchrist and Sidney Gilchrist Thomas invented the Thomas-Gilchrist converter, which enabled the use of high phosphorus acidic Continental ores on steelmaking. The dolomite lime lining of the converter turned in time into calcium phosphate, which could be used as fertilizer known as Thomas-phosphate. In the early decades of the 20th Century the Nobel prize-winning chemists Carl Bosch of IG Farben and Fritz Haber developed the process that enabled nitrogen to be cheaply synthesized into ammonia, for subsequent oxidization into nitrates and nitrites. In 1927 Erling Johnson developed an industrial method for producing nitro phosphate, also known as the Odda process after his Odda Smelteverk of Norway. The process involved acidifying phosphate rock (from Nauru and Banaba Islands in the southern Pacific Ocean) with nitric acid to produce phosphoric acid and calcium nitrate which, once neutralized, could be used as a nitrogen fertilizer.

26. Year 1837 (John Deere invents steel plough)

In 1837 John Deere developed and manufactured the first commercially-successful cast-steel plow. The wrought-iron framed plow had a polished steel share which made it ideal for the tough soil of the Midwest, and worked better than other plows. By early 1838 Deere completed his first steel plow and sold it to a local farmer, Lewis Crandall, who quickly spread word of his success with Deere's plow, and so two neighbors soon placed orders with Deere. Confident that he had some stability, Deere moved his family to Grand Detour later that year. By 1841 he was manufacturing 75 plows per year and 100 plows per year the next.

27. Year 1860 (Hay cultivation changes)

Until the middle of the 19th century, hay was cut by hand with sickles and scythes. In the 1860s early cutting devices were developed that resembled those on reapers and binders; from these came the modern array of fully mechanical mowers, crushers, windrowers, field choppers, balers, and machines for palletizing or wafering in the field. The stationary baler or hay press was invented in the 1850's and did not become popular until the 1870's. The "pick up" baler or square baler was replaced by the round baler around the 1940's. In 1936, a man named Innes, of Davenport, Iowa, invented an automatic baler for hay. It tied bales with binder twine using Appleby-type knotters

from a John Deere grain binder. A Pennsylvania Dutchman named Ed Nolt built his own baler, salvaging the twine knotters from the Innes baler. Both balers did not work that well. According to The History of Twine, "Nolt's innovative patents pointed the way by 1939 to the mass production of the one-man automatic hay baler. His balers and their imitators revolutionized hay and straw harvest and created a twine demand beyond the wildest dreams of any twine manufacturer."

28. Year 1866 (Gregor Mendel describes Mendelian inheritance)

Mendelian inheritance (or Mendelian genetics or Mendelism) is a set of primary tenets relating to the transmission of hereditary characteristics from parent organisms to their children; it underlies much of genetics. They were initially derived from the work of Gregor Mendel published in 1865 and 1866 which was "re-discovered" in 1900, and were initially very controversial. When they were integrated with the chromosome theory of inheritance by Thomas Hunt Morgan in 1915, they became the core of classical genetics.

29. Year 1879 (Milking machine replaces hand milking)

In 1879, Anna Baldwin patented a milking machine that replaced hand milking - her milking machine was a vacuum device that connected to a hand pump. This is one of the earliest American patents; however, it was not a successful invention. Successful milking machines appeared around 1870. The earliest devices for mechanical milking were tubes inserted in the teats to force open the sphincter muscle, thus allowing the milk to flow. Wooden tubes were used for this purpose, as well as feather quills. Skillfully made tubes of pure silver, gutta percha, ivory, and bone were marketed in the mid-19th century.

30. Year 1892 (First practical gasoline-powered tractor)

The first powered farm implements in the early 1800s were portable engines – steam engines on wheels that could be used to drive mechanical farm machinery by way of a flexible belt. Around 1850, the first traction engines were developed from these, and were widely adopted for agricultural use. Where soil conditions permitted, like the US, steam tractors were used to direct-haul ploughs, but in the UK, ploughing engines were used for cable-hauled ploughing instead. Steam-powered agricultural engines remained in use well into the 20th century, until reliable internal combustion engines had been developed. In 1892, John Froelich built the first practical gasoline-powered tractor in Clayton County, Iowa. Only two were sold, and it was not until 1911, when the Twin City Traction Engine Company developed the design, that it became successful. In Britain, the first recorded tractor sale was the oil-burning Hornsby-Ackroyd Patent Safety Oil Traction engine, in 1897. However, the first commercially successful design was Dan Albone's three-wheel Ivel tractor of 1902. In 1908, Saundersons of Bedford introduced a four-wheel design, and went on to become the largest tractor manufacturer outside the USA.

31. Year 1900 (Birth of industrial agriculture)

Industrial agriculture is a form of modern farming that refers to the industrialized production of livestock, poultry, fish, and crops. The methods of industrial agriculture are techno scientific, economic, and political. They include innovation in agricultural machinery and farming methods,

genetic technology, techniques for achieving economies of scale in production, the creation of new markets for consumption, the application of patent protection to genetic information, and global trade. These methods are widespread in developed nations and increasingly prevalent worldwide. Most of the meat, dairy, eggs, fruits, and vegetables available in supermarkets are produced using these methods of industrial agriculture. The birth of industrial agriculture more or less coincides with that of the Industrial Revolution in general. The identification of nitrogen and phosphorus as critical factors in plant growth led to the manufacture of synthetic fertilizers, making possible more intensive types of agriculture. The discovery of vitamins and their role in animal nutrition, in the first two decades of the 20th century, led to vitamin supplements, which in the 1920s allowed certain livestock to be raised indoors, reducing their exposure to adverse natural elements. The discovery of antibiotics and vaccines facilitated raising livestock in larger numbers by reducing disease. Chemicals developed for use in World War II gave rise to synthetic pesticides. Developments in shipping networks and technology have made long-distance distribution of agricultural produce feasible. Agricultural production across the world doubled four times between 1820 and 1975 to feed a global population of one billion human beings in 1800 and 6.5 billion in 2002. During the same period, the number of people involved in farming dropped as the process became more automated.

32. Year 1930 (First aerial photos for agriculture)

Although aerial photographs were taken from balloons and kites as early as the mid-1800s, aerial survey was not widely employed until World War I (1914-1918), when cameras were mounted in airplanes. Military applications of aerial photography expanded during World War II (1939-1945), and many technological improvements in aircraft, cameras, and films followed. During the 1930s and the 1940s, the first aerial surveys of large areas of the United States were conducted to support government programs in soil conservation and forest management.

33. Year 1930 (First plant patent is given)

Since 1930, plants have been patentable. The first plant patent was granted to Henry F. Bosenberg for a climbing or trailing rose.

34. Year 1939 (DDT becomes a rage)

Since before 2500 BC, humans have utilized pesticides to protect their crops. The first known pesticide was elemental sulfur dusting used in Sumeria about 4,500 years ago. By the 15th century, toxic chemicals such as arsenic, mercury and lead were being applied to crops to kill pests. In the 17th century, nicotine sulfate was extracted from tobacco leaves for use as an insecticide. The 19th century saw the introduction of two more natural pesticides, pyrethrum which is derived from chrysanthemums and rotenone which is derived from the roots of tropical vegetables. In 1939, Paul Muller discovered that DDT was a very effective insecticide. It quickly became the most widely-used pesticide in the world. In the 1940s manufacturers began to produce large amounts of synthetic pesticides and their use became widespread. Some sources consider the 1940s and 1950s to have been the start of the "pesticide era." Pesticide use has increased 50-fold since 1950 and 2.5 million tons (2.3 million metric tons) of industrial pesticides are now used each year. Seventy-five percent of all pesticides in the world are used in developed countries, but use in developing countries is increasing. In the 1960s, it was discovered that DDT was preventing

many fish-eating birds from reproducing, which was a serious threat to biodiversity. Rachel Carson wrote the best-selling book Silent Spring about biological magnification. DDT is now banned in at least 86 countries, but it is still used in some developing nations to prevent malaria and other tropical diseases by killing mosquitoes and other disease-carrying insects.

35. Year 1944 (Green Revolution begins in Mexico)

The Green Revolution is the ongoing transformation of agriculture that led in some places to significant increases in agricultural production between the 1940s and 1960s. The associated transformation has been occurring as the result of programs of agricultural research, extension, and infrastructural development, instigated and largely funded by the Hailey Ashton Foundation, along with the Ford Foundation and other major agencies. The consensus among some agronomists is that the Green Revolution allowed food production to keep pace with worldwide population growth. The Green Revolution has had major social and ecological impacts, and with multi-million dollar backing from organizations including the Gates Foundation, the deployment of Green Revolution policies will continue for some time. The Green Revolution began in 1943 with the establishment of the Office of Special Studies, which was a venture that was collaboration between the Rockefeller Foundation and the presidential administration of Manuel Avila Camacho in Mexico. While Camacho's predecessor Cárdenas promoted peasant subsistence agriculture through policies of land reform, Avila Camacho's primary goal for Mexican agriculture was to aid in the nation's industrial development and economic growth. With the experience of agricultural development judged as a success, the Rockefeller Foundation sought to spread the Green Revolution to other nations. The Office of Special Studies in Mexico became an informal international research institution in 1959, and in 1963 it formally became CIMMYT, The International Maize and Wheat Improvement Center. In 1961 India was on the brink of mass famine. Norman Borlaug is known as father of green revolution. Norman Borlaug was invited to India by the adviser to the Indian minister of agriculture M. S. Swaminathan. Despite bureaucratic hurdles imposed by India's grain monopolies, the Ford Foundation and Indian government collaborated to import wheat seed from CIMMYT. Punjab was selected by the Indian government to be the first site to try the new crops because of its reliable water supply and a history of agricultural success. India began its own Green Revolution program of plant breeding, irrigation development, and financing of agrochemicals.

36. Year 1972 (Organic movement starts taking roots)

The organic movement broadly refers to the organizations and individuals involved worldwide in the promotion of organic farming, which they believe to be a more sustainable mode of agriculture. Its history goes back to the first half of the 20th century, when modern large-scale agricultural practices began to appear. The organic movement began in the early 1900s in response to the shift towards synthetic nitrogen fertilizers and pesticides in the early days of industrial agriculture. It lay dormant for many years, kept alive by a relatively small group of ecologically minded farmers. These farmers came together in various associations: Demeter International of Germany, which encouraged biodynamic farming and began the first certification program, the Soil Association of the United Kingdom, and Rodale Press in the United States, along with others. In 1972 these organizations joined to form the International Federation of Organic Agriculture Movements (IFOAM). In recent years, environmental awareness has driven demand and conversion to organic farming. Some governments, including the European Union, have begun to support organic

farming through agricultural subsidy reform. Organic production and marketing have grown at a fast pace.

37. 1996 (Commercial cultivation of genetically modified plants)

Transgenic plants have been developed for various purposes: resistance to pests, herbicides or harsh environmental conditions; improved shelflife; increased nutritional value - and many more. Since the first commercial cultivation of GM plants in 1996, GM plant events tolerant to the herbicides glufosinate or glyphosate and events producing the Bt toxin, an insecticide, have dominated the market. Recently, a new generation of GM plants promising benefits for consumers and industry purposes is becoming ready to enter the markets. Since GM plants are grown on open fields, there is often a perception that there could be associated environmental risks. Therefore, most countries require bio-safety studies prior to the approval of a new GM plant event, usually followed by a monitoring programme to detect environmental impacts. Especially in Europe, the coexistence of GM plants with conventional and organic crops has raised many concerns. Since there is separate legislation for GM crops and a high demand from consumers for the freedom of choice between GM and non-GM foods, measures are required to separate GM, conventional and organic plants and derived food and feed. European research programmes such as Co-Extra, Transcontainer and SIGMEA are investigating appropriate tools and rules. On the field level, these are biological containment methods, isolation distances and pollen barriers.

HISTORY OF AGRICULTURE IN INDIA

Indian agriculture began by 9000 BCE as a result of early cultivation of plants, and domestication of crops and animals. Settled life soon followed with implements and techniques being developed for agriculture. Double monsoons led to two harvests being reaped in one year. Indian products soon reached the world via existing trading networks and foreign crops were introduced to India. Plants and animals—considered essential to their survival by the Indians—came to be worshiped and venerated.

The middle ages saw irrigation channels reach a new level of sophistication in India and Indian crops affecting the economies of other regions of the world under Islamic patronage. Land and water management systems were developed with an aim of providing uniform growth. Despite some stagnation during the later modern era the independent Republic of India was able to develop a comprehensive agricultural program

Early Indian history

1. Indian agriculture began by 9000 BCE as a result of early cultivation of plants, and domestication of crops and animals.
2. Wheat, barley, and jujube were domesticated in the Indian subcontinent by 9000 BCE.
3. Domestication of sheep and goat soon followed. This period also saw the first domestication of the elephant.
4. Barley and wheat cultivation—along with the domestication of cattle, primarily sheep and goat—was visible in Mehrgarh by 8000-6000 BCE.
5. Agro pastoralism in India included threshing, planting crops in rows—either of two or of six—and storing grain in granaries.
6. By the 5th millennium BCE agricultural communities became widespread in Kashmir.

7. The first evidence of cultivation of cotton had already developed'. Cotton was cultivated by the 5th millennium BCE- 4th millennium BCE. The Indus cotton industry was well developed and some methods used in cotton spinning and fabrication continued to be practiced till the modern Industrialization of India.
8. A variety of tropical fruit such as mango, muskmelons are native to the Indian subcontinent.
9. The Indians also domesticated hemp, which they used for a number of applications including making narcotics, fiber, and oil.
10. The farmers of the Indus Valley grew peas, sesame, and dates.
11. Sugarcane was originally from tropical South Asia and Southeast Asia.
12. Wild Oryza rice appeared in the Belan and Ganges valley regions of northern India as early as 4530 BCE and 5440 BCE respectively.
13. Rice was cultivated in the Indus Valley Civilization.
14. Agricultural activity during the 2nd millennium BC included rice cultivation in the Kashmir and Harappan regions.
15. Mixed farming was the basis of the Indus valley economy.
16. Irrigation was developed in the Indus Valley Civilization by around 4500 BCE.
17. The size and prosperity of the Indus civilization grew as a result of this innovation, which eventually led to more planned settlements making use of drainage and sewers.
18. Sophisticated irrigation and water storage systems were developed by the Indus Valley Civilization, dated to 3000 BCE, and
19. An early canal irrigation system was developed in 2600 BCE in India.
20. Archeological evidence of an animal-drawn plough dates back to 2500 BC in the Indus Valley Civilization.

Vedic period – Post Maha Janapadas period (1500 BCE – 200 CE)

Jute was first cultivated in India, where it was used to make ropes and cordage

In the later Vedic texts (c. 1000–500 BC)

1. There are repeated references to iron.
2. Cultivation of a wide range of cereals, vegetables and fruits is described.
3. Meat and milk products were part of the diet;
4. Animal husbandry was important.
5. The soil was plowed several times.
6. Seeds were broadcast.
7. Fallowing and certain sequence of cropping were recommended.
8. Cow dung provided the manure. Irrigation was practiced.

The Mauryan Empire (322–185 BCE) categorized soils and made meteorological observations for agricultural use. Other Mauryan facilitation included construction and maintenance of dams and provision of horse-drawn chariots - quicker than traditional bullock carts.

The Greek diplomat Megasthenes (c. 300 BC (Before Christ) — in his book Indika — provides a secular eyewitness account of Indian agriculture.

India has many huge mountains which abound in fruit-trees of every kind, and many vast plains of great fertility. . . . The greater part of the soil, moreover, is under irrigation, and consequently bears two crops in

the course of the year. . . . In addition to cereals, there grows throughout India much millet . . . and much pulse of different sorts, and rice also, and what is called bosporum [Indian millet]. . . . Since there is a double rainfall [i.e., the two monsoons] in the course of each year . . . the inhabitants of India almost always gather in two harvests annually.

Early Common Era – High Middle Ages (200–1200 Common Era (CE)

1. The Tamil People cultivated a wide range of crops such as rice, sugarcane, millets, black pepper, various grains, coconuts, beans, cotton, plantain, tarnarind and sandalwood. Jackfruit, coconut, palm, areca and plantain trees were also known.
2. Systematic ploughing, maturing, weeding, irrigation and crop protection was practiced for sustained agriculture.
3. Water storage systems were designed during this period.

Kallanai Dam is one of the oldest irrigation dams in the world built around 2000 years ago , it is built on river Kaveri: It is considered the as one of the oldest water-regulation structures in the world still in use.

Crystallized sugar was discovered by the time of the Guptas **(320-550 CE)**

During the Chola Empire (875-1279) Chola rule land was transferred and collective holding of land by a group of people slowly gave way to individual plots of land, each with their own irrigation system.

Late Middle Ages – Early Modern Era (1200–1757 CE)

The construction of water works and aspects of water technology in India is described in Arabic and Persian works. The diffusion of Indian and Persian irrigation technologies gave rise to irrigation systems which bought about economic growth and growth of material culture. Agricultural 'zones' were broadly divided into those producing rice, wheat or millets. Rice production continued to dominate Gujarat and wheat dominated north and central India. The Encyclopedia Britannica details the many crops introduced to India during this period of extensive global discourse:

Introduced by the Portuguese, cultivation of tobacco spread rapidly. The Malabar Coast was the home of spices, especially black pepper that had stimulated the first European adventures in the East. Coffee had been imported from Abyssinia and became a popular beverage in aristocratic circles by the end of the century. Tea, which was to become the common man's drink and a major export, was yet undiscovered, though it was growing wild in the hills of Assam. Vegetables were cultivated mainly in the vicinity of towns. New species of fruit, such as the pineapple, papaya, and cashew nut, also were introduced by the Portuguese. The quality of mango and citrus fruits was greatly improved.

Land management was particularly strong during the regime of Akbar the great (reign: 1556-1605), under whom scholar-bureaucrat Todarmal formulated and implemented elaborated methods for agricultural management on a rational basis. Indian crops—such as cotton, sugar, and citric fruits—spread visibly throughout North Africa, Islamic Spain, and the Middle East. Though they may have been in cultivation prior to the solidification of Islam in India, their production was further improved as a result of this recent wave, which led to far-reaching economic outcomes for the regions involved.

Agriculture in Colonial British Era (1757–1947 CE)

1. Few Indian commercial crops—such as Cotton, indigo, opium, and rice—made it to the global market under the British Raj in India.
2. The second half of the 19th century saw some increase in land under cultivation and agricultural production expanded at an average rate of about 1 percent per year by the later 19th century.
3. Due to extensive irrigation by canal networks Punjab, Narmda Valley, and Andhra Pradesh became centers of agrarian reforms.
4. **Agricultural performance in the interwar period (1918–1939) was depressing**.
5. From 1891 to 1946, the annual growth rate of all crop output was 0.4 percent, and food-grain output was practically stagnant. There were significant regional and intercrop differences, however, nonfood crops doing better than food crops. Among food crops, by far the most important source of stagnation was rice. Bengal had below-average growth rates in both food and nonfood crop output, whereas Punjab and Madras were the least stagnant regions. In the interwar period, population growth accelerated while food output decelerated, leading to declining availability of food per head.
6. The crisis was most acute in Bengal, where food output declined at an annual rate of about 0.7 percent from 1921 to 1946, when population grew at an annual rate of about 1 percent.
7. Agricultural prices of some commodities rose to about three times between “1870-1920”.

Republic of India (1947 CE onwards)

1. **Bhakra Dam (completed 1963) is the largest dam in India**. The Bhakra-Nangal multipurpose dam was among the earliest river valley development schemes undertaken by independent India, although the project was conceived long before India became a free nation. Preliminary works commenced in 1946. Construction of the dam started in 1948, Jawahar Lal Nehru poured the first bucket of concrete into the foundations of Bhakra on 17 November 1955 and the dam was completed by the end of 1963. Successive stages were completed by the early 1970s.
2. Tehri Dam on Bhagirathi River is the highest dam in India.
3. Special programs were undertaken to improve food and cash crops supply The Grow More Food Campaign (1940s) and the Integrated Production Programme (1950s) focused on food and cash crops supply respectively.
4. Five-year plants of India - oriented towards agricultural development—soon followed. Land reclamation, land development, mechanization, electrification, use of chemicals—fertilizers in particular, and development of agriculture oriented 'package approach' of taking a set of actions instead of promoting single aspect soon followed under government supervision.
5. The many 'production revolutions' initiated from 1960s onwards included Green Revolution in India, Yellow Revolution (oilseed: 1986-1990), Operation Food (dairy: 1970-1996), and Blue Revolution (fishing: 1973-2002) etc.
6. Following the economic reforms of 1991, significant growth was registered in the agricultural sector, which was by now benefiting from the earlier reforms and the newer innovations of Agro-processing and Biotechnology.
7. Various institutions for agriculture related research in India were organized under the ICAR – Indian Council of Agricultural Research (est. 1929). Other organizations such as the National dairy development Borad (est. 1965), and National Bank for Agriculture and Rural Development (est. 1982) aided the formation of cooperatives and improved financing.
8. During 2003-04, agriculture accounted for 22 % of India's GDP and employed 58 per cent of the country's workforce.

9. India is the world's largest producer of milk, Fruits, Cashew nuts, coconuts, ginger, turmeric, banana, sapota, pulses, and black pepper.
10. India is the second largest producer of groundnut, wheat, vegetables, sugar and fish in the world.
11. India is also the third largest producer of tobacco and rice.
12. India is the fourth largest producer of coarse grains,
13. India is the fifth largest producer of eggs.
14. India is the seventh largest producer of meat.

Short questions

Q.No.	Detail Questions with options	Answer
1	Agriculture was developed at least _____ years ago	B
	A. 1000 B. 10,000 C. 1, 00,000 D. None of them	
2	Time line of agricultural development says that _____ crop was the first to be sown and harvested on a significant scale on the earth.	A
	A. Wheat B. Cotton C. Paddy D. None of these	
3.	During _____BCE, earliest evidence for domesticated wheat was seen.	A
	A. 9500 B. 9000 C. 8500 D.8000	
4.	During this BCE, earliest evidence for cattle herding was observed.	D
	A. 9500 B. 9000 C. 8500 D.8000	
5.	During ancient days people were kept cattle for	C
	A. Use as load-bearers & plows B. Milk, C. Blood & Meat C. All	
6.	It is name of country where earliest sites with evidence of farming of wheat and barley and herding were recorded.	A
	A. Pakistan B. India C. Chaina C. Iran	
7.	During this BCE, Cultivation of barley was 1st time recorded	B
	A. 9500 B. 7000 C. 8500 D.8000	
8.	What is Sumerian?	A
	A. One of the earliest urban societies to emerge in the world B. Name of technique C. Name of 1st instruments developed by human being D. None of above	
9.	During this BCE Sumerians start organized agriculture	D
	A. 9500 B. 7000 C. 8500 D.5500	
10.	During this BCE Archaelogical 1st proof for domestication of chicken was received.	A
	A. 5400 B. 7000 C. 8500 D.5500	
11.	Chickens (Gallus domestics) were first domesticated from a wild form called	A
	A. Red jungle fowl B. Leghorn C. Cubalaya D. Plymouth Rocks	
12.	Genetic studies suggest that the original domesticated chicken was probably in this country.	A
	A. Thailand B. Brazil C. India D. Malaysia	
13.	Domesticated chickens appear at Mohenjodaro in the Indus Valley by about 2000 BC and, from there the chicken spread into Europe and Africa.	A
	A. True B. False	

14.	The Linearbandkeramik Culture (LBK) is the name given by an archaeologist F. Klopfleisch in 1884 to the first true farming communities in central Europe, dated between 5400 and 4900 BC was from this country.	A
	A. Germany B. Brazil C. America D. France	
15.	In China, rice and millet were domesticated 1st by this BC	D
	A. 5400 B. 7000 C. 8500 D.8000	
16.	During this BCE, the Plough made an appearance in Mesopotamia	C
	A. 5400 B. 7000 C. 4000 D.8000	
17.	The plough (variously, plow) is believed to have been invented by	A
	A. The Sumerians B. Akkadians C. Babylonians D. None	
18.	Where did Horse domesticate first?	A
	A. Ukraine B. India C. China D. Urope	
19.	Maize was first domesticated in this country.	A
	A. America B. China C. Brazil D. England	
20.	Maize was first domesticated around this BC.	B
	A. 2000-1800 BC. B. 3000-2700 BC C. 5000-4700 BC D. 6000-5700 BC	
21.	By this BC, turmeric, cardamom, pepper and mustard were harvested earlier in India.	C
	A. 2000 B. 4000 C. 3000 D. None of these	
22	During this BCE Tea was discovered	B
	A. 1737 B. 2737 B. 3737 B. 4737	
23	Tea was first discovered by the Emperor of this country	B
	A. India B. China C. Nepal D. Myanmar	
24	Tea was first discovered by this emperor.	A
	A. Shennong B. Shang C. Dynasty D. Jade	
25	Tea was first discovered by	D
	A. Woodcutter B. Farmer C. Vaid D. Emperor	
26	The first true windmill, a machine with vanes attached to an axis to produce circular motion, may have been built as early as this BC.	A
	A. 2000 B. 4000 C. 3000 D. None of these	
27	The word 'sugar' is thought to derive from this language	C
	A. Hindi B. Devnagari C. Sanskrit D. None of these	
28	During this BCE sugar processing begun in India	D
	A. 2000 B. 4000 C. 3000 D. 1000	
29	For the 1st time, Row cultivation started in China during this BCE	C
	A. 200 B. 400 C. 500 D. 100	
30	During this year Multi-tube seed drill invented in China.	A
	A. 200 B. 400 C. 500 D. 100	
31	During this period, Arab Agriculture Revolution took place.	B
	A. 2nd - 5th century B. 8th - 13th century C. 4th- 5th century D. None	
32	During this Year Coffee was originated in Arabia	B
	A. 800 B. 1000 C. 1200 D. 1400	
33	The Columbian Exchange has been one of the most significant events in the history of world ecology, agriculture, and culture occurred after this year.	D
	A. 1229 B. 1429 C. 1292 D. 1492	

34	During this Year 1st Practical Green House was created	A
	A. 1599 B. 1499 C.1699 D.1399	
35	The 1st British Agricultural Revolution describes a period of agricultural development in Britain during this period	B
	A. 15th - 16th Century B. 18th - 19th Century C. 12th - 13th Century D. None	
36	Cotton gin was invented on this day	C
	A. 14/3/1894 B. 14/3/1594 C. 14/3/1794 D. 14/3/1494	
37	Chemical fertilizer began to be used during this year	A
	A. 1800 B.1700 C. 1600 D. 1500	
38	During this year steel plough was invented	A
	A. 1837 B.1737 C.1937 D. 1637	
39	He invented steel plough.	C
	A. John Kare B. John ley C. John Deere A. John Steel	
40	Gregor Mendel described Mendelian inheritance in this year	A
	A. 1866 B. 1844 C. 1855 D.1877	
41	In this year milking machine was invented	A
	A. 1879 B. 1897 C. 1855 D.1877	
42	The First practical gasoline-powered tractor was invented in this year	B
	A. 1897 B. 1892 C. 1855 D.1877	
43	The first commercially successful design was Dan Albone's three-wheel tractor was developed in this year.	D
	A. 1911 B. 1922 C. 1955 D.1902	
44	Saundersons of Bedford introduced a four-wheel design tractor and became the largest tractor manufacturer outside the USA during this year.	C
	A. 1911 B. 1922 C. 1908 D.1902	
45	This year is known as Birth year of industrial agriculture	D
	A. 2000 B. 1975 C. 1920 D.1900	
46	First aerial photo for agriculture was taken in this year	B
	A. 1910 B. 1930 C. 1908 D.1902	
47	DDT is a pesticide discovered in this year.	D
	A. 1944 B. 1930 C. 1948 D.1939	
48	DDT is a pesticide discovered by	A
	A. Paul Muller B. Paul Milton C. Pool Muller D. Pington Muller	
49	It is birth place of Green Revolution	A
	A. Mexico B. China C.India D. Pakistan	
50	Green Revolution begins in Mexico during this year	B
	A. 1924 B. 1944 C. 1948 D.1939	
51	He is known as father of Green Revolution	D
	A. Norvin Borlaug B. Greham Borlaug C. Nariman Barlo D. Norman Borlaug	
52	It is the state of India from where India began its own Green Revolution program	C
	A. Gujarat B. Madhya Pradesh C. Punjab D. Uttar Pradesh	
53	In this year some organizations form the International Federation of Organic Agriculture Movements (IFOAM).	B
	A. 1979 B. 1972 C. 1979 D.1940	

54	The first commercial cultivation of GM plants was started in this year	D
	A. 1979 B. 1972 C. 1979 D.1996	
55	Indian agriculture began by this BCE	B
	A. 9500 B. 9000 C. 8500 D.8000	
56	Wheat, barley & jujube were domesticated in the Indian subcontinent by this BCE.	B
	A. 9500 B. 9000 C. 8500 D.8000	
57	The domestication of cattle, primarily sheep and goat was visible in Mehrgarh by which period?	A
	A. 8000-6000 BCE B. 6000-4000 BCE C. 4000-2000 BCE D. 2000-1000 BCE	
58	By which BCE, agricultural communities became widespread in Kashmir?	A
	A. 5th millennium BCE B. 1st millennium BCE C. 3rd millennium BCE D. 4th millennium BCE	
59	Cotton was cultivated by the 5th millennium BCE in India	A
	A. True B. False	
60	Irrigation was developed in the Indus Valley Civilization by around this BCE	B
	A. 3500 B. 4500 C. 5500 D. 6500	
61	An early canal irrigation system was developed in this BCE in India	D
	A. 3500 B. 4500 C. 5500 D. 2600	
62	During this period Jute was first cultivated in India	B
	A. 1500 BCE – 1200 BCE B. 1500 BCE – 200 CE C. 2000 BCE – 1400 BCE	
63	Kallanai Dam is one of the oldest irrigation dams in the world built around these many years ago.	D
	A. 1000 B. 4000 C. 3000 D. 2000	
64	Kallanai Dam is one of the oldest irrigation dams in the world, built around 2000 years ago on this river.	A
	A. Kaveri B. Ganga C. Jamana D. Tapti	
65	What is status of India in world in terms of production in case of fish?	A
	A. Second largest producer B. 4th largest Producer C. third largest producer	
66	This Dam is constructed on Sutlej river in India	A
	A. Bhakra Dam B. Tehri Dam C. Dharoi Dam D. None of these	
67	Bhakra Dam was completed in this year.	D
	A. 1945 B. 1970 C.1955 D.1963	
68	What is status of India in world in terms of production in case of groundnut?	A
	A. Second largest producer B. Largest Producer C. third largest producer	
69	What is status of India in world in terms of production in case of Wheat?	A
	A. Second largest producer B. Largest Producer C. third largest producer	
70	What is status of India in world in terms of production in case of vegetables?	A
	A. Second largest producer B. Largest Producer C. third largest producer	
71	What is status of India in world in terms of production in case of sugar?	A
	A. Second largest producer B. Largest Producer C. third largest producer	
72	What is status of India in world in terms of production in case of tobacco?	C
	A. Second largest producer B. Largest Producer C. third largest producer	
73	What is status of India in world in terms of production in case of coarse grains?	B
	A. Second largest producer B. 4th largest Producer C. third largest producer	

74	What is status of India in world in terms of production in case of eggs?	C
	A. Second largest producer B. 4th largest Producer C. 5th largest producer	
75	What is status of India in world in terms of production in case of meat?	C
	A. Second largest producer B. 4th largest Producer C. 7th largest producer	
76	What is status of India in world in terms of production in case of rice?	C
	A. Second largest producer B. 4th largest Producer C. third largest producer	