English Descriptive

Q.1) Write an essay on any one of the following topics in about 600 words. (40 Marks)

a) How can organisations effectively integrate the younger generation with experienced senior professionals to balance education driven innovation and experience based wisdom in the workplace?

b) India committed to reducing the emissions intensity of its GDP by 45 percent by 2030 from 2005 levels as part of its updated Nationally Determined Contributions. What is the way forward?

c) How can youngsters help older people in keeping up with times in the education sector?

d) India's startup ecosystem often mirrors ideas from Western countries. Discuss whether these models effectively address the needs of a developing economy like India.

Q.2) Write a precis from the given paragraph in about 180 words. (30 Marks)

The Amazon rainforest, often referred to as the lungs of the Earth, plays a crucial role in regulating the global climate and maintaining biodiversity. Recent scientific reports highlight that climate change is rapidly altering the ecological balance of the Amazon River basin. According to recent environmental assessments, the Amazon stores nearly one hundred billion tonnes of carbon, making it one of the largest natural carbon sinks in the world. However, rising global temperatures, erratic rainfall patterns, and increased frequency of droughts have started to weaken its capacity to absorb carbon dioxide effectively. Data from climate monitoring agencies indicate that the average temperature in parts of the Amazon has increased by nearly one degree Celsius over the past few decades. This warming trend has intensified evaporation and reduced soil moisture, leading to stress on vegetation and aquatic ecosystems. The Amazon River system, which supports thousands of fish species and sustains millions of people, has experienced fluctuating water levels due to irregular rainfall and glacier melt patterns in upstream regions. These changes have disrupted breeding cycles of aquatic species and affected the livelihoods of indigenous communities dependent on fishing and river based agriculture. Deforestation and forest degradation further compound the effects of climate change. Studies suggest that nearly seventeen percent of the Amazon rainforest has already been lost, bringing the ecosystem closer to a potential tipping point where large areas may transition from dense forest to savanna like conditions. Scientists warn that such a shift would not only reduce biodiversity but also release massive amounts of stored carbon into the atmosphere, accelerating global warming. Increased forest fires during prolonged dry seasons have also contributed to declining air quality and loss of wildlife habitats. Hydrological changes are another major concern. The Amazon River's natural flood pulse, which historically supported fertile floodplains and nutrient rich ecosystems, is becoming unpredictable. Satellite observations reveal that extreme floods and severe droughts are occurring more frequently than before, threatening both terrestrial and aquatic biodiversity. Researchers emphasise that protecting the Amazon requires coordinated international efforts, including sustainable land use practices, stronger forest governance, and investment in climate resilient conservation strategies. Without urgent action, the ecological stability of the Amazon River basin and its role in maintaining global climate balance may be permanently compromised.

Q.3) Read the following comprehension and answer the questions that follow (30 Marks)

In recent years, scientists have been exploring innovative ways to generate clean energy using natural processes. One such concept is based on the principle of osmosis and reverse osmosis. Osmosis refers to the natural movement of water through a semi permeable membrane from a region of lower salt concentration to a region of higher salt concentration. This movement creates pressure, and researchers have discovered that this pressure difference can be converted into usable electricity. Reverse osmosis works in the opposite direction, where external pressure is applied to move water against the natural osmotic flow, commonly used in water purification. The idea of harnessing osmotic pressure for energy production is gaining attention as countries search for sustainable alternatives to fossil fuels. Japan has emerged as a leader in experimenting with such advanced technologies. Scientists have introduced the concept of phytoelectric plants, which generate electricity through natural biological processes. Plant roots release organic compounds into the soil, and microorganisms break down these compounds, releasing electrons in the process. Special electrodes placed in the soil capture these electrons and convert them into a small but continuous flow of electricity. This system allows plants to contribute to energy generation without causing any harm to their growth or surrounding environment. The integration of osmotic energy with phytoelectric technology offers multiple

advantages. It supports renewable energy production, reduces dependence on conventional fuels, and can be implemented in wetlands or coastal regions where natural salinity differences exist. Pilot projects in Japan suggest that although the electricity generated by individual plants is limited, large scale deployment can provide a steady and environmentally friendly power source. Scientists are optimistic that future improvements in membrane design and microbial efficiency will enhance the performance of these systems. Despite its promise, osmotic power generation faces several challenges. The current efficiency levels remain lower than established renewable technologies such as solar and wind energy. Researchers are continuously working to improve materials, reduce costs, and increase energy output. Nevertheless, the concept highlights how basic scientific principles like osmosis can be applied in innovative ways to address global energy needs. The development of phytoelectric plants also reflects the growing trend of combining biology, chemistry, and engineering to create sustainable technological solutions.

(a) According to the passage, which of the following best explains the fundamental scientific principle that enables electricity generation through osmotic systems, and how it contributes to sustainable energy development?

(b) In the context of phytoelectric plants discussed in the passage, which statement most accurately describes the mechanism through which electricity is produced and captured?

(c) The passage highlights several advantages of combining osmotic technology with biological systems. Which of the following options best reflects the broader environmental significance mentioned by the author?

(d) Which of the following challenges associated with osmotic power generation is specifically emphasised in the passage, especially when compared with other renewable technologies?

(e) Based on the author's concluding remarks, what larger trend in scientific and technological research is reflected through the development of phytoelectric plants and osmotic energy systems?