

Total Marks : 250

Time : 3 Hours

Candidates should attempt all questions of Group A with word limit of 300 words and any 10 questions of Group B with word limit of 250 words.

Question 1 to Question 5
20 marks each (answer in 300 words)

Question 6 to Question 18
15 marks each (answer in 250 words)

GROUP A

- Q.1** Facilitating a conducive ecosystem for private investment is essential to driving a sustainable cycle of economic growth. In this context, discuss the key challenges that hinder India's goal of achieving a \$5 trillion economy.
ଆର୍ଥିକ ଅଭିବୃଦ୍ଧିର ଏକ ସ୍ଥାୟୀ ଚକ୍ର ଚଳାଇବା ପାଇଁ ଘରୋଇ ନିବେଶ ପାଇଁ ଏକ ଅନୁକୂଳ ଇକୋସିଷ୍ଟମକୁ ସୂଚନା କରିବା ଅତ୍ୟନ୍ତ ଜରୁରୀ। ଏହି ପରିପ୍ରେକ୍ଷୀରେ, ଭାରତର \$5 ଟ୍ରିଲିୟନ ଅର୍ଥନୀତି ହାସଲ ଲକ୍ଷ୍ୟକୁ ବାଧା ଦେଉଥିବା ପ୍ରମୁଖ ଚ୍ୟାଲେଞ୍ଜଗୁଡ଼ିକ ଉପରେ ଆଲୋଚନା କରନ୍ତୁ।
- Q.2** What is meant by 'active inclusion' in the context of sustainable economic growth? Discuss the measures implemented by the government to promote active inclusion.
ସ୍ଥାୟୀ ଆର୍ଥିକ ଅଭିବୃଦ୍ଧି ପରିପ୍ରେକ୍ଷୀରେ 'ସକ୍ରିୟ ଅନ୍ତର୍ଭୁକ୍ତି' କ'ଣ ବୁଝାଏ? ସକ୍ରିୟ ଅନ୍ତର୍ଭୁକ୍ତିକୁ ପ୍ରୋତ୍ସାହିତ କରିବା ପାଇଁ ସରକାର କାର୍ଯ୍ୟକାରୀ କରିଥିବା ପଦକ୍ଷେପଗୁଡ଼ିକ ଉପରେ ଆଲୋଚନା କରନ୍ତୁ।
- Q.3** To address the growing threat of drug-resistant bacteria, researchers are investigating how a particular superbug evolves to resist an antibiotic considered the last line of defense. In this context, explain the concept of antimicrobial resistance and discuss the key factors contributing to antibiotic resistance in India.
ଔଷଧ-ପ୍ରତିରୋଧୀ ଜୀବାଣୁର ବର୍ଦ୍ଧିତ ବିପଦକୁ ସମାଧାନ କରିବା ପାଇଁ, ଗବେଷକମାନେ ଅନୁସନ୍ଧାନ କରୁଛନ୍ତି ଯେ କିପରି ଏକ ନିର୍ଦ୍ଦିଷ୍ଟ ସୁପରବଗ୍ ଶେଷ ପ୍ରତିରକ୍ଷା ରେଖା ଭାବରେ ବିକଶିତ ହୋଇ ଏକ ଆଣ୍ଟିବାୟୋଟିକ୍ ପ୍ରତିରୋଧୀ ପାଇଁ ବିକଶିତ ହୁଏ। ଏହି ପରିପ୍ରେକ୍ଷୀରେ, ଆଣ୍ଟିମାଇକ୍ରୋବାୟାଲ୍ ପ୍ରତିରୋଧର ଧାରଣା ବ୍ୟାଖ୍ୟା କରନ୍ତୁ ଏବଂ ଭାରତରେ ଆଣ୍ଟିବାୟୋଟିକ୍ ପ୍ରତିରୋଧରେ ଅବଦାନ ରଖୁଥିବା ପ୍ରମୁଖ କାରଣଗୁଡ଼ିକ ଉପରେ ଆଲୋଚନା କରନ୍ତୁ।
- Q.4** Analyze the key highlights of the Odisha Budget 2025-26, focusing on its fiscal indicators, major policy initiatives, and sectoral growth trends. Discuss its implications for economic development in the state.
ଓଡ଼ିଶା ବଜେଟ୍ 2025-26 ର ମୁଖ୍ୟ ସୂଚନାଗୁଡ଼ିକୁ ବିଶ୍ଳେଷଣ କରନ୍ତୁ, ଏହାର ଆର୍ଥିକ ସୂଚକ, ପ୍ରମୁଖ ନୀତି ପଦକ୍ଷେପ ଏବଂ କ୍ଷେତ୍ରୀୟ ଅଭିବୃଦ୍ଧି ଧାରା ଉପରେ ଧ୍ୟାନ ଦିଅନ୍ତୁ। ରାଜ୍ୟରେ ଆର୍ଥିକ ବିକାଶ ପାଇଁ ଏହାର ପ୍ରଭାବ ଆଲୋଚନା କରନ୍ତୁ।
- Q.5** Discuss Odisha's transformation in disaster management over the past two decades. What key lessons can other states and countries learn from its approach?
ଗତ ଦୁଇ ଦଶନ୍ଧି ମଧ୍ୟରେ ବିପର୍ଯ୍ୟୟ ପରିଚାଳନାରେ ଓଡ଼ିଶାର ପରିବର୍ତ୍ତନ ବିଷୟରେ ଆଲୋଚନା କରନ୍ତୁ। ଏହାର ଆଭିମୁଖ୍ୟରୁ ଅନ୍ୟ ରାଜ୍ୟ ଏବଂ ଦେଶମାନେ କ'ଣ ପ୍ରମୁଖ ଶିକ୍ଷା ପାଇପାରିବେ?

GROUP B

- Q.6 Can PM-KISAN be the game-changer in transforming India's agricultural support system and addressing rural distress?**
କ'ଣ ପ୍ରଧାନମନ୍ତ୍ରୀ-କିଷାନ ଭାରତର କୃଷି ସହାୟତା ବ୍ୟବସ୍ଥାକୁ ପରିବର୍ତ୍ତନ କରିବା ଏବଂ ଗ୍ରାମୀଣ ଦୁର୍ଦ୍ଦଶାର ସମାଧାନ କରିବାରେ ଖେଳ ପରିବର୍ତ୍ତକ ହୋଇପାରେ?
- Q.7 Recent studies on global rainforest deforestation reveal a critical situation. How can efforts be intensified to safeguard tropical forests and enhance their role in regulating Earth's climate?**
ବିଶ୍ୱ ବର୍ଷାଜଳ କ୍ଷୟ ଉପରେ ସାମ୍ପ୍ରତିକ ଅଧ୍ୟୟନ ଏକ ଜଟିଳ ପରିସ୍ଥିତି ପ୍ରକାଶ କରେ। ଉଷ୍ଣକଟିବନ୍ଧୀୟ ଜଙ୍ଗଲକୁ ସୁରକ୍ଷା ଦେବା ଏବଂ ପୃଥିବୀର ଜଳବାୟୁ ନିୟନ୍ତ୍ରଣରେ ସେମାନଙ୍କର ଭୂମିକାକୁ ବୃଦ୍ଧି କରିବା ପାଇଁ ପ୍ରୟାସକୁ କିପରି ତୀବ୍ର କରାଯାଇପାରିବ?
- Q.8 Technology serves as both an enabler and a challenge to national security. In light of this, discuss how law enforcement agencies can leverage social media to enhance national security.**
ପ୍ରଯୁକ୍ତିବିଦ୍ୟା ଜାତୀୟ ସୁରକ୍ଷା ପାଇଁ ଏକ ସମର୍ଥକ ଏବଂ ଏକ ଚ୍ୟାଲେଞ୍ଜ ଭାବରେ କାର୍ଯ୍ୟ କରେ। ଏହାକୁ ଦୃଷ୍ଟିରେ ରଖି, ଆଇନ ପ୍ରବର୍ତ୍ତନ ଏଜେନ୍ସିଗୁଡ଼ିକ ଜାତୀୟ ସୁରକ୍ଷାକୁ ବୃଦ୍ଧି କରିବା ପାଇଁ ସାମାଜିକ ଗଣମାଧ୍ୟମକୁ କିପରି ବ୍ୟବହାର କରିପାରିବେ ତାହା ଆଲୋଚନା କରନ୍ତୁ।
- Q.9 Discuss the economic significance of Odisha's ecosystem services and land commons, highlighting the challenges they face and the need for sustainable management policies.**
ଓଡ଼ିଶାର ଇକୋସିଷ୍ଟମ ସେବା ଏବଂ ଭୂମି ସାଧାରଣ କ୍ଷେତ୍ରର ଆର୍ଥିକ ଗୁରୁତ୍ୱ ବିଷୟରେ ଆଲୋଚନା କରନ୍ତୁ, ସେମାନେ ସମ୍ମୁଖୀନ ହେଉଥିବା ଚ୍ୟାଲେଞ୍ଜ ଏବଂ ସ୍ଥାୟୀ ପରିଚାଳନା ନୀତିର ଆବଶ୍ୟକତା ଉପରେ ଆଲୋଚନା କରନ୍ତୁ।
- Q.10 Agricultural growth and transformation are impossible without an active private sector that supports and drives farming, agribusiness, and agri-food value chains. Discuss.**
କୃଷି, କୃଷି ବ୍ୟବସାୟ ଏବଂ କୃଷି-ଖାଦ୍ୟ ମୂଲ୍ୟ ଶୃଙ୍ଖଳକୁ ସମର୍ଥନ ଏବଂ ଚାଳିତ କରୁଥିବା ଏକ ସକ୍ରିୟ ଘରୋଇ କ୍ଷେତ୍ର ବିନା କୃଷି ଅଭିବୃଦ୍ଧି ଏବଂ ପରିବର୍ତ୍ତନ ଅସମ୍ଭବ। ଆଲୋଚନା କରନ୍ତୁ।
- Q.11 "Intelligence reform in India can only be effective if it is integrated with police modernization, ensuring the enhancement of both technological and human capabilities of State police personnel." Discuss the challenges associated with India's intelligence framework in this context.**
"ଭାରତରେ ଗୁପ୍ତଚର ସଂସ୍କାର କେବଳ ସେତେବେଳେ ପ୍ରଭାବଶାଳୀ ହୋଇପାରିବ ଯଦି ଏହା ପୋଲିସ ଆଧୁନିକୀକରଣ ସହିତ ସମନ୍ୱିତ ହୁଏ, ରାଜ୍ୟ ପୋଲିସ କର୍ମଚାରୀଙ୍କ ପ୍ରଯୁକ୍ତିବିଦ୍ୟା ଏବଂ ମାନବ କ୍ଷମତା ଉଭୟର ବୃଦ୍ଧିକୁ ସୁନିଶ୍ଚିତ କରେ।" ଏହି ପରିପ୍ରେକ୍ଷୀରେ ଭାରତର ଗୁପ୍ତଚର ଢାଞ୍ଚା ସହିତ ଜଡ଼ିତ ଚ୍ୟାଲେଞ୍ଜଗୁଡ଼ିକ ବିଷୟରେ ଆଲୋଚନା କରନ୍ତୁ।
- Q.12 India is among the first countries to develop a comprehensive 'Cooling Action Plan' in line with the Montreal Protocol to combat ozone layer depletion. Discuss the extent to which this plan can aid in reducing both direct and indirect emissions while meeting the cooling demands across various economic sectors.**
ଓଜୋନ ସ୍ତର ହ୍ରାସକୁ ମୁକାବିଲା କରିବା ପାଇଁ ମଣ୍ଟ୍ରିଆଲ ପ୍ରୋଟୋକଲ ସହିତ ଏକ ବ୍ୟାପକ 'କୁଲିଂ ଆକ୍ସନ ପ୍ଲାନ' ବିକଶିତ କରିବାରେ ଭାରତ ପ୍ରଥମ ଦେଶମାନଙ୍କ ମଧ୍ୟରେ ଅନ୍ୟତମ। ବିଭିନ୍ନ ଆର୍ଥିକ କ୍ଷେତ୍ରରେ ଶୀତଳତା ଚାହିଦା ପୂରଣ କରିବା ସହିତ ଏହି ଯୋଜନା ପ୍ରତ୍ୟକ୍ଷ ଏବଂ ପରୋକ୍ଷ ନିର୍ଗମନକୁ ହ୍ରାସ କରିବାରେ କେତେ ସାହାଯ୍ୟ କରିପାରିବ ତାହା ଆଲୋଚନା କରନ୍ତୁ।
- Q.13 "A disaster-resilient world requires robust and resilient infrastructure." In this context, examine how the Coalition for Disaster Resilient Infrastructure (CDRI) can support India's commitment to the Sendai Framework for Disaster Risk Reduction in mitigating disaster risks.**
"ଏକ ବିପର୍ଯ୍ୟୟ-ପ୍ରତିରୋଧୀ ବିଶ୍ୱ ପାଇଁ ଦୃଢ଼ ଏବଂ ସ୍ଥିର ଭିତ୍ତିଭୂମି ଆବଶ୍ୟକ।" ଏହି ପରିପ୍ରେକ୍ଷୀରେ, ବିପର୍ଯ୍ୟୟ ପ୍ରତିରୋଧୀ ଭିତ୍ତିଭୂମି ପାଇଁ ମେଣ୍ଟ (CDRI) ବିପର୍ଯ୍ୟୟ ବିପଦ ହ୍ରାସ କରିବାରେ ସେଣ୍ଟାଲ ଫ୍ରେମୱାର୍କ ପ୍ରତି ଭାରତର ପ୍ରତିବଦ୍ଧତାକୁ କିପରି ସମର୍ଥନ କରିପାରିବ ତାହା ଯାଞ୍ଚ କରନ୍ତୁ।

- Q.14** Discuss how the key features of the Paris Call contribute to strengthening cybersecurity. Additionally, outline the measures taken by the Government of India to address cybersecurity challenges.
ପ୍ୟାରିସ୍ ଆହ୍ୱାନର ପ୍ରମୁଖ ବୈଶିଷ୍ଟ୍ୟଗୁଡ଼ିକ ସାଇବର ସୁରକ୍ଷାକୁ ସୁଦୃଢ଼ କରିବାରେ କିପରି ଅବଦାନ ରଖେ ତାହା ଆଲୋଚନା କରନ୍ତୁ। ଏହା ସହିତ, ସାଇବର ସୁରକ୍ଷା ତ୍ୟାଲେଞ୍ଜର ମୁକାବିଲା ପାଇଁ ଭାରତ ସରକାରଙ୍କ ଦ୍ୱାରା ନିଆଯାଇଥିବା ପଦକ୍ଷେପଗୁଡ଼ିକର ରୂପରେଖ ଦିଅନ୍ତୁ।
- Q.15** "It may be time for the government to consider new legislation to replace the Armed Forces Special Powers Act, 1958 (AFSPA), as it has been ineffective in both preventing human rights violations and ensuring adequate protection for soldiers who risk their lives in the defense of the nation." In this context, examine the relevance of AFSPA in addressing contemporary security challenges.
"ସରକାରଙ୍କ ପାଇଁ ସଶସ୍ତ୍ର ବାହିନୀ ସ୍ୱତନ୍ତ୍ର କ୍ଷମତା ଆଇନ, ୧୯୫୮ (AFSPA)କୁ ବଦଳାଇବା ପାଇଁ ନୂତନ ଆଇନ ବିଚାର କରିବାର ସମୟ ଆସିପାରେ, କାରଣ ଏହା ମାନବାଧିକାର ଉଲ୍ଲଙ୍ଘନକୁ ରୋକିବା ଏବଂ ଜାତିର ପ୍ରତିରକ୍ଷାରେ ନିଜ ଜୀବନକୁ ବିପଦରେ ପକାଇଥିବା ସୈନିକଙ୍କ ପାଇଁ ପର୍ଯ୍ୟାପ୍ତ ସୁରକ୍ଷା ସୁନିଶ୍ଚିତ କରିବାରେ ପ୍ରଭାବହୀନ ହୋଇଛି।" ଏହି ପରିପ୍ରେକ୍ଷୀରେ, ସମସ୍ତାମୟିକ ସୁରକ୍ଷା ତ୍ୟାଲେଞ୍ଜର ମୁକାବିଲାରେ AFSPAର ପ୍ରାସଙ୍ଗିକତା ଯାଞ୍ଚ କରନ୍ତୁ।
- Q.16** "Identify the major threat to wetlands in India. Discuss the measures taken at the national and international level in protection and conservation of wetlands in India."
"ଭାରତରେ ଆର୍ଦ୍ରଭୂମି ପ୍ରତି ପ୍ରମୁଖ ବିପଦ ଚିହ୍ନଟ କରନ୍ତୁ। ଭାରତରେ ଆର୍ଦ୍ରଭୂମିର ସୁରକ୍ଷା ଏବଂ ସଂରକ୍ଷଣରେ ଜାତୀୟ ଏବଂ ଅନ୍ତର୍ଜାତୀୟ ସ୍ତରରେ ନିଆଯାଇଥିବା ପଦକ୍ଷେପଗୁଡ଼ିକ ଆଲୋଚନା କରନ୍ତୁ।"
- Q.17** Examine the reason for increasing unemployment among Indian youths in recent years in India. Evaluate the role of state-specific initiatives, with a focus on Odisha, in tackling the issue effectively.
ଭାରତରେ ସାମ୍ପ୍ରତିକ ବର୍ଷଗୁଡ଼ିକରେ ଭାରତୀୟ ଯୁବକମାନଙ୍କ ମଧ୍ୟରେ ବେକାରୀ ବୃଦ୍ଧି ପାଇବାର କାରଣ ଯାଞ୍ଚ କରନ୍ତୁ। ଏହି ସମସ୍ୟାକୁ ପ୍ରଭାବଶାଳୀ ଭାବରେ ମୁକାବିଲା କରିବାରେ ଓଡ଼ିଶା ଉପରେ ଧ୍ୟାନ ଦେଇ ରାଜ୍ୟ-ନିର୍ଦ୍ଦିଷ୍ଟ ପଦକ୍ଷେପଗୁଡ଼ିକର ଭୂମିକା ମୂଲ୍ୟାଙ୍କନ କରନ୍ତୁ।
- Q.18** Elaborate upon the growing issue of space debris in recent times. Also discuss the significance of ISRO's recent mission in achieving the zero debris target.
ସାମ୍ପ୍ରତିକ ସମୟରେ ମହାକାଶ ଅଳିଆର ବର୍ଦ୍ଧିତ ସମସ୍ୟା ଉପରେ ବିସ୍ତୃତ ଭାବରେ ଆଲୋଚନା କରନ୍ତୁ। ଶୂନ୍ୟ ଧ୍ୱଂସାବଶେଷ ଲକ୍ଷ୍ୟ ହାସଲ କରିବାରେ ISROର ସାମ୍ପ୍ରତିକ ମିଶନର ଗୁରୁତ୍ୱ ବିଷୟରେ ମଧ୍ୟ ଆଲୋଚନା କରନ୍ତୁ।

(GS PAPER III: FULL SYLLABUS)

GROUP A

Q.1 Answer

APPROACH:

Introduction: Define a conducive investment ecosystem and its role in economic growth.

Body: Discuss key challenges—policy uncertainty, infrastructure gaps, regulatory hurdles, financial constraints, and global economic factors. Provide relevant examples and data.

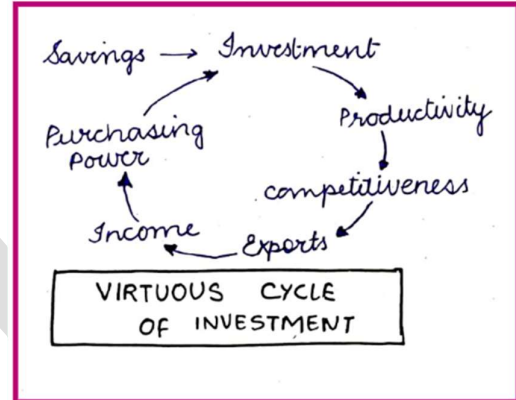
Conclusion: Suggest reforms to enhance investment, ensuring sustainable economic growth.

Introduction:

Economic Survey 2018-19 has advocated “Investment” and especially private investment to be the key driver of a virtuous cycle of productivity, jobs, export, demand and savings to realise the goal of \$5 trillion economies by 2024-25.

As per Economic Survey 2017-18, India’s Investment slowdown of 6-7% from 2005-07 to 2017-18 is largely driven by a slowdown in private investment. Therefore, it is crucial in reviving private investment as can be seen from the examples of China (45% investment rate), Japan (1950-70), the Asian tigers, etc.

Body:



This virtuous cycle will be a catalyst for India to achieve an annual real growth rate of 8% to make India the world’s 3rd largest economy worth **\$5 trillion by 2024-25**. Therefore, the government has taken several steps like **Make in India, Startup India, etc, to boost investment**.

However, there are several obstacles in the way of achieving a \$5 trillion economy led by private investment:-

Issue	Details
Twin Balance Sheet Problem	Though reducing, the rate of Non-Performing Assets (NPAs) is still high (9.3%), affecting the lending capacity of banks and the demand for loans from corporates, particularly in sectors like power and telecom.
Liquidity Crisis	The IL&FS crisis led to a liquidity crunch in the financial market, reducing fund availability for investment.
Low Rate of Investment & Growth Slowdown	Investment rate is at 29%, which needs to rise to 36% (as per NITI Aayog) to achieve the \$5 trillion economy goal.
Poor Ease of Doing Business	India ranks low (163rd) in contract enforcement, dampening investor confidence.
Agricultural Distress	High variability and low productivity in agriculture reduce the purchasing power of the majority of India's population.
Late Converger Stall	Economic Survey warns of challenges like rising protectionism, structural transformation issues, poor education & skill development, and climate change effects on agriculture.

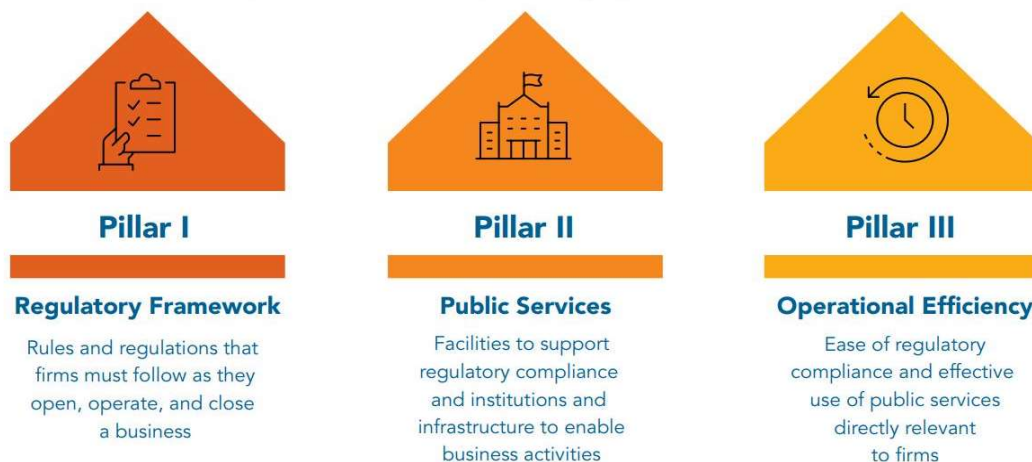
Energy Dependence	India imports over 80% of its oil and 50% of its natural gas, making it vulnerable to currency fluctuations and geopolitical risks.
Second-Generation Reforms	Slow reforms in land, labor, and skilling reduce investor confidence.

B-READY topics correspond to various stages of the life cycle of a firm and examine three cross-cutting themes



Source: B-READY project.

B-READY pillars define the scope of the project



These obstacles, along with global slowdown risk, low rate of exports (1.7% for goods) etc., need to be resolved at the earliest to reignite the “Animal spirit” of private investment in the economy.

Conclusion:

Focusing on resolving NPAs, MSMEs slowdown, and liquidity crisis should be the top agenda of the government. Along with these, taking holistic steps on the sectoral problem of Agriculture, manufacturing and services should be the priority. Recent steps like project Sashakt, KISAN scheme, Foreign trade policy, improvement in Ease of Doing Business ranking, etc. are steps in the right direction.

Q.2 Answer

APPROACH:

Introduction: Define ‘active inclusion’ in the context of sustainable economic growth and its significance in ensuring equal opportunities for all.

Body: Explain key aspects of active inclusion, such as social protection, inclusive labor markets, and equal access to resources. Discuss government measures like MGNREGA, Skill India, and social welfare schemes.

Conclusion: Highlight the role of active inclusion in fostering economic growth, reducing inequalities, and achieving sustainable development.

Introduction:

Active inclusion refers to both the 'pace' and 'pattern' of growth. Active inclusion is that which increases capabilities and allows more people to contribute to and participate in the benefits of growth. Pure economic growth can lead to inequality as a long-term cost, while active inclusion seeks to ensure that benefits are distributed 'equitably' among all sections.

Active inclusion empowers by increasing rewards to work, thus creating conditions for the many to contribute to and participate in the growth process. Expenditure on agricultural productivity, health and education, employment and MSME credit will all aid active inclusion.

Body:

Core components of active inclusion:

- Adequate income support to the employed, quality employment generation, inclusive labour markets.
- Access to essential services such as housing, education, finance, health, social security, etc.
- Removal of gender, caste, communal barriers.

Steps taken by the Government and their role in Active Inclusion:

Category	Schemes/Initiatives	Objective
Employment and Labour Welfare	Parampargat Krishi Yojana	Promotion of organic farming, integrated farming, and livestock to double farmers' income.
	PM KISAN	Input support to farmers for agricultural growth.
	Make in India, Start Up India, MSME promotion	Creation of quality jobs in the manufacturing sector, reducing underemployment in agriculture and allied sectors.
	PM Shram Yogi Mandhan Yojana	Social security for unorganised and small-scale workers.
	Coastal Employment Zones (CEZs) under SAGARMALA	Promoting large-scale production for exports, overcoming the limitations of SEZs.
Access to Services	PMAY (Rural and Urban)	Providing affordable housing.
	Article 21A	Free and compulsory primary education.
	Ayushman Bharat, Mission Indradhanush	Health initiatives including vaccination, institutional deliveries, and healthcare services.
	ICDS, MDMS	Nutritional support through Integrated Child Development Services (ICDS) and Mid-Day Meal Scheme (MDMS).
	JAM Trinity, Stand Up India, MUDRA loans, SIDBI, NABARD	Financial inclusion and credit access for rural development.
	Employee State Insurance	Social security initiatives.

	Corporation, Atal Pension Yojana	
Bridging Gaps	Beti Bachao Beti Padhao (BBBP)	Empowerment and education of the girl child.
	Maternity Benefits Amendment Act	Enhancing maternity benefits for working women.
	Sensitization of police and administration	Addressing communal and caste-related issues.
	Black Money Act, Fugitive Economic Offenders Act	Tackling economic inequality and financial fraud.

Conclusion:

Inclusion is essential for sustainable growth but only active inclusion is sustainable. Since India still reels under inequality, poverty, health and other challenges, the government must fulfil its duties under Article 38, 41, 42, 43 of Directive Principles by better implementation of the above programmes.

Q.3 Answer

APPROACH:

Introduction: Define antimicrobial resistance (AMR) and its implications for public health.

Body: Explain the mechanisms of AMR development and key factors contributing to antibiotic resistance in India, such as overuse, self-medication, and lack of sanitation. Provide examples.

Conclusion: Emphasize the need for stringent policies, awareness, and research to combat AMR.

Introduction:

Antibiotics are drugs that treat infections caused by bacteria. When certain bacteria are no longer eliminated by previously curable antibiotics, and thus become resistant to the effect of those drugs, it is known as '**Antibiotic Resistance**'. Antibiotic resistance is a naturally occurring phenomenon that can be slowed, but not stopped. Over time, bacteria adapt to the drugs that are designed to kill them and change to ensure their survival. For example, in the case of **Methicillin-Resistant Staphylococcus aureus (MRSA)**, the bacterium, *S. aureus*, is no longer killed by the antibiotic, methicillin.

"**Superbugs**" is a term used to describe strains of bacteria that are resistant to the majority of antibiotics commonly used today.

Body:

Antimicrobial Resistance in India:

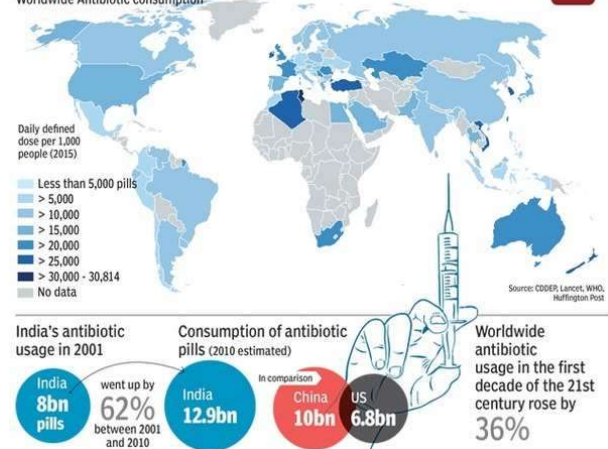
"The Scoping Report on Antimicrobial Resistance in India" prepared by DBT shows India has some of the highest antibiotic resistance rates, particularly the Carbapenem class of antibiotics, one of the last-resort antibiotics to treat serious bacterial infections in humans, and resistance to them among various gram-negative bacteria was extremely high.

In India, 60,000 newborns die each year of Antibiotic-Resistant Neonatal Infections. The report also shows the highest prevalence of MDR-TB in India across the world.

Factors Responsible in India:

INDIA HIGH ON ANTIBIOTIC USAGE

Worldwide Antibiotic consumption



UN Adhoc Interagency Coordination Group (IACG) on Antimicrobial Resistance Report listed out various reasons for spread of AMR in Indian setting:

Category	Issues
Misuse of Antibiotics	Overuse, misuse, and abuse of antibiotics like Colistin due to self-medication and incomplete courses.
Hospital Acquired Infections	High prevalence of infections such as MRSA (Methicillin-resistant <i>Staphylococcus aureus</i>).
Agricultural & Livestock Misuse	Poor hygiene in poultry farms driven by profit motives, leading to excessive antibiotic use. Overuse of fungicides, leading to <i>Candida auris</i> becoming a superbug.
Cultural Factors	Negligence of hygiene during mass gatherings like Kumbh Mela. Increased non-vegetarian consumption for protein requirements.
Regulatory Issues	Lack of regulations to control antibiotic overuse and faulty medical practices such as pharmaceutical waste disposal.

Way forward:

- **Strengthening surveillance, regulatory frameworks, professional education** and oversight of antimicrobial prescription and use, and increasing awareness among all stakeholders are also significant.
- **India's medical societies in 2012 adopted the Chennai Declaration**, a set of national recommendations to promote antibiotics.
- **Taking the learnings forward from the implementation of the National Policy** on containment of AMR and subsequent the National Action Plan on AMR 2017-21 should be implemented with letter and spirit.
- **India's Red Line campaign** – which demands that prescription-only antibiotics be marked with a red line, to discourage the over-the-counter sale of antibiotics– is a step forward.

Conclusion:

The National Health Policy, 2017 also terms antimicrobial resistance as one of the key healthcare issues and prioritises development of guidelines regarding antibiotic use, limiting over-the-counter use of antibiotics and restricting the use of antibiotics as growth promoters in livestock.

Q.4 Answer

APPROACH:

Introduction: Provide an overview of the Odisha Budget 2025-26, highlighting its fiscal objectives and overall economic vision.

Body: Analyze key fiscal indicators, major policy initiatives, and sectoral allocations. Discuss trends in infrastructure, social welfare, and industrial growth with relevant examples.

Conclusion: Assess its potential impact on Odisha's economic development, fiscal sustainability, and long-term growth prospects.

Introduction:

The Odisha Budget 2025-26, presented by Chief Minister Mohan Charan Majhi, projects a GSDP of ₹10.63 lakh crore with a 12% growth rate. The budget focuses on rural development, infrastructure, and fiscal discipline while maintaining a revenue surplus and managing a fiscal deficit of 3.2% of GSDP.

Body:

Fiscal Indicators

Indicator	Value
Revenue Surplus	₹31,800 crore (3% of GSDP)
Fiscal Deficit	₹34,200 crore (3.2% of GSDP)
Expenditure	₹2,66,800 crore (9% increase from 2024-25 RE)
Receipts (excluding borrowings)	₹2,32,600 crore (8% increase)

Major Policy Initiatives

Scheme Name	Allocation	Purpose
Antyodaya Gruha Yojana	₹7,550 crore (over three years)	Housing for the poor
Mukhya Mantri Sadak Yojana	₹3,470 crore	Rural road connectivity
Mukhyamantri Sahari Bikas Yojana	₹1,100 crore	Urban infrastructure development
MLALAD Scheme	Increased from ₹3 crore to ₹5 crore per constituency	Local area development by MLAs

Sectoral Growth Trends

Sector	Growth Rate (2024-25)	Growth Rate (2023-24)
Agriculture	3.8%	7.6%
Manufacturing	6.6%	8.7%
Services	10% (highest contribution to GSDP at 37%)	-

Per Capita GSDP

Region	Estimated Per Capita GSDP
State	₹2,03,085
India	₹2,30,195

Major Policy Initiatives

- **Antyodaya Gruha Yojana:**
 - Aims to provide concrete houses to poor families affected by poverty, disasters, and displacement.
 - ₹7,550 crore allocated over three years, with ₹2,603 crore for 75,000 houses in 2025-26.
- **Rural and Urban Infrastructure Development:**
 - **Mukhya Mantri Sadak Yojana:** ₹3,470 crore allocated to improve rural roads and connectivity.

- **Mukhyamantri Sahari Bikas Yojana:** ₹1,100 crore for civic amenities in cities.
- ₹200 crore for developing 322 hectares in Bhubaneswar for IT, research, and service sectors.
- **Legislative Area Development:**
 - **MLALAD Scheme:** Annual allocation per constituency increased from ₹3 crore to ₹5 crore, with a total allocation of ₹735 crore.

Category	2023-24	2024-25 (Projected)	Remarks
GSDP Growth Rate	-	7.2%	Higher than India's 6.4%
Sector-wise Growth			
Agriculture	7.6%	3.8%	Decline indicates challenges
Manufacturing	8.7%	6.6%	Industrial slowdown
Services	11.5%	10%	Fastest-growing sector
Sectoral Contribution to GSDP			
Agriculture	-	28%	Significant share
Manufacturing	-	35%	Strong industrial base
Services	-	37%	Largest contributor
Per Capita GSDP	-	₹2,03,085	Lower than India's ₹2,30,195

Implications for Economic Development

1. Fiscal Stability and Growth:

- A revenue surplus of **3% of GSDP** ensures financial stability.
- Increased capital outlay (**17% growth**) will drive infrastructure-led growth.

2. Infrastructure and Employment Generation:

- Rural and urban connectivity projects will enhance trade and employment opportunities.
- Investments in IT and research sectors in Bhubaneswar will boost skilled employment.

3. Social and Economic Equity:

- The **Antyodaya Gruha Yojana** addresses housing needs for vulnerable populations.
- The enhanced **MLALAD** scheme empowers local governance for region-specific development.

4. Challenges and Concerns:

- Declining growth in **agriculture and manufacturing** sectors may impact overall economic momentum.
- The **fiscal deficit at 3.2% of GSDP** remains within limits but requires efficient debt management.
- Lower **per capita income** than the national average indicates the need for more inclusive growth policies.

Conclusion:

The Odisha Budget 2025-26 emphasizes balanced economic growth with significant investments in infrastructure, housing, and rural development. While the revenue surplus and fiscal prudence indicate financial stability, the slowdown in agriculture and manufacturing poses challenges. Strategic policy implementation will be crucial for sustaining long-term economic growth and improving living standards in the state.

Q.5 Answer

APPROACH:

Introduction: Highlight Odisha's vulnerability to natural disasters and the need for an effective disaster management system.

Body: Discuss key initiatives like early warning systems, community preparedness, cyclone shelters, and policy improvements. Provide examples from Cyclone 1999 to present.

Conclusion: Emphasize Odisha's success in minimizing disaster impact and the key lessons for other regions in resilience and preparedness.

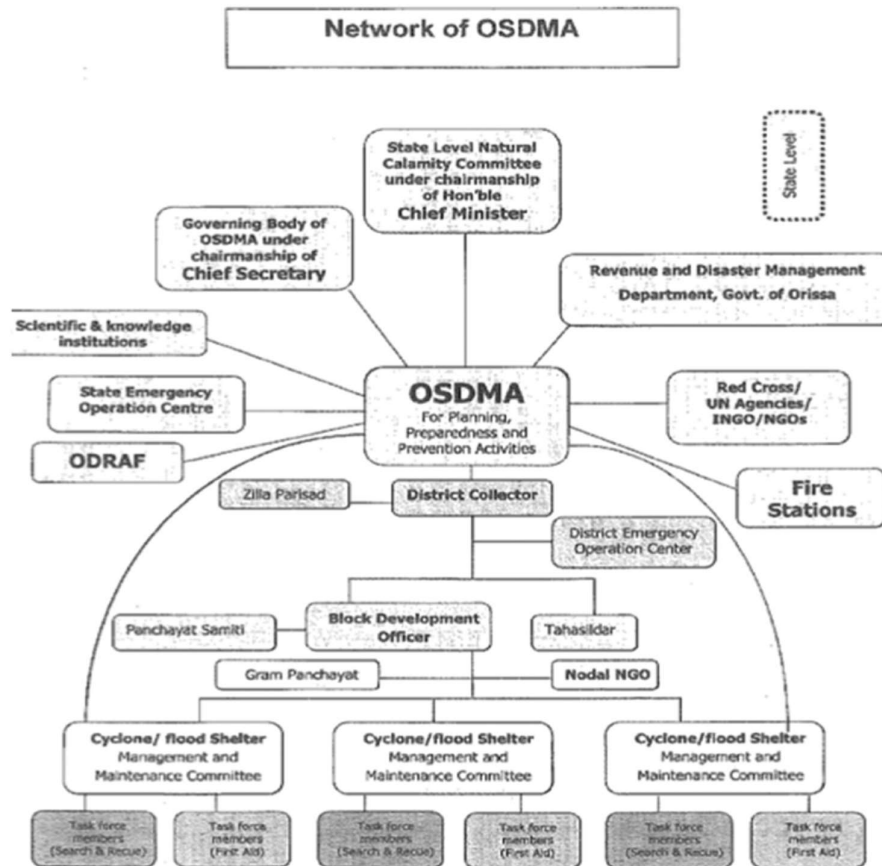
Introduction:

Odisha has undergone a remarkable transformation in disaster management since the devastating Super Cyclone of 1999. With a goal of 'zero-human casualties,' the state has developed a robust disaster preparedness framework, making it a global model in disaster resilience.

Body:

Key Aspects of Odisha's Disaster Management Approach

Key Aspect	Details
Institutional Framework	Odisha was the first Indian state to establish a disaster management authority (OSDMA) in 1999, before the NDMA was set up in 2005.
Community-Centric Approach	Local communities, self-help groups, and trained volunteers play a central role in disaster preparedness, risk reduction, and relief.
Early Warning Systems	Odisha has a last-mile early warning system with sirens, watchtowers, and mass messaging across 1,200 coastal villages.
Disaster-Resilient Infrastructure	Over 800 multipurpose cyclone shelters, evacuation roads, and embankments have been built to mitigate cyclone impact.
International Collaboration	Partnerships with global organizations like the World Bank have strengthened Odisha's disaster management capacity.



Lessons for Other States and Countries

- **Proactive Planning:** Investing in disaster resilience before calamities strike reduces loss of life and economic damage.
- **Community Involvement:** Engaging local communities enhances disaster response and builds long-term resilience.
- **Infrastructure Development:** Constructing resilient infrastructure minimizes the impact of disasters.
- **Technology and Innovation:** Advanced early warning systems and real-time data can significantly improve preparedness and response.
- **Adaptability:** Disaster management should be dynamic, evolving with emerging climate risks and challenges.

Conclusion:

Odisha's experience highlights that disaster preparedness must be a developmental priority. With climate change intensifying natural calamities, governments worldwide must adopt a proactive, community-driven, and technology-integrated approach to disaster management.

GROUP B

Q.6 Answer

APPROACH:

Introduction: Define PM-KISAN and its objectives in providing direct income support to farmers.

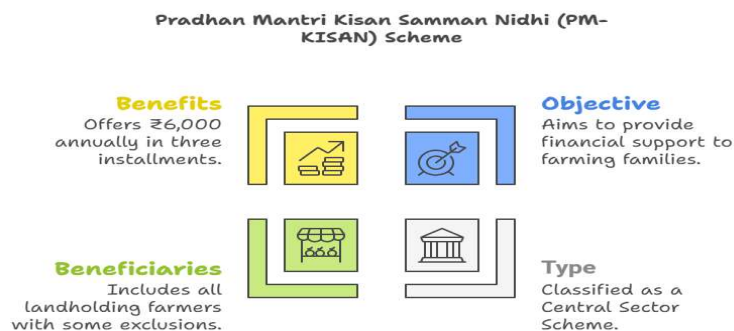
Body: Discuss its impact on rural livelihoods, financial inclusion, and agricultural investment. Address challenges like beneficiary exclusions and implementation hurdles. Compare with other agrarian support schemes.

Conclusion: Evaluate its potential as a transformative policy and suggest improvements for maximizing its effectiveness.

Introduction:

Rural India, primarily being agricultural, is handicapped by issues of lower incomes, falling productivity, farmer suicides etc, whose manifestation can be directly witnessed through agitations all around like- Farmer rallies in Delhi, Silent marches in Mumbai. Apart from this, issues of migration, caste and gender barriers impact the rural distress landscape.

PM-KISAN is a structured income support scheme for small and marginal farmers owning less than 2 hectares of land. There are about 12.50 crore small and marginal farmer families in India. It is a direct cash transfer scheme providing Rs. 6,000 per annum, in three equal installments of Rs. 2,000 each.



Body:

PM KISAN can help alleviate the distress:

- Potential of greater efficiency in enabling poor households to directly purchase the required goods and services, as well as enhance their market choices.
- Utilization of income support to buy necessary inputs. E.g. Seeds, fertilizers, etc.
- Can act as a social security support during distress times. According to data from the All India Financial Inclusion Survey (NAFIS) released by NABARD, average savings per household in rural areas is only Rs 9650.
- It can reach about most of the farmer families compared to loan waivers that can benefit a maximum of 30 per cent of the peasantry, and the higher MSP policy which can benefit a maximum of 10-15 per cent of the peasantry.
- Help reduce agricultural indebtedness.
- Enhance rural consumption.

Limitations of PM KISAN:

Issue	Details
Inadequate Financial Support	PM-KISAN's Rs. 2,000 every four months is insufficient to relieve financial stress for small and marginal farmers, providing only Rs. 17 per day per household.
No Link to Land Size	The cash transfer is uniform and not based on the size of the farmer's land, leading to possible discrepancies.
Exclusion of Tenant	Tenant farmers and agricultural laborers, who are among the most

Farmers & Agricultural Laborers	vulnerable, are left out of the scheme.
Incomplete Tenancy Records & Lack of Digitization	Many states (e.g., Jharkhand, Bihar, Gujarat, Tamil Nadu) lack digitized land records, making it difficult to identify beneficiaries.
Not a Substitute for Agricultural Reforms	PM-KISAN should complement, not replace, reforms in Agri-marketing and agricultural investments to enhance productivity and sustainability.
Doesn't Address Core Agricultural Issues	The scheme does not tackle key concerns like land productivity, underemployment, income diversification, storage, and wastage, making it insufficient as a standalone solution.

Steps needed– Need to manage:

- **Production Risks:** Irrigation coverage expansion, cheaper inputs, Zero Budget Natural Farming, soil management.
- **Weather & Disaster Related Risks,** crop insurance under PM Fasal Bima Yojana needs to be farmer friendly. Farmers must also be appraised by the Agri-Meteorological Advisory Service.
- **Price Risks:** MSP awareness beyond rice and wheat, contract farming. Move towards livestock, fisheries and integrated farming.
- **Credit Risks:** More access to formal credit, financial cum digital literacy and Awareness generation in the required field.
- **Market Risks:** Promotion of e-NAM, exposure to commodities market, long term contracts on pre-determined prices, etc.

Conclusion:

Policy Risks –

- Implement model APLM Act, reduce scope of Essential Commodities Act to situations of natural calamities. Encourage R&D and start-ups in the field of Agriculture as a Service (AaaS).
- Promote MSMEs to reduce underemployment in agriculture and migration.

Q.7 Answer

APPROACH:

Introduction: Highlight the critical role of tropical rainforests in regulating Earth's climate and the alarming deforestation trends.

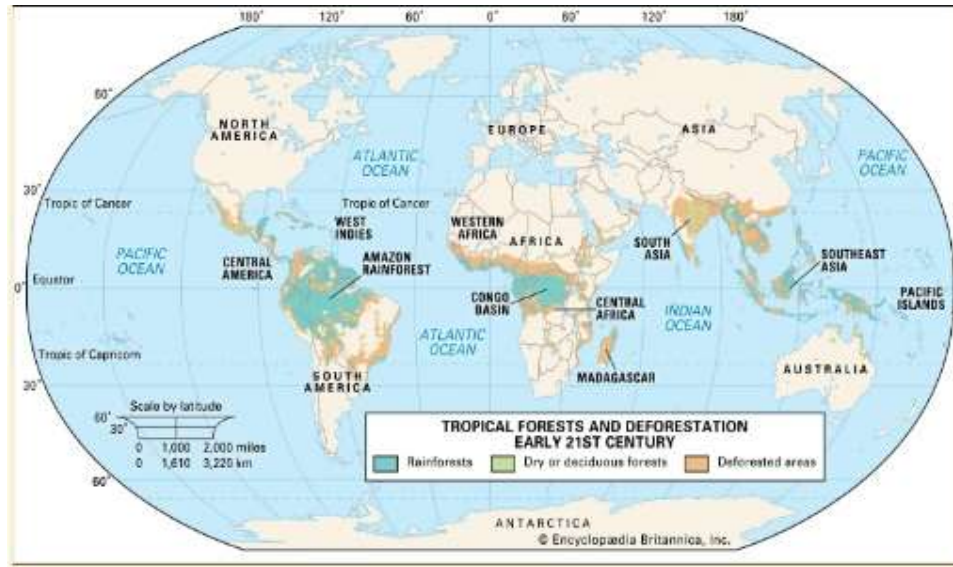
Body: Discuss conservation efforts, policy measures, sustainable practices, and global cooperation. Provide examples like the Amazon Fund and REDD+ initiatives.

Conclusion: Emphasize the urgency of intensified actions and the need for global commitment to preserving rainforests.

Introduction:

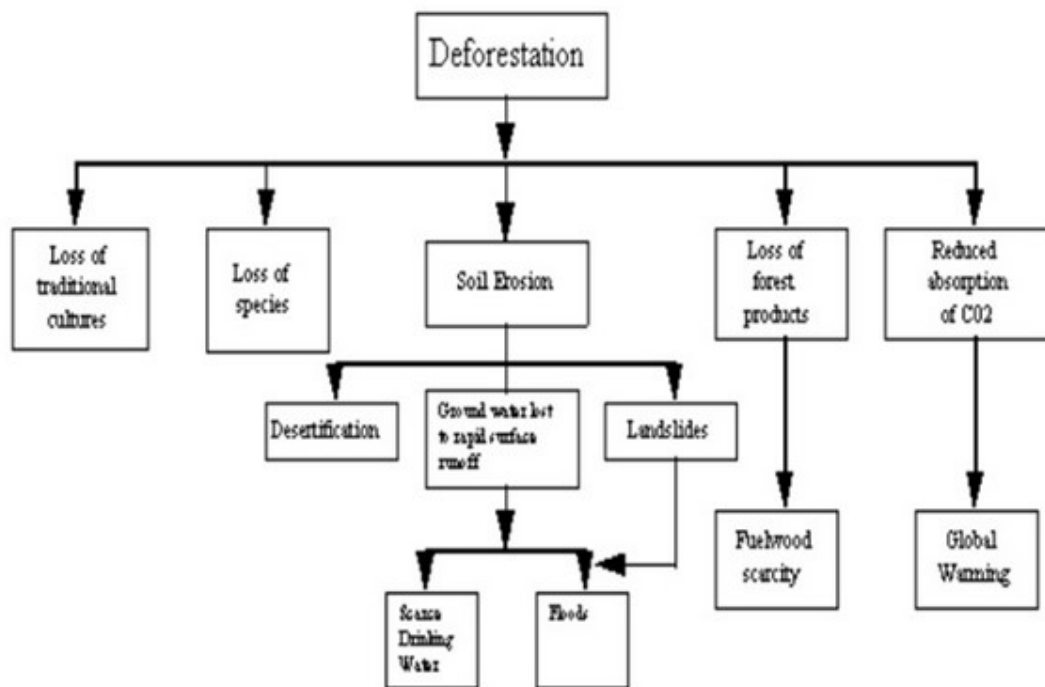
Rainforests are closed-canopy forests growing within 28 degrees north or south of the equator, characterized by high levels of rainfall (200 cm), and high species diversity. Such forests are in Asia, Australia, Africa, America, and Central America, Mexico and on many of the Pacific Islands. They play a major role in carbon sequestration and thus regulation of temperature.

The FAO's State of the World's Forests (SOFO) 2024 report, highlights the importance of innovation in the forest sector to address global challenges, including climate change, and emphasizes the need for technological, social, policy, institutional, and financial innovations.



Body:

Causes of Deforestation:



Cause	Details	Examples
Agricultural Expansion	Primary reason for deforestation, especially for subsistence-based agriculture and plantations.	Africa (Gulf of Guinea Coast, Congo Basin) Indonesia and Malaysia (Plantation Agriculture)
Developmental Activities	Deforestation due to urbanization, infrastructure expansion, hydroelectric projects, and mining.	Brazil: Balbina HEP submerged 24,000 km ² of

		rainforest
Lapses in Government Policies	Lack of enforcement of regulations leading to forest degradation due to agriculture and logging.	80% of forest degradation in Indonesia and Brazil
Climate Change & Forest Fires	Increased frequency of forest fires due to climate change and El-Niño events.	Amazon Rainforest (Brazil) Indonesia (1997 El-Niño event)

Stepping Up Efforts to Protect the World's Tropical Forests:

The international community and the state, along with communities, are trying to save the rainforest through various programs such as REDD and REDD-Plus (Focus areas of these programmes are sustainable management of the rainforest). Various SDGs like SDG 2 (Food Security), 13 (Climate Action), 15 (Life on land) are related to saving rainforests. Yet, there are many miles to go-

- **Social Forestry:** By giving ownership and management rights to the local population, the rainforest can be saved, as the forest provides a livelihood to the local populace. In Guatemala, the community-owned forest enterprise is managing 4.2 lakh Ha of forest successfully.
- **Use of technology:** It can provide real-time monitoring of rainforest and can help in the successful implementation of government policies.
- **Teaching about the importance of the environment** and how they can help to save rainforests.
- Restoring damaged ecosystem by planting trees on land where forests have been cut down.
- Encourage people to live in a way that does not hurt the environment.
- Establishing parks to protect rainforests and wildlife.
- Supporting companies that operate in a way that minimizes damage to the environment.

Conclusion:

The **International Tropical Timber Organization (ITTO) under the UN**, which promotes the sustainable management and conservation of tropical rainforests, is a pioneer in this regard, and it should make a consensus on sustainable use of its resource. Sustainable managing the rainforests and creating sustainable supply chains require a balancing act. The role of tropical rainforests is undisputed in mitigating the effect of global warming; there is a need to boost the mitigation strategy to save the tropical rainforests.

Q.8 Answer

APPROACH:

Introduction: Define social media's role in modern communication and its impact on national security.

Body: Discuss how law enforcement agencies can utilize social media for intelligence gathering, crisis management, misinformation control, and public engagement. Provide relevant examples.

Conclusion: Highlight the importance of responsible usage and technological advancements in strengthening national security.

Introduction:

India's National Security landscape is threatened with various external challenges such as stressed and susceptible borders, terrorism as well as internal challenges such as left-wing extremism and separatist movements.

21st century technological advancements have been a double-edged sword for national security purposes, as on one hand technology has become the yardstick of defence prowess of the country, e.g. Nuclear Triad and on the other hand, it has become the softest target to destabilize any country, e.g. Communication Networks.



Body:

Aspect	Role of Technology in National Security	Challenges Posed by Technology	Use of Social Media for National Security
Threat Response	Helps counter evolving threats like ASAT missiles.	Terrorists using satellite phones and VoIP (e.g., Mumbai attack).	Identifying flashpoints of disturbances and gauging public mood.
Border Security	Faster and securer infrastructure, e.g., CIBMS.	Increased arms race (nuclear, space militarization, etc.).	Engaging citizens for secure communities (e.g., Twitter Samvad).
Surveillance	High-risk zone monitoring via SWATHI Radar, UAVs.	Use of social media for radicalization (e.g., ISIS activities).	Fact-checking fake news, rumors, and misinformation.
Critical Infrastructure Protection	Systems like CMS securing communication networks.	Cyberattacks on national databases (India 2nd most attacked).	Preparing SOPs and emergency communication.
Intelligence Gathering	Actionable, interoperable intelligence via NATGRID.	Organized crime using sophisticated hacking methods.	Operation Chakravayuh for de-radicalization of youth.
Military	Nano-tech in LCA Tejas making it lighter and	Risks of emerging arms race and global	Building actionable intelligence through public

Advancements	stronger.	militarization.	data analysis.
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Conclusion:

For safeguarding and effectively utilizing social media and cyber space revising National Cyber Security Policy, Institutionalizing National Social Media Policy are the urgent steps to tackle distinct social media challenges. Also creating awareness, empowering agencies- technically, legally and financially, implementing National Security Strategy Doctrine effectively to capitalize upon upcoming technological advancements is the step forward.

Q.9 Answer

APPROACH:

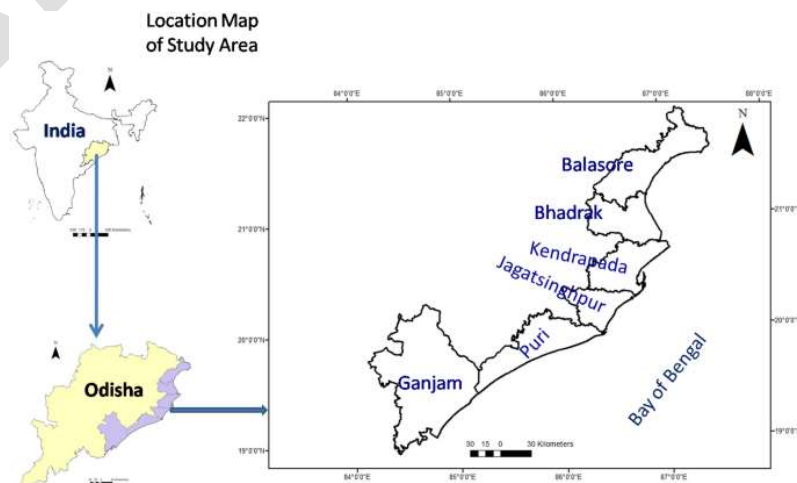
Introduction: Define Odisha's ecosystem services and land commons, emphasizing their economic importance in livelihoods, agriculture, and industry.

Body: Discuss key ecosystem services like fisheries, forestry, and water resources, their contribution to the economy, and the challenges such as deforestation, climate change, and overexploitation. Provide examples.

Conclusion: Emphasize the need for sustainable management policies to balance economic benefits with environmental conservation.

Introduction:

Odisha's ecosystem services and land commons, including forests, pastures, and uncultivated lands, contribute significantly to its economy, with an estimated annual value of ₹36,890 crore (\$5 billion). These resources provide crucial livelihood support, regulate climate, and maintain biodiversity. However, they face severe threats such as land degradation, overuse, and encroachments, necessitating sustainable management policies.



Body:

Economic Significance and Challenges

- **Economic Contribution:** The state's economy relies heavily on natural resources, with key services such as food, water, raw materials, and climate regulation valued at over ₹60,000 per hectare per annum. These resources also support agriculture and rural livelihoods.
- **Challenges:** Unsustainable exploitation, land degradation, biodiversity loss, soil erosion, and water shortages threaten these ecosystem services. Additionally, Odisha's vulnerability to climate change exacerbates these risks.

Need for Sustainable Management

- **Policy Integration:** Recognizing the economic value of ecosystem services in policymaking is crucial for their protection.
- **Legal and Institutional Reforms:** Strengthening land governance, preventing encroachments, and promoting sustainable land use practices.
- **Community-Based Management:** Engaging local communities in conservation efforts to ensure the long-term sustainability of land commons.

Conclusion:

Odisha's ecosystem services are vital for its economy and environmental stability. Addressing threats through sustainable policies, institutional reforms, and community participation is essential to safeguard these resources for future generations.

Q.10 Answer

APPROACH:

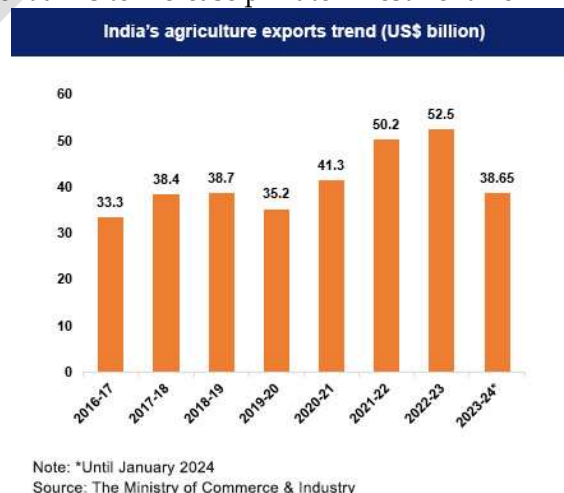
Introduction: Define the role of the private sector in agricultural growth and transformation, emphasizing its significance in modern agribusiness and value chains.

Body: Explain how private sector involvement enhances productivity, infrastructure, and market linkages. Discuss challenges such as regulatory constraints and smallholder inclusion. Provide examples of successful private interventions in agribusiness.

Conclusion: Highlight the need for policy support and public-private partnerships to ensure sustainable agricultural transformation.

Introduction:

To elevate farmers from their current distress, enhancing private investment in the agriculture sector is very crucial and the government aims to increase private investment from 13 % to around 30 %.



Body:

Sector	Investment	Role
Public Sector	Investment is falling as a large proportion goes into subsidies for fertilizers, irrigation, and other agricultural inputs rather than actual investment. Mostly from the government side.	Frames/provides legislation, policy guidelines, support pricing, and subsidies. Provides inputs like fertilizer and energy at concessional rates.
Private Sector	Investment has declined due to excessive government regulations and control over the sector. Mostly from individual farmers; corporate sector investment occurs mostly after the harvest.	Ensures superior service delivery to the end consumer. Maximizes service at an affordable price.

Role of the Private Sector In



Sector	Private Sector Involvement
Agriculture	Supports new technology adoption requiring high skill and capital-intensive methods like Precision Agriculture, Polyhouse cropping, and self-propelled sprayers.
Farming	Private sector engages in contract farming; e.g., PepsiCo's Frito Lay division collaborates with agronomists and service providers to assist smallholder farmers in potato production and direct procurement.
Agri-food Value Chain	Companies like Reliance Fresh directly partner with farmers for fresh fruits and vegetables, improving farmer livelihoods, enhancing produce quality, reducing wastage, and minimizing intermediaries.
Allied Activities	
Livestock	Companies like DeLaval provide dairy solutions to improve production, animal welfare,

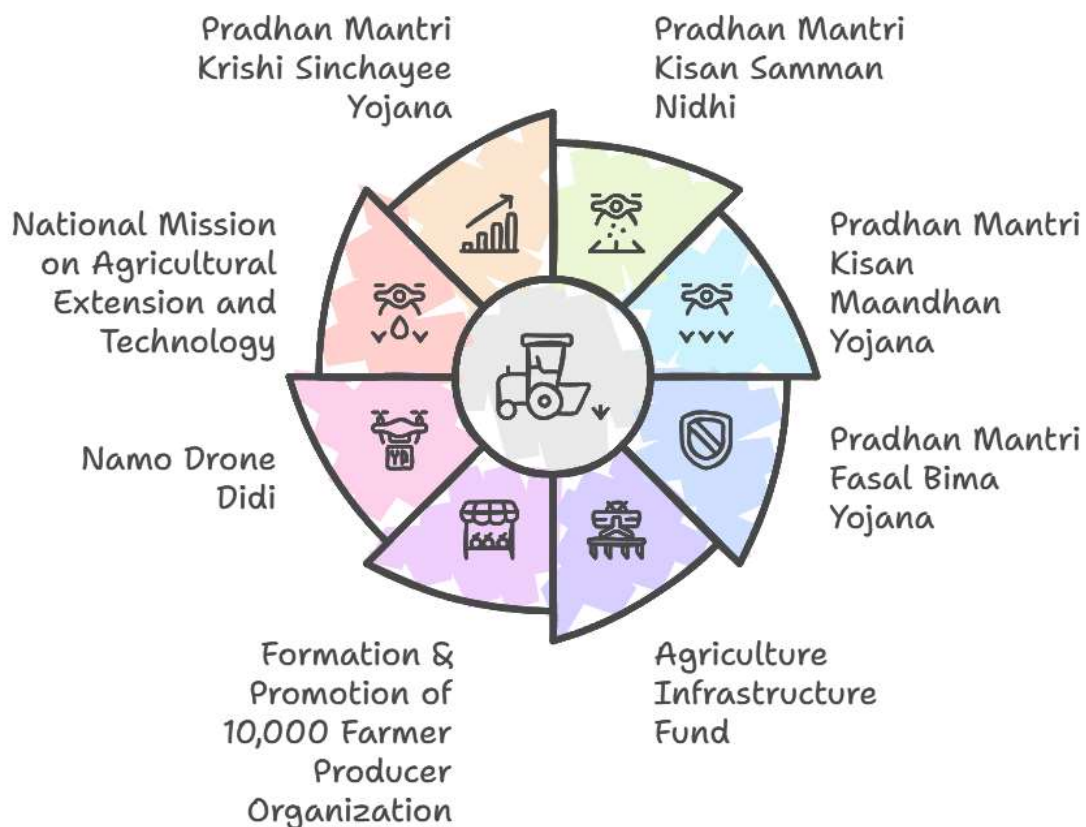
	and quality of life.
Fisheries	Innovations in cost-effective services; e.g., Signode India Ltd developed Modified Atmospheric Packaging for dry fish in Kerala, increasing shelf life and export potential.

Challenges for the Private Sector in Serving and Driving Agriculture

- Land lease Policy: Weak land rights led to tenure insecurity that ultimately results in reduced land productivity because of poor land management.
- Land Fragmentation: It has inhibited the ability of the farmers to invest in new technologies, making the private sector unviable for small farmers as the average farm size in India is 1.5 hectares (NITI Aayog report)
- Contract Farming: The fear of exploitation by the big corporate houses, which is shedding farmers' way from making a contract with them, like PepsiCo India Holdings sued farmers for illegally growing and selling a potato variety registered in the company's name.
- Agriculture markets are very much fragmented in India, with each farmer confined to a single mandi in many products in many states and making it impossible for the private sector to contact each farmer individually.

Way forward:

Key Agricultural Initiatives



- Land Leasing: Implementation of a model (agricultural) land leasing act proposed by the NITI Aayog to simplify the leasing of farmland to boost private sector morale.
- Contract farming: SFAC speedy implementation of the Model law on contract farming announced in the budget 2017-18, and encouraging the Small Farmers Agri-Business consortium would encourage private sector participation.
- Government initiative: Enacting a liberal APMC law, scaling up digital technologies, encouraging private players to set up mandis, warehouses, cold storage, and Mega food parks should be the priorities.

Conclusion:

NITI Aayog has indeed launched several initiatives and reports in 2025, including a "Fiscal Health Index 2025" and a policy report on "Expanding Quality Higher Education through States and State Public Universities," focusing on improving fiscal health and higher education quality.

Q.11 Answer

APPROACH:

Introduction: Define India's intelligence framework and its role in national security.

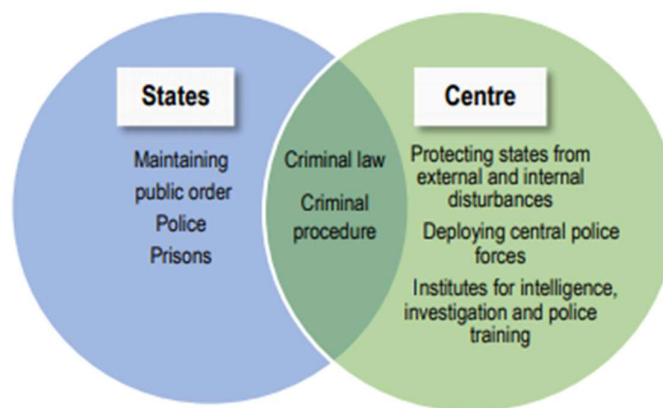
Body: Discuss challenges like outdated technology, lack of coordination, inadequate training, and insufficient integration with police modernization. Provide relevant examples.

Conclusion: Emphasize the need for a holistic reform approach, integrating intelligence and police modernization for enhanced security.

Introduction:

Intelligence reforms without the police reforms are pointless because the local policemen develop the strategic intelligence given by the central agencies which needs enough cognitive and analytical skill to process the intelligence. Thus there is a need for comprehensive and not piecemeal reforms.

Figure 1: Responsibilities of centre and states with regard to police

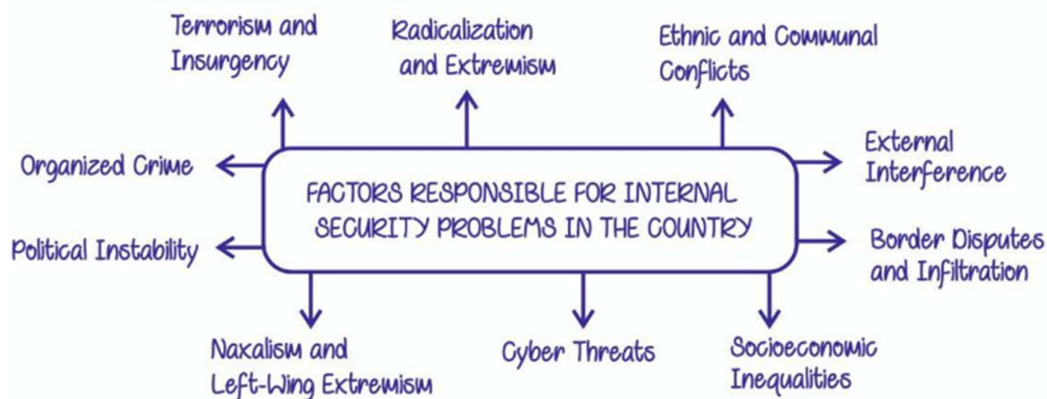


Body:

Category	Key Initiatives
Police Modernization	- Establish open and separate direct recruitment mechanisms for intelligence agencies through UPSC. - Outsource specialized needs of national security management rather than relying only on police personnel. - Use the Modernization of Police Forces Scheme to address deficiencies in state police infrastructure. - Improve forensic laboratories, equipment, training infrastructure,

	communication systems, and police mobility.
Technological Up-gradation	- Enhance in-house technical research and development capabilities. - Upgrade offensive and defensive capabilities in cyber warfare. - Empower Indian Police with IT and Criminal Intelligence through NCRB. - Build a National Resource Centre for IT solutions for police organizations. - Upgrade crime analysis technology. - Provide IT and Fingerprint Science training for police capacity building.
Capacity Building of State Police Personnel	- Familiarize police personnel with electronic evidence gathering processes. - Ensure knowledge of rules and regulations for data access and intermediary liability. - Appoint a National Intelligence Director to improve interagency coordination and eliminate duplications. - Introduce legislation in Parliament to define the charters, functions, and duties of intelligence organizations. - Separate investigation duties from law-and-order responsibilities (e.g., NIA).

Deficiencies in Intelligence framework in India



Issue	Details
Inefficient Coordination	After the Kargil intrusion (1999), the Intelligence Bureau (IB) created a Multi-Agency Centre (MAC) that receives intelligence mainly from Central agencies.

	However, in 2011, state special branches contributed only 11% of inputs.
Lack of Dedicated Intelligence Cadre	Intelligence agencies rely on police officers rather than language experts, scientists, IT professionals, or cyber specialists, affecting efficiency.
No Unified Intelligence Authority	Agencies like NATGRID, IB, MAC, and CCTNS exist, but there is no single authority to coordinate them, leading to slow responses during crises like the 26/11 attack.
Lack of Checks and Balances	The intelligence system lacks oversight, and political interference (e.g., CBI politicization) reduces efficiency.
No Legislative Backing	Most intelligence agencies operate through executive orders without clear oversight. For example, CBI and RAW report to the PMO, DRI to the Finance Ministry, and Military Intelligence to the Defense Ministry.

Conclusion:

Given the immense contemporary security challenges India is confronting, as it emerges as a global power, a paradigm shift is needed to modernize intelligence work in a holistic manner, which may require radical changes in the existing intelligence culture with short term, medium term and long term objectives clearly identified.

Q.12 Answer

APPROACH:

Introduction: Define the India Cooling Action Plan (ICAP) and its objectives in addressing cooling demands while reducing emissions.

Body: Explain how ICAP mitigates direct emissions through energy-efficient cooling technologies and indirect emissions via sustainable policies. Discuss its impact across sectors like residential, commercial, transport, and agriculture. Provide examples of initiatives under ICAP.

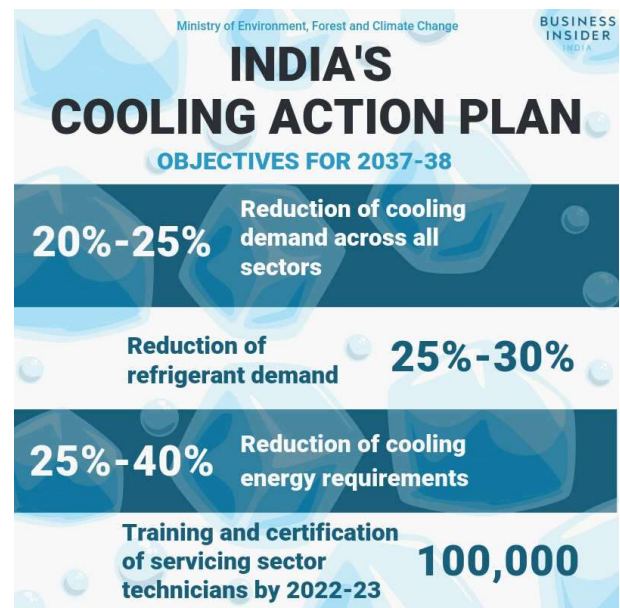
Conclusion: Highlight ICAP's significance in balancing economic growth with environmental sustainability and its role in meeting India's climate commitments.

Introduction:

India, as a part of the Montreal protocol and the landmark Kigali Amendment, is one of the first countries to devise a cooling action plan in an attempt to phase out ozone depleting substances. India Cooling Action Plan (ICAP), led by the Ministry of Environment, Forests and Climate Change (MOEFCC), provides a 20-year perspective (2017-18 to 2037-38) to address the cooling requirements across sectors and ways and means to provide access to sustainable cooling for all. With people around the world living through the fourth hottest year on record in 2018, the need for cooling solutions is more urgent than ever. India's cooling demand is projected to grow by 8 times in the next 20 years.

Targets and Framework of ICAP:

- Assessment of cooling requirements across



sectors in the next 20 years and the associated refrigerant demand and energy use.

- Map the technologies available to cater to the cooling requirement, including passive interventions, refrigerant-based technologies, and alternative technologies such as not-in-kind technologies.
- Suggest interventions in each sector for sustainable cooling and thermal comfort for all.
- Focus on skilling of RAC service technicians.
- Develop an R&D innovation ecosystem for indigenous development of alternative technologies.

Body:

ICAP's Role In Reducing Direct Emissions

Direct emissions are due to the release of refrigerant. They can occur during normal operation or because of leaks from pipes and components:

- Reduction of cooling demand across sectors by 20% to 25 % by year 2037-38.
- Reduction of refrigerant demand by 25% to 30% by year 2037-38.
- Reduction of cooling energy requirements by 25% to 40% by year 2037-38.

ICAP's Role in Reducing Indirect Emissions

Indirect emissions are due to energy consumption and contribute 2/3 of the total emissions:

- Promotion of passively-cooled building design with natural and mechanical ventilation.
- Adoption of adaptive thermal comfort standards to specify pre-setting of temperatures of air conditioning equipment for commercial built spaces.
- India will also seek to support the development and deployment of low-GWP refrigerant alternatives.

Socio-economic Benefits Accrued by ICAP:

- Thermal comfort for all – provision for cooling for EWS and LIG housing.
- Skilled workforce for better livelihoods and environmental protection.
- Make in India – domestic manufacturing of air-conditioning and related cooling equipment.
- Cooling is also linked to human health and productivity. Linkages of cooling with Sustainable Development Goals (SDGs) are well acknowledged.
- The cross-sectoral nature of cooling and its use in development of the economy makes provision for cooling an important developmental necessity.

ICAP and Impact of Cooling Different Sectors:

Sector	Planned Measures	Expected Impact
Household	Improving efficiency of ACs and fans through better servicing and adoption of adaptive thermal practices.	30% reduction in cooling energy requirements; 20% TR reduction by 2037-38.
Construction	Implementation of building energy codes, thermal comfort standards, eco-labeling of cooling products, and energy-efficient housing designs.	Reduced cooling load in buildings, increased energy efficiency.
Agriculture	Development of robust cold-chain infrastructure to reduce post-harvest losses.	Increased refrigeration use; potential rise in carbon footprint.
Transport AC	Encouraging public transport, hybrid, and electric vehicles to reduce dependency on air-conditioned passenger cars.	Lower energy consumption in transportation cooling.

Limitations of ICAP:

- The CAP does not take into consideration the needs of 90% of the Indian population and is skewedly focused on 10% of the population.
- The NCAP has not indicated the benchmark for thermal comfort that needs to guide energy efficiency measures for all users of active as well as passive cooling.
- Its actual intent seems to be "myopically" focused on the market for personal air conditioners, ignoring the fact that demand for cooling is driven by people and not by the sale of air conditioners.
- Implementation of the guidelines needs a framework that has not been drawn out.

Conclusion:

ICAP must be based on the fact that about 60 per cent of current space cooling energy consumption is by top 10 per cent of the population, this is only way ahead to give thermal comfort for all. India needs thermal comfort defined to guide interventions for energy efficiency in buildings and there is also a need to estimate cooling demand based on thermal comfort definition and not on sales of ACs. Implementation roadmap should be drawn out considering different sectors and their different requirements.

Q.13 Answer

APPROACH:

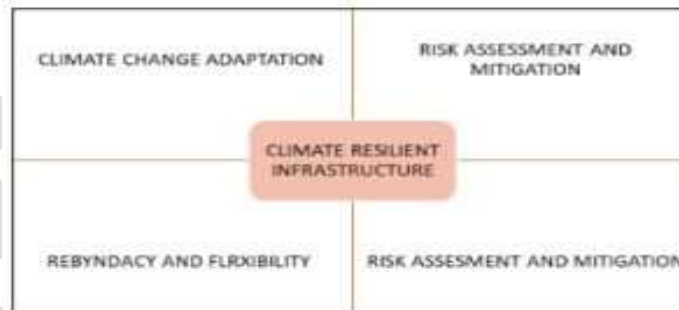
Introduction: Define CDRI and its objectives in enhancing disaster-resilient infrastructure.

Body: Explain how CDRI aligns with India's commitment to the Sendai Framework through capacity building, risk assessment, technological collaboration, and policy support. Provide relevant examples.

Conclusion: Highlight CDRI's role in strengthening India's disaster preparedness and promoting global resilience.

Introduction:

Economic losses from disasters that damage infrastructure can reach huge proportions. The **World Bank estimates that annual disaster losses are already close to \$520 billion and those disasters push up to 24 million people in a year into poverty.** So by ensuring that all new investments in infrastructure are made in a risk-sensitive way, a significant reduction in economic losses from disasters can be realised.



Body:

Disaster Resilient Infrastructure creates a Disaster Resilient World:

When infrastructure fails, disaster follows. So the countries need to look beyond immediate relief and rehabilitation and focus on "build back better" after a natural catastrophe besides reducing infrastructural losses, disaster-resilient infrastructure will also help achieve targets on reduction in mortality, number of affected people, and economic losses due to disasters.

For example, post-disaster damage analysis, after the 1995 Great Hanshin-Awaji Earthquake in Hyogo Prefecture, Japan, it was found that buildings constructed to the 1971 standard performed far better than those built to an earlier standard; and those of the 1981 standard performed best of all, with only a very small share suffering collapse. It demonstrated the effectiveness of Japan's seismic design standards and continuous improvement there of.

International agreements - reiterating benefits of investing in resilient infrastructure:

The Sendai Framework for Disaster Risk Reduction: It identifies investing in Disaster Risk Reduction (DRR) for resilience and building back better in reconstruction as priorities for action towards reducing disaster risk.

Sustainable Development Goals: Goal 9 recognises disaster-resilient infrastructure as a crucial driver of economic growth and development.

Sendai Framework for Disaster Risk Reduction (SFDRR) and Coalition for Disaster Resilient Infrastructure (CDRI)

The Sendai Framework for Disaster Risk Reduction (SFDRR) highlighted the role of improved disaster resilience, including that of infrastructure, as a cornerstone for sustainable development. While inaugurating the Asian Ministerial Conference on Disaster Risk Reduction (AMCDRR, New Delhi), the Prime Minister of India announced that India would work with partner countries and key stakeholders in launching a “Coalition for Disaster Resilient Infrastructure (CDRI)”.



To garner inputs from the wider base of global stakeholders, the Government of India (GOI) in collaboration with the United Nations Office for Disaster Risk Reduction (UNISDR) hosted the International Workshop on Disaster Resilient Infrastructure in New Delhi, India from 15-16 January 2018.

Aspect	India's Commitment & Challenges	Role of CDRI & Global Learning
Understanding Disaster Risk	India needs to enhance early warning systems and risk reduction efforts.	Learning from global best practices to improve mitigation.
Disaster Risk Governance	Strengthening policies and institutions for better disaster management.	CDRI supports policy frameworks for disaster resilience.
Investment in Risk Reduction	Balancing economic growth with disaster-resilient infrastructure.	CDRI provides funding and technology for resilient infrastructure.
Early Warning & Preparedness	India needs better early warning systems and post-disaster recovery strategies.	Japan's expertise can help in early detection and rehabilitation.
Building Back Better	Challenges in protecting property and infrastructure from extreme weather.	Learning from countries with strong disaster mitigation policies.

International Collaboration	India can benefit from partnerships for disaster risk reduction.	CDRI facilitates global cooperation in disaster resilience.
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India's initiative for **Coalition for Disaster Resilient Infrastructure** will help in the development of appropriate infrastructure to face natural calamities, for both the least developed and developing countries. CDRI will act as a synergy between Disaster Risk Reduction, Sustainability Goals and Climate Accord providing for sustainable and inclusive growth.

Conclusion:

Japan's unique path to improved building safety can be emulated by Indian policymakers to build its infrastructure disaster resilient, by initiating steps like:

- Legal framework, for uniform national building standards(under the Building Standard law).
- Building Code- Recognized as a minimum standard.
- Quality Assurance Mechanism.
- Role of local governments in building quality assurance, for carrying out building confirmation, structural review, inspection, and so.

Q.14 Answer

APPROACH:

Introduction: Define the Paris Call and its objectives in strengthening cybersecurity.

Body: Explain its key features, including multi-stakeholder collaboration, cyber resilience, and protection of critical infrastructure. Discuss India's cybersecurity measures like policy frameworks, CERT-In, and data protection initiatives.

Conclusion: Emphasize the importance of international cooperation and national efforts in tackling cybersecurity threats.

Introduction:

Recently, the UNESCO Internet Governance Forum (IGF) meeting convened in Paris, "The Paris Call for Trust and Security in Cyberspace" was commenced, aiming at developing common principles for securing cyberspace.

The goals mentioned in the Paris Call and the principles adopted, represent a consensus of priorities between states, corporations and civil society. Paris call gives a fresh momentum to the issue of creating globally acceptable cybersecurity norms by mounting support from multiple stakeholders. Important points are as follows.

Body:

Category	Key Points
Inclusive Regulatory Process	Recognize the responsibilities of the private sector in improving trust, security, and stability in cyberspace. Adopt a strong multi-stakeholder approach to enhance collaboration among the government, private sector, and civil society to combat cyber criminality.
International Law	Encourage better coordination in regulating cyberspace and the use of ICT in line with the principles of the U.N. Charter and international humanitarian law. Focus on maintaining international peace and security.
State Sovereignty	Promote the exclusive role of sovereign states in hostile cyber activities. Advocate for measures preventing interference with elections.

Protection of Citizens	Safeguard individuals and critical infrastructure from harm. Ensure protection against any invasion.
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Challenges in the domain of cybersecurity:



- Ransomware: It spreads a virus that latches onto customer and business information that can only be removed if one meets the cybercriminal's egregious demands. Ransomware attacks are one of the areas where cybercrime is growing rapidly.
- Rapidly growing digital footprint: Use of Internet services is growing rapidly, but users don't have much knowledge of threats and protection systems, even professional people become victims of cyber bullying, phishing, online bank frauds, etc.
- Cryptocurrency: Cryptocurrencies in major economies are unregulated, Ransomware attacks, Hawala transactions, Terror funding, Money laundering, etc., are possible through payment via cryptocurrencies.
- Data piracy and commercial use of user data: For better targeted advertisements with the help of data mining, MNCs are selling user data. It poses a serious threat to cybersecurity and privacy of individuals.
- Cyber warfare: Modern warfare is changing, with internet attacks economies can be crippled along with critical infrastructures, along with this misleading information warfare is spreading.

Steps taken by the government to tackle challenges in the domain of cybersecurity:

- India's stance has gradually shifted to a multi-stakeholderism from a multilateralism approach.
- Requirement of data localization (storing of data within the country) and server management is being advocated.
- National Cyber Security Policy, 2013: The Policy is aimed at building a secure and resilient cyberspace for citizens, businesses and the Government.
- Computer Emergency Response Team (CERT-in) launched 'Cyber Swachhta Kendra' (Botnet Cleaning and Malware Analysis Centre) a new desktop and mobile security solution.
- Development of Public Private Partnerships is an important strategy under the National Cyber Security Policy 2013. For ex., antivirus company Quick Heal is providing a free bot removal tool.

- Sectoral and state CERTs: CCERTs on power and finance sectors have been launched by the Indian government. State CERTs are also on the way.

Conclusion:

Looking forward to becoming a secure cyber ecosystem, India has joined hands with several developed countries like the United States, Singapore, Japan, etc. These agreements will help India to deal with the challenge of sophisticated cyber threats. Encouraging cybersecurity in the country, the government of India has offered a fund of 5 crores to companies that work for the research and revolution of cybersecurity.

Q.15 Answer

APPROACH:

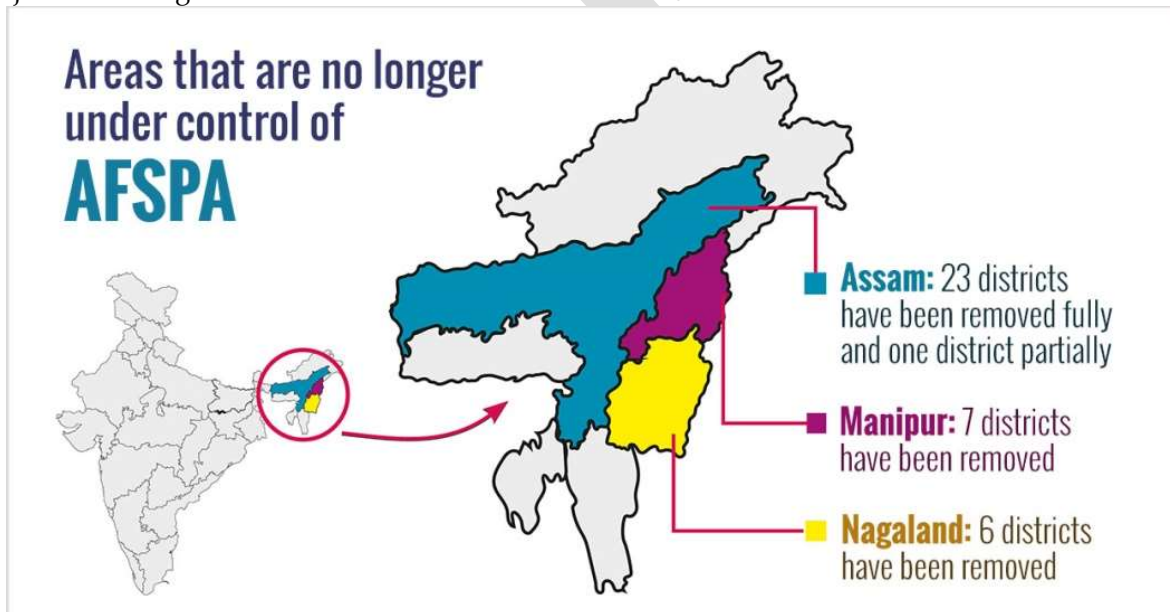
Introduction: Define AFSPA and its objectives in ensuring national security and maintaining public order.

Body: Analyze its effectiveness in addressing security challenges, concerns over human rights violations, judicial scrutiny, and the need for reforms or alternatives. Provide relevant examples.

Conclusion: Evaluate whether AFSPA remains relevant or requires replacement with a more balanced legal framework ensuring both security and human rights.

Introduction:

AFSPA gives armed forces power to maintain public order in “disturbed areas”. But over the years, there have been allegations of army excesses from residents of Manipur and Jammu and Kashmir. Supreme Court (July 2016), based on a PIL by the Extra-judicial Execution Victim Families Association, Manipur, held that excessive force cannot be used on people even in insurgency-hit areas while hearing a petition on extra-judicial killing.



Body:

Arguments in Support of AFSPA	Arguments in Favor of Repeal of AFSPA
Safeguards from legal harassment for soldiers.	Failed to protect human rights: Critics argue that AFSPA leads to human rights violations.
Operational requirement in disturbed areas.	Section 4: Allows armed forces to shoot to kill or destroy property on mere suspicion.

Repeal may demoralize armed forces, and militants may motivate locals to file lawsuits against the army.	Sanction for excessive use of force: Criticized for enabling soldiers to act with impunity.
Necessary to maintain law and order, otherwise, situations may spiral out of control.	Violation of Human Rights & Article 21 (Right to Life) of the Indian Constitution.
Success in reducing militancy in conflict-prone regions.	Section 6: Prohibits prosecution without the sanction of the central government, leading to lack of accountability.

Failed to protect our soldiers

Supreme Court has ruled that armed personnel would face criminal prosecution if found using excessive force even in areas where AFSPA is in force. Important observations:

- Indefinite deployment of armed forces in the name of restoring normalcy under AFSPA “would mock at our democratic process”, apart from symbolizing a failure of the civil administration and the armed forces.
- There is no concept of absolute immunity from trial by a criminal court.
- These observations of the Supreme Court completely dilute any protection offered under the AFSPA.
 - Soldiers can be dragged to criminal courts.
 - Today, numerous decades-old cases are being opened, and more and more retired officers and men are being called for investigations.

Conclusion:

We must, therefore, ponder whether the AFSPA is currently serving any useful purpose. In areas where AFSPA is in force, the population is completely against it. On the other hand, the fact that hundreds of officers and men have moved the Supreme Court shows that they are not fully confident that the AFSPA can actually protect them from legal harassment. A new legislation that strengthens both respect for human rights as well as protection to our soldiers is thus required.

Q.16 Answer

APPROACH:

Introduction: Define wetlands and their ecological significance.

Body: Identify major threats—urbanization, pollution, encroachment, climate change. Discuss national efforts (Wetlands (Conservation and Management) Rules, Ramsar sites) and international initiatives (Ramsar Convention).

Conclusion: Suggest policy reforms, stricter enforcement, and community participation for sustainable wetland conservation.

Introduction:

Wetlands are areas with standing or flowing water (Marshes, lakes, bogs, and swamps), either permanent or seasonal.

Ecological Importance	Biodiversity reservoirs (support birds, fish, and plant life) Water conservation (recharge groundwater, control floods) Climate change mitigation (carbon sinks) Support fisheries and local economies
Ramsar	The Ramsar Convention is an international treaty signed on February 2, 1971 in Ramsar,

Convention	Iran, dedicated to the conservation and sustainable use of wetlands globally. This day is now celebrated annually as World Wetlands Day.
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Body:

Major Threats to Wetlands in India

Wetlands in India face several threats that endanger their ecological balance and sustainability. The primary threats include:

- **Encroachment and Urbanization:** Rapid urban expansion and infrastructural development lead to the loss of wetland areas.
- **Pollution:** Industrial discharge, agricultural runoff, and untreated sewage severely degrade water quality.
- **Climate Change:** Rising temperatures and erratic rainfall patterns affect wetland hydrology and biodiversity.
- **Over-extraction of Resources:** Excessive fishing, groundwater extraction, and deforestation around wetlands disrupt ecological stability.
- **Invasive Species:** Introduction of non-native species disrupts the natural biodiversity of wetlands.
- **Agricultural Expansion:** Conversion of wetlands into agricultural lands reduces their ability to act as water regulators.

Measures for Protection and Conservation

To address these threats, various national and international initiatives have been undertaken:

National Level Measures

- **National Wetland Conservation Programme (NWCP) (1986):** This initiative aimed to identify and conserve significant wetlands across the country.
- **National Plan for Conservation of Aquatic Ecosystems (NPCA) (2015):** It merged the NWCP and National Lake Conservation Plan to ensure a holistic approach to wetland protection.
- **Identification of Over 2,200 Wetlands for Conservation:** The Ministry of Environment, Forest and Climate Change has recognized critical wetlands requiring protection.
- **State-Specific Conservation Efforts:** States like Gujarat, Andhra Pradesh, Uttar Pradesh, and West Bengal have undertaken specific measures to conserve their extensive wetland areas.

- **Legal Frameworks:** The Wetlands (Conservation and Management) Rules, 2017, regulate activities in wetlands and promote their sustainable use.

International Level Measures

- **Ramsar Convention on Wetlands (1971):** An international treaty for the conservation and sustainable use of wetlands.
- **Ramsar Site Designation:** India is home to **89 Ramsar sites**, with **Tamil Nadu** hosting the most (**20 sites**) followed by **Uttar Pradesh (10 sites)**.
 - The 2023-24 bird census by the Punjab government revealed a significant decline in migratory birds across the province's wetlands.
- **Global Conservation Partnerships:** Organizations such as the International Union for Conservation of Nature (IUCN) and the World-Wide Fund for Nature (WWF) support India's wetland conservation efforts.
- **Migratory Bird Protection:** Initiatives such as the Central Asian Flyway and East Asian-Australasian Flyway ensure the conservation of migratory species dependent on Indian wetlands.

Conclusion

Wetlands play a crucial role in maintaining ecological balance, supporting biodiversity, and sustaining livelihoods. However, they are under severe threat due to human activities and climate change. India has taken significant steps at both national and international levels to conserve these vital ecosystems. Strengthening policy frameworks, community participation, and global cooperation will be essential in ensuring the long-term sustainability of wetlands in India.

Q.17 Answer

APPROACH:

Introduction: Define unemployment and its impact on youth.

Body: Analyze causes—skill gap, automation, jobless growth, pandemic effects. Discuss Odisha's initiatives like "Skilled in Odisha," MSME promotion, and startup policies. Provide data-driven insights.

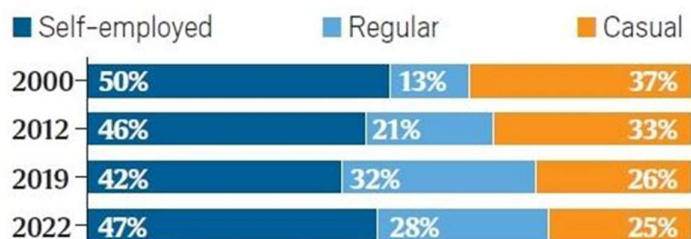
Conclusion: Recommend policy reforms, education-industry alignment, and investment in emerging sectors for sustainable employment.

Introduction:

The India Employment Report 2024, jointly published by the Institute for Human Development (IHD) and the **International Labour Organisation (ILO)**, presents critical insights into the Indian labour market. While it highlights some positive trends, such as improvements in job quality and a transition from agriculture to non-farm employment, it also underscores persistent challenges, particularly rising unemployment among educated youth.

Addressing these concerns requires a nuanced approach, including state-specific initiatives. This essay examines the reasons behind increasing unemployment among Indian youth and evaluates the effectiveness of Odisha's policies in mitigating this issue.

STATUS OF EMPLOYMENT OF YOUTHS



Source: IHD-ILO India Employment Report 2024

Body:

Causes	Explanation
Skills Mismatch and Education Disparities	There is a gap between the skills acquired by graduates and the demands of industries, leading to difficulty in finding suitable employment.
Structural Dependence on Agriculture	Despite a shift towards non-farm employment, agriculture still employs nearly half of India's workforce, limiting opportunities in industrial sectors.
High Youth Unemployment and NEET Population	In 2022, 28% of youth were neither in employment, education, nor training (NEET), with female youth being more affected.
Informality and Job Insecurity	Over 90% of jobs in India are informal, resulting in job insecurity, low wages, and lack of social protections.
Gender Disparities	Women's workforce participation remains low due to social norms, lack of skill training, and prevalence of low-paying informal jobs.

Role of Odisha in Tackling Youth Unemployment

Odisha's recent employment trends, as outlined in the Periodic Labour Force Survey (PLFS) 2023-24, reflect both progress and challenges in addressing youth unemployment. The state's initiatives have led to a decline in overall youth unemployment, though urban joblessness remains a concern.

- **Decline in Youth Unemployment:** Odisha's youth unemployment rate has fallen from 13.8% in 2022-23 to 11.1% in 2023-24. In rural areas, the rate dropped significantly from 12.7% to 9.3%.
- **Labour Force Participation Rate (LFPR) and Worker Population Ratio (WPR):** Odisha's LFPR increased from 63% to 67.1% in rural areas and from 51.5% to 53.2% in urban areas. The state's WPR stands at 62.9%, higher than several other states like Kerala, Karnataka, West Bengal, and Telangana.
- **Challenges in Urban Employment:** While rural unemployment decreased, urban unemployment rose slightly from 21.8% to 22.9%, indicating the need for targeted urban employment policies.
- **Sectoral Dependence on Agriculture:** More than 48.5% of Odisha's workforce remains engaged in agriculture. While this sustains employment levels, it highlights the need for diversification into industrial and service sectors.

Policy Recommendations:

- **Enhancing Employment-Intensive Growth:** Encouraging labour-based manufacturing and expanding employment opportunities in services and agriculture can create more jobs for young people.
- **Bridging the Skills Gap:** Odisha can focus on skill development programs aligned with industry demands to reduce the education-employment mismatch.
- **Formalizing Employment:** Strengthening labour laws and social security measures can help transition workers from informal to formal employment.
- **Targeted Urban Employment Policies:** Addressing urban unemployment requires investment in infrastructure, MSMEs, and the gig economy to generate sustainable jobs.
- **Promoting Women's Employment:** Special policies focusing on women's workforce participation, skill-building, and access to financial resources can enhance gender inclusion in employment.

Conclusion:

The India Employment Report 2024 provides a comprehensive view of both progress and challenges in India's labour market. Despite positive trends, youth unemployment remains a pressing issue due to skill mismatches, informality, and structural dependence on agriculture.

Odisha's targeted policies have yielded positive results in reducing rural unemployment, yet urban joblessness persists as a concern. A combination of skill development, employment-intensive growth, and policy reforms can help India, and Odisha in particular, tackle youth unemployment effectively and ensure inclusive and sustainable economic growth.

Q.18 Answer

APPROACH:

Introduction: Define space debris and its impact on satellite operations and space sustainability.

Body: Discuss rising debris concerns, risks to space assets, and global mitigation efforts. Highlight ISRO's PSLV-C58/XPoSat mission, POEM-3's role, and debris reduction strategies.

Conclusion: Emphasize ISRO's contribution to sustainable space exploration and the need for global collaboration on debris management.

Introduction:

With the rapid expansion of satellite deployments and space missions, the issue of space debris has become a pressing global concern. Space debris consists of defunct satellites, spent rocket stages, and fragments from collisions or disintegrations, posing significant risks to operational satellites and spacecraft. As the number of satellites in Low Earth Orbit (LEO) continues to grow, the chances of collisions and the creation of additional debris increase, necessitating proactive measures for mitigation.

Body:

ISRO's Innovative Approach to Space Debris Mitigation

The Indian Space Research Organisation (ISRO) has been at the forefront of addressing space debris concerns through its recent **PSLV-C58/XPoSat mission**. This mission incorporated groundbreaking strategies to minimize debris generation while ensuring effective space operations.

Key Features of PSLV-C58/XPoSat Mission	Details
PSLV Experimental Orbital Module-3 (POEM-3)	The fourth stage of the PSLV was repurposed into POEM-3, transforming it into an experimental orbital station. This allowed for additional scientific research and technology demonstrations, maximizing the utility of spent rocket stages.
De-orbiting Strategy	After deploying all satellites, the fourth stage was deliberately lowered from 650 km to 350 km. The reduced altitude increased atmospheric drag, ensuring a faster re-entry and burn-up, preventing long-term debris accumulation.
Passivation of the Stage	ISRO expelled all remaining fuel from the stage to eliminate explosion risks. This crucial step prevented fragmentation, which is a primary cause of debris multiplication.
Benefits of ISRO's Zero Debris Approach	Details
Minimal Debris Generation	By utilizing POEM-3 and passivating the fourth stage before controlled de-orbiting, ISRO ensured near-zero debris in Earth's orbit.
Reduced Risk to Space	Removing defunct rocket stages minimizes collision risks, protecting

Assets	valuable satellites and space infrastructure.
Environmental Responsibility	The spent stage re-entered Earth's atmosphere, burning up completely without leaving harmful fragments in orbit.

POEM-3: Advancements in Sustainable Space Exploration

ISRO's **POEM-3** served as an innovative and cost-effective orbital platform for scientific experiments and technology demonstrations. Developed by the **Vikram Sarabhai Space Centre (VSSC)**, POEM-3 leveraged the fourth stage of PSLV as a space lab, demonstrating India's commitment to sustainable space missions.

Global Significance of ISRO's Efforts

ISRO's successful deployment and disposal of POEM-3 align with global efforts to promote responsible space exploration. The mission demonstrated India's capability to manage space debris efficiently and contribute to international best practices in space sustainability.

Addressing the Growing Challenge:

- **Mitigating Risks of Space Debris:** By incorporating controlled de-orbiting and passivation, ISRO is leading by example in debris reduction.
- **Supporting International Guidelines:** ISRO's efforts align with the Inter-Agency Space Debris Coordination Committee (IADC) and UN-endorsed debris mitigation protocols.
- **Advancing Technological Innovation:** Through POEM-3 and similar missions, ISRO is pioneering reusable and sustainable space technology.

Conclusion

The PSLV-C58/XPoSat mission represents a landmark achievement in space debris mitigation, reinforcing ISRO's commitment to sustainable space exploration. By developing innovative strategies like POEM-3, ISRO has set a precedent for responsible space mission planning, aligning with global efforts to achieve a **zero debris target**. As space activities continue to grow, such proactive measures are crucial in ensuring a safer and more sustainable orbital environment for future generations.