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Editor's Note



Recent cyberattacks targeting supermarket refrigeration systems, exposing vulnerabilities in connected infrastructure and highlighting the risks of cyberattacks without ransom demands.

As we enter the post-Diwali week, Pala Civil Times brings you a selection of topics that have been recurring in the headlines. To begin with, Rajasthan's significant progress in expanding its solar power generation and installed capacity highlights its growing contribution to India's renewable energy transition. Next, we turn to COP31, which begins today in Antalya, Turkey, with considerable expectations surrounding its potential to advance global climate action. Our Science page explores how the recent cyberattacks targeting retail establishments across Europe expose vulnerabilities in digital security systems and raise important questions about the implications of cyberattacks that occur without any ransom demand.

Read through each of these topics with attention and focus to strengthen your understanding and gain an edge in an ever-evolving competitive examination landscape.

Happy reading!

P2. NATIONAL



Rajasthan Bags Award for Performance in Renewable Energy Framework

Rajasthan's emergence as a leading renewable energy hub, marked by substantial growth in solar power generation and installed capacity, and its national recognition for strengthening the policy, regulatory and investment ecosystem for renewable energy development.

Rajasthan Bags Award for Performance in Renewable Energy Framework

Rajasthan has received national recognition for its performance under the Renewable Energy State Assessment Framework (RE-SAF), developed by the Union Ministry of New and Renewable Energy in collaboration with the Power Finance Corporation. The award recognises the State's progress in renewable energy capacity, policy development, grid readiness and investment facilitation, highlighting its growing role in India's clean energy transition and the national target of achieving 500 GW of non-fossil fuel-based installed capacity by 2030.

Rajasthan's Performance in Renewable Energy

National Recognition: Rajasthan received the top honours under RE-SAF, with Vice-President C.P. Radhakrishnan presenting the award in New Delhi.

Installed Capacity: The State has achieved 51.6 GW of installed renewable energy capacity, including 45 GW of solar power capacity.

Green Energy Hub: Rajasthan has emerged as a major renewable energy hub, contributing significantly to India's clean energy expansion.

National Target: Its renewable energy growth supports India's target of achieving 500 GW of installed non-fossil fuel-based power capacity by 2030.

Renewable Energy State Assessment Framework (RE-SAF)

Developed By: Union Ministry of New and Renewable Energy in collaboration with the Power Finance Corporation.

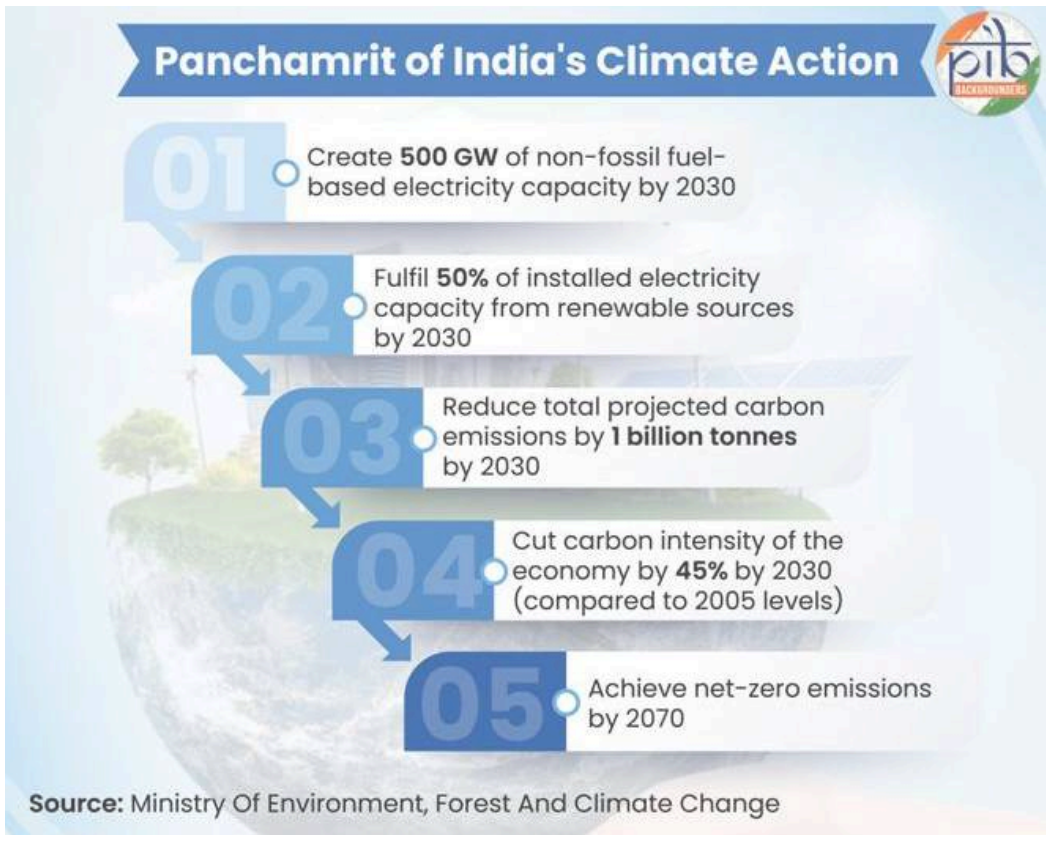
Purpose: Assesses and benchmarks the performance of States in developing renewable energy and creating an enabling ecosystem for its expansion.

Assessment Parameters include

- Renewable energy development and capacity addition.
- Policy and regulatory frameworks.
- Grid readiness.
- Power distribution company (DISCOM) performance.
- Investment-friendly environment.

Significance for India's Renewable Energy Transition

RE-SAF encourages States to improve renewable energy performance through benchmarking and identification of policy and infrastructure gaps.



PYQ COMPASS

Q. Consider the following statements: (2022)
1. Gujarat has the largest solar park in India.
2. Kerala has a fully solar powered International Airport.
3. Goa has the largest floating solar photovoltaic project in India.
Which of the statements given below is/are correct?
a) 1 and 2 b) 2 only c) 1 and 3 d) 3 only

Q. Consider the following: (2024)
1. Battery storage
2. Biomass generators
3. Fuel cells
4. Rooftop solar photovoltaic units
How many of the above are considered "Distributed Energy Resources"
a) Only one
b) Only two
c) Only three
d) All four

COP31, Antalya: Key Issues in Global Climate Action

The 31st Conference of the Parties (COP31) to the United Nations Framework Convention on Climate Change (UNFCCC) is being held in Antalya, Turkey, from November 9–20, 2026. With around 100,000 participants expected, the summit will focus on translating existing climate commitments into action, particularly through climate finance, adaptation, energy transition and support for developing countries. It is the first COP since the United States' exit from the Paris Agreement earlier in 2026, intensifying questions about climate finance and the responsibilities of developed countries.

Understanding the COP Framework

Conference of the Parties (COP): The annual meeting of countries that are parties to the 1992 UNFCCC, where they review progress and negotiate collective climate action.

Three Meetings at Antalya: The summit brings together COP31 under the UNFCCC, CMP21 under the Kyoto Protocol and CMA8 under the Paris Agreement.

Paris Agreement: Requires countries to submit Nationally Determined Contributions (NDCs), or national climate action plans, every five years. It aims to hold global warming well below 2°C while pursuing efforts to limit it to 1.5°C.

Consensus-Based Decisions: COP decisions require consensus, allowing a single country to delay or block an agreement.

PYQ COMPASS

Q. With reference to the Agreement at the UNFCCC Meeting in Paris in 2015, which of the following statements is/are correct? (2016)

1. The Agreement was signed by all the member countries of the UN and it will go into effect in 2017.
2. The Agreement aims to limit greenhouse gas emissions so that the rise in average global temperature by the end of this century does not exceed 20C or even 1.50C above pre-industrial levels.
3. Developed countries acknowledged their historical responsibility in global warming and committed to donate S 1000 billion a year from 2020 to help developing countries to cope with climate change.

Select the correct answer using the code given below.

a) 1 and 3 only b) 2 only
c) 2 and 3 only d) 1, 2 and 3

An Unusual Dual-Leadership Arrangement

Host Country: Turkey is the formal host and COP31 President, responsible for logistics and the voluntary Action Agenda.

Negotiating Leadership: Australia has exclusive authority over formal negotiations, drafting of texts and steering decisions.

Background: A disagreement between Turkey, which proposed Antalya, and Australia, which proposed Adelaide in partnership with Pacific Island countries, resulted in a power-sharing arrangement.

Major Negotiating Priorities at COP31

Climate Finance: France and the Philippines will facilitate discussions on climate finance commitments, including the $300 billion annual goal agreed at COP29 and the broader $1.3 trillion annual finance roadmap by 2035.

Mitigation: India and Germany will co-chair consultations on strengthening mitigation efforts and the meaning of transitioning away from fossil fuels.

Adaptation: The UK and Sierra Leone will work towards tripling adaptation finance and advancing the Global Goal on Adaptation (GGA), which is expected to be finalised at COP32.

Just Transition: Mexico and Poland will lead discussions on a just transition mechanism to adapt to the shift away from carbon-intensive activities.

Ocean and Climate Action: Palau and Canada will lead consultations on ocean-related issues, with Pacific Island countries seeking to incorporate ocean commitments into formal COP decisions.

Electrification Target: Turkey seeks commitments ***to increase electricity's share of global final energy consumption from approximately 23% to 35% by 2035.***

Outcomes of COP30 and the Unfinished Agenda

COP31 inherits several unresolved commitments from COP30, held in Belém, Brazil, under the outcome package known as the Global Mutirão.

Adaptation Finance: Called for at least a threefold increase in adaptation finance by 2035, but did not establish a clear baseline and deferred the proposed target by five years.

Climate Finance Roadmap: Endorsed the Baku-to-Belém Roadmap to mobilise at least $1.3 trillion annually for developing countries by 2035 from public and private sources, building on the $300 billion annual goal agreed at COP29.

Implementation Mechanisms: Established the Global Implementation Accelerator and the Belém Mission to 1.5 to support countries in implementing their climate plans. It also advanced work on a just transition mechanism.

Unresolved Fossil Fuel Transition: Despite support from more than 80 countries for a roadmap to move away from coal, oil and gas, the final text did not explicitly mention fossil fuels and referred instead to the 2023 UAE Consensus.

Parallel Initiatives: Brazil is steering a voluntary roadmap process on fossil fuel transition outside formal COP negotiations. Colombia and the Netherlands launched the Santa Marta process in April 2026 to identify pathways for phasing out fossil fuels.

PYQ COMPASS

Q. Which of the statements regarding 'Green Climate Fund' is/are correct? (2015)
1. It is intended to assist the developing countries in adaption and mitigation practices to counter climate change.
2. It is founded under the aegis of UNEP, OECD, Asian Development Bank and World Bank.
Select the correct answer using the code given below:
a) 1 only
b) 2 only
c) Both 1 and 2
d) Neither 1 nor 2

Key policy decisions agreed at COP30

Theme	*Core decision*
Climate finance	Countries agreed to **mobilise** $1.3 trillion per year by 2035
Adaptation finance	Commitment to **triple global adaptation** finance by 2035
Loss & damage	The loss and damage fund was **fully operationalised**
Fossil fuels	No fossil-fuel phase-out included in the final text, only a reference to the COP28 line on "transitioning away"

India's Climate Commitments and Negotiating Position

India enters COP31 with its third NDC, covering 2031–2035, approved and submitted in April 2026. It is also co-chairing consultations on mitigation.

Emission Intensity: Raised the target for reducing the emission intensity of GDP to 47% below 2005 levels by 2035, compared with the earlier target of 45% by 2030. Emission intensity measures greenhouse gas emissions per unit of economic output.

Non-Fossil Energy Capacity: Increased the target for the share of non-fossil sources in installed power capacity from 50% by 2030, a target already achieved, to 60% by 2035.

Carbon Sink: Raised the target for creating an additional carbon sink through forest and tree cover from 2.5–3 billion tonnes to 3.5–4 billion tonnes of CO_2 equivalent. A carbon sink absorbs more carbon dioxide than it releases.

Conditional Climate Ambition: Linked further climate ambition to the provision of new and additional finance and technology by developed countries.

Balanced Climate Action: Union Environment Minister Bhupender Yadav called for equal importance to adaptation, mitigation and the means of implementation, including finance, technology and capacity-building.

CBDR-RC: India emphasised that countries should follow pathways suited to their respective circumstances, without imposing a uniform approach to climate action.

Cyberattack on Supermarket Refrigeration Systems in Europe: Emerging Threats to Critical Infrastructure

A series of cyberattacks targeting supermarket refrigeration systems across Europe in October 2026 exposed the vulnerabilities of internet-connected physical infrastructure. Attackers manipulated refrigeration settings, raising temperatures and causing large-scale food spoilage across hundreds of supermarkets. The absence of ransom demands or data theft raised concerns that the attacks were intended not for financial gain but for deliberate disruption of essential supply chains.

What Happened in Europe?

Scale: Approximately 700 supermarket sites in France were affected. Similar attacks were reported in Belgium, Estonia, Finland, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Germany and Sweden.

Affected Outlets: Retail chains such as Intermarché, Carrefour, Spar and Delhaize, along with some IKEA-operated restaurants, were reportedly affected.

Manipulation: Attackers raised refrigeration temperatures to approximately 50°C by activating the forced defrost function and extending the defrost cycle from one hour to eight hours.

Delayed Detection: The extended cycle delayed alarms, allowing food stocks to spoil before staff could respond.

Damage: Food worth millions of euros was reportedly destroyed. No ransom demands or customer data theft were reported, and no group claimed responsibility.

How Were the Refrigeration Systems Hacked?

The attack exploited vulnerabilities in Internet of Things (IoT) and Operational Technology (OT) systems used to control physical equipment.

Centralised refrigeration controllers : allow maintenance contractors to remotely monitor equipment and modify settings.

Weak Security: Inadequately secured internet-connected controllers provided attackers with potential entry points.

Ordinary Commands: Attackers exploited the existing forced defrost function rather than deploying sophisticated malware.

Legacy Software: Refrigeration controllers often remain operational for 10–20 years, frequently running outdated software with inadequate security support.

What Was the Motive Behind the Attack?

Conventional Cybercrime: Cybercriminals generally seek financial gains through ransomware (encrypting systems and demanding payment) or data theft and extortion.

Absence of Ransom: The attackers neither demanded payment nor appeared to seek stolen customer information.

Deliberate Disruption: The apparent objective was to spoil food stocks, disrupt retail operations, empty shelves and create public anxiety.

Possible State-Sponsored Activity: The attacks could represent an attempt by a state-backed actor to test the vulnerability of essential supply chains and disrupt everyday economic activities.

Implications for India

Critical Infrastructure: India's power grids, factories, transport networks, hospitals, smart cities and supply chains increasingly depend on connected systems.

Essential Services: Traffic signals, water treatment facilities and industrial control systems could be disrupted through compromised equipment.

Food and Health Security: Refrigeration failures could damage food stocks and temperature-sensitive medicines, vaccines and blood products.

Third-Party Vulnerabilities: Remote access provided to equipment manufacturers and maintenance contractors can become an entry point for cyberattacks.

Indian Context: *IoT-based refrigeration monitoring is increasingly used by Indian supermarkets and dark stores for food-safety compliance.*

INTERNET OF THINGS (IOT)

Definition: The Internet of Things (IoT) refers to a network of physical objects embedded with sensors, software and internet connectivity, enabling them to collect, exchange and process data.

Smart Devices: include household appliances, vehicles, wearable devices, industrial machinery and transportation systems.

Connectivity and Automation: IoT enables devices to communicate with one another and with other internet-enabled systems, allowing remote monitoring, data exchange and automated operations.

Applications: IoT is used in smart homes, traffic management, industrial automation, healthcare, agriculture and warehouse inventory management.

Enterprise Applications: Businesses use IoT devices to monitor parameters such as temperature, humidity, air quality, energy consumption and machine performance. Real-time data analysis helps identify anomalies and improve operational efficiency.

Linkage with the European Supermarket Cyberattack

Smart Refrigeration: Supermarkets use IoT-enabled sensors and connected controllers to monitor refrigeration temperatures and remotely regulate cooling systems.

Cybersecurity Vulnerability: Inadequately secured internet-connected controllers can provide attackers with unauthorised access to physical equipment.

Physical Consequences: The European incident demonstrated how manipulating connected refrigeration controls could cause temperatures to rise, resulting in the disruption of supply chains.

Way Forward

Software Security: Regularly update firmware and replace unsupported equipment.

Secure Connectivity: Remove unnecessary internet exposure and route remote access through protected networks and VPNs.

Multi-Factor Authentication (MFA): Strengthen authentication for remote access.

Network Segmentation: Separate OT networks from conventional IT networks to contain cyber intrusions.

Continuous Monitoring: Audit connected devices, detect unauthorised changes and ensure reliable alarm systems.

PYQ COMPASS

Q. When the alarm of your smartphone rings in the morning, you wake up and tap it to stop the alarm which causes your geyser to be switched on automatically. The smart mirror in your bathroom shows the day's weather and also indicates the level of water in your overhead tank. After you take some groceries from your refrigerator for making breakfast, it recognises the shortage of stock in it and places an order for the supply of fresh grocery items. When you step out of your house and lock the door, all lights, fans, geysers and AC machines get switched off automatically. On your way to the office, your car warns you about traffic congestion ahead and suggests an alternative route, and if you are late for a meeting, it sends a message to your office accordingly. In the context of emerging communication technologies, which one of the following terms best applies to the above scenario? (2018)

a) Border Gateway Protocol
b) Internet of Things
c) Internet Protocol
d) Virtual Private Network

PYQ COMPASS

Q. When the alarm of your smartphone rings in the morning, you wake up and tap it to stop the alarm which causes your geyser to be switched on automatically. The smart mirror in your bathroom shows the day's weather and also indicates the level of water in your overhead tank. After you take some groceries from your refrigerator for making breakfast, it recognises the shortage of stock in it and places an order for the supply of fresh grocery items. When you step out of your house and lock the door, all lights, fans, geysers and AC machines get switched off automatically. On your way to the office, your car warns you about traffic congestion ahead and suggests an alternative route, and if you are late for a meeting, it sends a message to your office accordingly. In the context of emerging communication technologies, which one of the following terms best applies to the above scenario? (2018)

a) Border Gateway Protocol
b) Internet of Things
c) Internet Protocol
d) Virtual Private Network

Ans : b

The scenario described is an example of the Internet of Things (IoT), which refers to a network of interconnected devices that communicate and share data with each other to automate tasks and improve efficiency. Key elements in the scenario:

1. Smartphone and geyser: The alarm triggers the geyser, showcasing interconnected devices.
2. Smart mirror: Displays weather and water tank level, a feature of IoT-enabled devices.
3. Refrigerator: Recognizes shortages and orders groceries automatically, using IoT for inventory management.
4. Home automation: Lights, fans, and other appliances switch off when you lock the door, an IoT feature for energy efficiency.
5. Smart car: Provides traffic updates, suggests routes, and sends messages—an example of IoT in vehicles.

PYQ COMPASS

Q. Consider the following statements: (2022)
1. Gujarat has the largest solar park in India.
2. Kerala has a fully solar powered International Airport.
3. Goa has the largest floating solar photovoltaic project in India.
Which of the statements given below is/are correct?
a) 1 and 2
b) 2 only
c) 1 and 3
d) 3 only

Ans : b
Statement 1 is incorrect. Gujarat does have a large solar park, but Kurnool in Andhra Pradesh currently has the largest solar park in India, called the Pavagada Solar Park.
Statement 2 is correct. Cochin International Airport in Kerala is the world's first fully solar powered airport, which is a significant achievement in renewable energy.
Statement 3 is incorrect. While Goa has a floating solar project, the largest floating solar project in India is in Telangana at the Srisailam Reservoir. Thus, the correct answer is b) 2 only.

Q. Consider the following: (2024)
1. Battery storage
2. Biomass generators
3. Fuel cells
4. Rooftop solar photovoltaic units
How many of the above are considered "Distributed Energy Resources"
a) Only one
b) Only two
c) Only three
d) All four

Ans : d
Distributed Energy Resources (DERs) refer to small-scale units of local generation or storage connected to the grid. These resources are located close to where energy is used, and they can operate independently or in conjunction with the grid. All of the above given options are considered Distributed Energy Resources (DERs), as they are small-scale, localized energy generation or storage solutions. Thus, the correct answer is d)

PYQ COMPASS

Q. Which of the statements regarding 'Green Climate Fund' is/are correct? (2015)
1. It is intended to assist the developing countries in adaption and mitigation practices to counter climate change.
2. It is founded under the aegis of UNEP, OECD, Asian Development Bank and World Bank.
Select the correct answer using the code given below:
a) 1 only b) 2 only c) Both 1 and 2 d) Neither 1 nor 2

Ans : a
Statement 1 is correct. The Green Climate Fund (GCF) is established to help developing countries in their efforts to counter climate change, specifically by financing climate change mitigation and adaptation projects.
Statement 2 is incorrect. The Green Climate Fund was established under the United Nations Framework Convention on Climate Change (UNFCCC), not by UNEP, OECD, the Asian Development Bank, or the World Bank. It is governed by a Board that is accountable to the Conference of the Parties (COP) to the UNFCCC.
Thus, Statement 1 is correct, and Statement 2 is incorrect.

Q. With reference to the Agreement at the UNFCCC Meeting in Paris in 2015, which of the following statements is/are correct? (2016)
1. The Agreement was signed by all the member countries of the UN and it will go into effect in 2017.
2. The Agreement aims to limit greenhouse gas emissions so that the rise in average global temperature by the end of this century does not exceed 20C or even 1.50C above pre-industrial levels.
3. Developed countries acknowledged their historical responsibility in global warming and committed to donate S 1000 billion a year from 2020 to help developing countries to cope with climate change.
Select the correct answer using the code given below.
a) 1 and 3 only b) 2 only c) 2 and 3 only d) 1, 2 and 3

Ans : b
The Paris Agreement was not signed by all the member countries of the UN. It aims to limit the global temperature rise to well below 2°C and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels by the end of this century. The agreement includes a commitment by developed countries to provide $100 billion per year by 2020 (not $1000 billion) to assist developing countries in mitigating and adapting to climate change. So only statement 2 is correct, making option b the right answer.

PRACTICE QUESTIONS

Consider the following statements regarding COP31:

1. Turkey is responsible for hosting COP31 and overseeing its voluntary Action Agenda, while Australia has authority over formal negotiations.
2. Article 9.1 of the Paris Agreement requires developing countries to provide financial resources to developed countries for climate action.
3. The Global Goal on Adaptation (GGA) seeks to strengthen adaptation efforts and assess progress in building climate resilience.

Which of the statements given above are correct?

a) 1 and 2 only
b) 1 and 3 only
c) 2 and 3 only
d) 1, 2 and 3

Answer: b) 1 and 3 only

Statement 1 is correct. COP31 follows an unusual dual-leadership arrangement, with Turkey hosting the summit and Australia leading formal negotiations.

Statement 2 is incorrect. Article 9.1 places the obligation on developed countries to provide financial resources to developing countries.

Statement 3 is correct. The GGA aims to enhance adaptive capacity, strengthen resilience and reduce vulnerability to climate change.

Consider the following statements regarding the application of the Internet of Things (IoT) in industrial and critical infrastructure:

1. IoT-enabled sensors and controllers can facilitate remote monitoring and regulation of industrial equipment.
2. A cyberattack targeting an IoT-connected operational system can cause physical disruption even without involving the theft of sensitive data.
3. Operational Technology (OT) is primarily concerned with processing business information and does not directly interact with physical equipment.

Which of the statements given above are correct?

a) 1 and 2 only
b) 1 and 3 only
c) 2 and 3 only
d) 1, 2 and 3

Answer: a) 1 and 2 only

Statement 1 and 2 are correct. ***Statement 3 is incorrect.*** Operational Technology (OT) directly monitors and controls physical devices, equipment and industrial processes. Information Technology (IT), in contrast, primarily deals with data processing and communication.

PYQ COMPASS

Q. Consider the following statements : (2023)
Statement-I: The Supreme Court of India has held in some judgments that the reservation policies made under Article 16(4) of the Constitution of India would be limited by Article 335 for maintenance of efficiency of administration.
Statement-II: Article 335 of the Constitution of India defines the term 'efficiency of administration'.
Which one of the following is correct in respect of the above statements?
(a) Both Statement-I and Statement-II are correct and Statement-II is the correct explanation for Statement I
(b) Both Statement-I and Statement-II are correct and Statement-II is not the correct explanation for Statement-I
(c) Statement-I is correct but Statement-II is incorrect
(d) Statement-I is incorrect but Statement- II is correct

Ans : C
Statement-I: This is correct. The Supreme Court has held in several judgments (e.g., Indra Sawhney case, M. Nagaraj case) that reservation policies under Article 16(4) (which provides for reservation in public employment) must not compromise the "efficiency of administration" as mandated by Article 335. Article 335 states that claims of Scheduled Castes and Scheduled Tribes must be balanced with maintaining administrative efficiency.
Statement-II: This is incorrect. Article 335 mentions "efficiency of administration" but does not define the term. The interpretation of what constitutes "efficiency of administration" is left to judicial interpretation and administrative practice.
Thus, Statement-I is correct, and Statement-II is incorrect, making the correct answer (c) Statement I is correct but Statement-II is incorrect.

Q. Which one of the following reflects the most appropriate relationship between law and liberty? (2018)
(a) If there are more laws, there is less liberty. (b) If there are no laws, there is no liberty.
(c) If there is liberty, laws have to be made by the people.
(d) If laws are changed too often, liberty is in danger

Ans : b
The most appropriate relationship between law and liberty is reflected in (b) If there are no laws, there is no liberty.