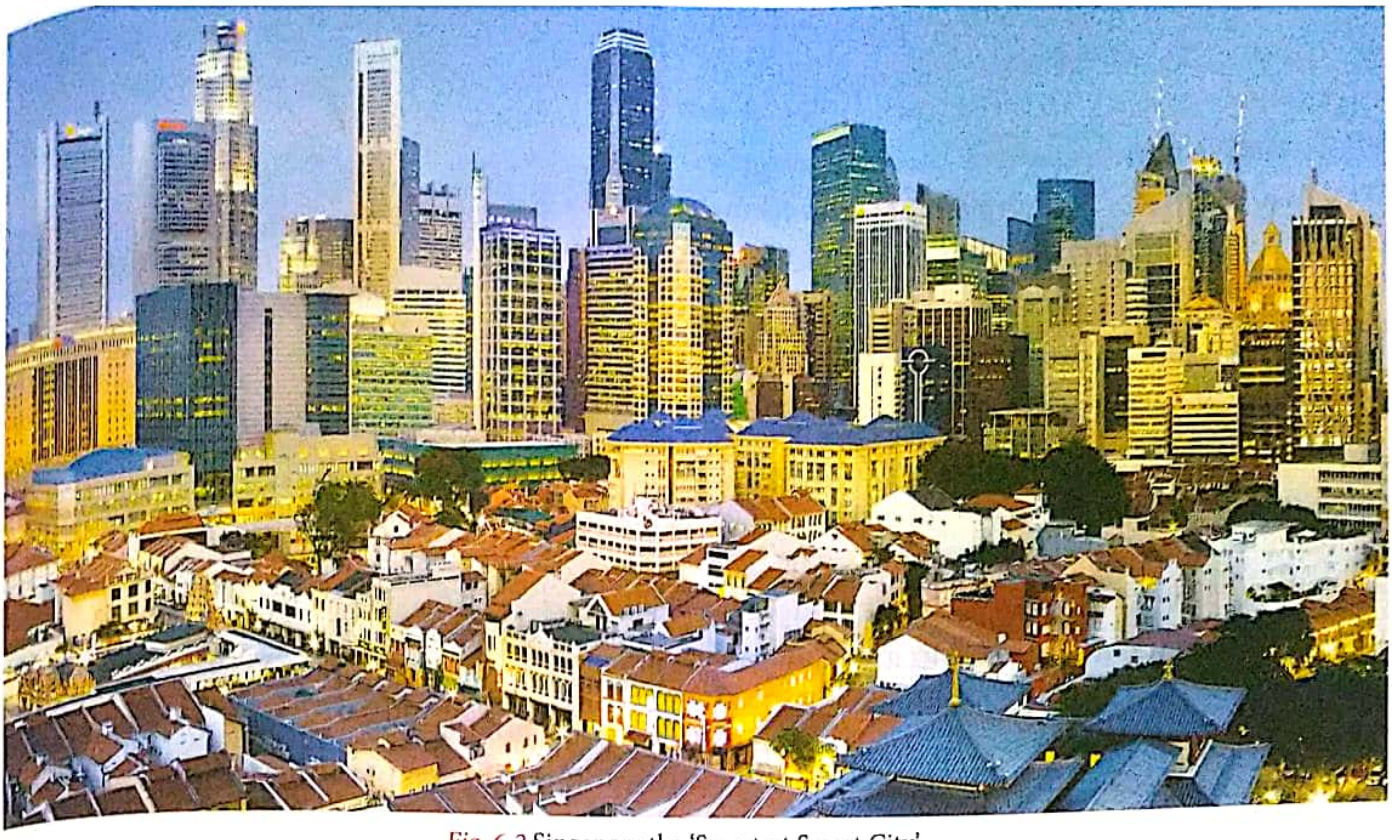

Fig. 6.2 Singapore the 'Smartest Smart City'

companies to absorb astonishing amount of data. This data is monitored by a programme known as Virtual Singapore that enables authorities to find the most effective ways to manage the city.

Barcelona

Barcelona has set up smart parking and traffic systems to monitor congestion. The city is also incredibly energy efficient. It takes full advantage of the bright sunshine it receives. Almost all large buildings use solar water heaters to fulfill their own hot water requirement.

Fig. 6.3 'Bicing' in Barcelona

It has one of the cleanest public transport systems in the world with its fleet of hybrid[2] buses, as well as its smart cycling initiative named 'Bicing'. The city has made its waste management system simple by setting up pneumatic[3] tubes under city waste bins that do not require large disposal trucks. A number of apps are used to assist with day to day living. There is customer service line for the city through which citizens can file complaints on things like potholes and broken lights.

London

As London continues to grow and age, its infrastructure related problems are becoming very clear. Huge congestion and emissions and its old-fashioned metro system are a

2 hybrid: using two different types of power, especially petrol/gas or diesel and electricity to make a new product
3 pneumatic: worked by air under pressure

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major problem. Smart technology is helping to control these issues. Seeing London's population growth and the difficulties that may arise, smart initiatives such as electric bike sharing systems and 300+ smart parking spaces to monitor parking have started which have had a positive effect.

London currently has plans to use River Thames as a renewable source of energy by using it to heat homes, reducing the need for boilers, providing better air quality and reduced power bills for residents. The city also plans to begin installing solar panels on houses to provide an increase in green energy. The power grid will then be managed digitally to maximise its efficiency, reducing carbon emissions.

San Francisco

San Francisco is one of the tech capitals of the world. California bay's transport system is fairly outdated but it has been revolutionised by smart payment methods for fares, which allow passengers to pay for their commutes via their smart phones without any type of contact. The city also plans to reduce private vehicle ownership.

Smart parking methods have also helped to solve the problem of parking and to control the flow of congestion. San Francisco is also leading the way in many clean energy initiatives. A recent law also states that all new buildings are required to have at least 15% of roof space dedicated to solar panels.

Oslo

The smart energy plans of Oslo have led to it being recognised as one of the most sustainable smart cities today. The city currently uses about 65,000 smart LED lights linked by 650

Fig. 6.4 Oslo at Night

processing stations. These not only reduce consumption of energy but can actually monitor the area to determine how bright they need to be, for example, in foggy conditions they are able to become bright, and in bright conditions become dimmer. The city has a construction plan of an additional 37 miles of cycling road and ban on cars in the city centre by 2019.

The city uses waste as one of its primary fuels. Both industrial and standard waste have been used for this. Interestingly, because the city uses so much of its waste as fuel, they depleted their entire stockpile in 2013 and the authorities had to import waste from abroad! In future, Oslo has plans to redraw its entire transport network by 2020 and is aiming to cut fuel emissions by 50%.

Smart Cities in India

With the new vision of 'Digital India', the Government of India launched an ambitious plan in 2015, to develop 100 smart cities across the country by 2020. In January 2016, the Government of India announced a list of first 20 Smart Cities under its 'Smart Cities Mission'. The next two years will see the inclusion of 40 and 38 cities, respectively. Of the 98 cities, 24 are capital cities, another 24 are business and

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industrial centres, 18 are culture and tourism influenced areas, 5 are port cities and 3 are education and healthcare hubs.

List of the First 20 Smart Cities in India	
1	Bhubaneswar (Odisha)
2	Pune (Maharashtra)
3	Jaipur (Rajasthan)
4	Surat (Gujarat)
5	Kochi (Kerala)
6	Ahmedabad (Gujarat)
7	Jabalpur (Madhya Pradesh)
8	Visakhapatnam (Andhra Pradesh)
9	Solapur (Maharashtra)
10	Davangere (Karnataka)
11	Indore (Madhya Pradesh)
12	New Delhi
13	Coimbatore (Tamil Nadu)
14	Kakinada (Andhra Pradesh)
15	Belgaum (Karnataka)
16	Udaipur (Rajasthan)
17	Guwahati (Assam)
18	Chennai (Tamil Nadu)
19	Ludhiana (Punjab)
20	Bhopal (Madhya Pradesh)

Table 6.1 Smart Cities in India

The Eight pillars of India's Smart City Programme:

1. Smart Governance
2. Smart Energy
3. Smart Environment
4. Smart Transportation
5. Smart IT & Communications
6. Smart Buildings
7. Smart Health Hospitals
8. Smart Education

Steps towards Developing Smart Cities in India:

- The Government of India allocated INR 70.6 billion for smart cities in the Budget 2014–15.
- The government is putting together the standards for executing this mega plan and identifying the cities to be developed in consultation with the states.
- A few smart cities are already coming up across the country, such as Kochi Smart City, Gujarat International Finance Tec-City (GIFT) in Ahmedabad, Naya Raipur in Chhattisgarh, Lavasa in Maharashtra and Wave Infratech's Smart City near New Delhi.
- India has also invited foreign partnership in developing the smart cities and has signed deals with Germany, US, Spain and Singapore.
- India's Smart City Plan also includes creating Industrial Corridors between big metropolitan cities in India. These include the Delhi-Mumbai Industrial Corridor, the

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Chennai Bangalore Industrial Corridor and the Bangalore-Mumbai Economic Corridor. It is hoped that many industrial and commercial centres will be recreated as smart cities along these corridors. These corridors are developed by the Indian Government in collaboration with foreign governments for example, Japan and the UK, who are keen to find new avenues of investment in India.

CQ *Challenge Question*

Do you think that if there was a plan to develop 'Smart Villages' in India, the problem of urbanisation could have been solved to a great extent?

STRATEGIES TO KEEP URBAN AREAS CLEAN

Urbanisation is followed by congestion, pollution, hygiene and sanitation. As our planet continues to grow in population, there will be growth in waste products. This waste creates huge environmental problems. Heaps of garbage is a common sight in India. The current scenario on sanitation consciousness is very serious. The first step in this direction is inculcating a culture of cleanliness among the people. This can be started by spreading awareness among the residents in our localities to dispose the domestic garbage in a proper way and in the designated place.

Swachh Bharat Abhiyan

The Swachh Bharat Abhiyan (Clean India Campaign) was initiated by the Government of India in 2016. The aim of this campaign is to make a 'Swachh Bharat' by the time India marks the 150th birth anniversary of the Father of the Nation, Mahatma Gandhi. Thousands of people have joined this programme voluntarily.

Waste Management

Waste management is collection, transportation, and disposal of garbage, sewage and other waste products. It is the process of treating solid wastes. For the treatment of waste, it needs to be segregated into biodegradable and non-biodegradable. From household items to the food we eat, basically everything can be labelled as 'biodegradable' or 'non-biodegradable'.

Biodegradable substances: The term 'biodegradable' is used for those things that get decomposed naturally, such as food stuff, human and animal wastes, plant products and dead organisms. These substances easily decompose with time. Most waste found in rural areas is biodegradable. This should be used to make compost.

Non-biodegradable substances: The term 'non-biodegradable' is used for those things that do not breakdown or get decomposed naturally. These substances consist of plastic materials, metal scraps, aluminium cans and bottles, hazardous chemicals, etc. These substances are practically immune

Fig. 6.5 Diagrammatic Representation of Processes in Waste Management

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to the natural processes and thus cannot be broken down even after thousands of years. Therefore, these waste rather than returning back to nature, contribute to solid waste which is very hazardous for the environment. Several countries are looking for eco-friendly alternatives that can minimise the threat to several land and aquatic life forms.

Simple Steps towards Handling Waste

- Install separate dust bins for biodegradable and non-biodegradable waste at small intervals in the city and people should be made aware to use them
- 'Recycling' is a method to deal with this problem. Plastics, metals, and glass bottles can be broken down with the help of chemicals and can again be used to create new plastic, metal and glass products, but the process requires time, energy and expense.
- Enough paid toilets and washrooms
- Reward those who keep their surroundings clean including industrial houses.
- Make commercial units including hospitals and hotels responsible to create their own system to hand over the unit waste directly to solid waste management units
- Make it compulsory to handover biodegradable waste to the collection agents only and ban public littering.
- Use of incineration—a method to convert waste into energy, should be promoted. It reduces the heaps of waste and makes the environment clean.
- Event organisers in public places should clean up their trash after every major social, cultural, religious or political event. (The Urban Development Ministry in India has issued guidelines asking all municipal bodies to ensure that event organisers are made to clean up the place within six hours of hosting the event otherwise they will be fined.)
- City/district level waste recycling plants should be created.
- Bring the latest technology in solid waste management.
- Involve school children and NGOs for awareness campaign.

Fig. 6.6 Composting: A Way to Reuse Organic Waste

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☐ Answer the following questions :

1. What are the eight pillars of India's smart city programme ?
2. Write the steps of developing smart cities in India.
3. How the culture of cleanliness can be inculcate among the people
4. What is waste management ?
5. What are biodegradable and Non-biodegradable waste ?
6. Write the steps towards handling waste.