Q1. How has globalization led to the reduction of employment in the formal sector of the Indian economy? Is increased informalization detrimental to the development of the country? **(200 words) [12½]**

Approach to question:

How globalization has led to the reduction of employment in the formal sector of the Indian economy:

1. **Increased competition:** Globalization has opened up Indian markets to foreign companies, leading to increased competition for domestic industries. This competition often leads to cost-cutting measures, including workforce reduction in the formal sector.

2. **Outsourcing and offshoring:** Globalization has enabled companies to outsource or offshore their operations to countries with lower labor costs. This has resulted in the relocation of jobs from the formal sector in India to other countries or to the informal sector.

Increased informalization and its impact on the development of the country:

1. **Lack of social security:** The informal sector often lacks social security benefits such as healthcare, pension, and insurance, leaving workers vulnerable to economic shocks and reducing their overall well-being.

2. **Low productivity and income:** Informal sector jobs are often characterized by low productivity and income levels. This perpetuates poverty and hinders upward mobility, leading to income inequality and slower economic development.

Informalization is detrimental due to its impact on social security, productivity, income inequality, limited access to finance, and inadequate regulation. Therefore, it is crucial for the government to address these challenges and create an enabling environment that promotes formal sector growth while ensuring inclusive and sustainable development for all.

Answer:

Globalization has had a significant impact on the Indian economy, leading to both positive and negative consequences, including changes in employment patterns.

Globalization's Impact on Employment in the Formal Sector:

1. **Outsourcing:** Globalization has led to the outsourcing of jobs to countries with lower labor costs, affecting formal sector employment.

2. **Automation:** Increased globalization has facilitated the adoption of technology and automation, reducing the demand for labor in certain industries.

3. **Competition:** Globalization has intensified competition, forcing some formal sector industries to downsize or restructure.

Increased Informalization and its Impact:

1. **Informal Sector Growth:** As formal sector employment opportunities decrease, many workers enter the informal sector to sustain their livelihoods.

2. **Lack of Protections:** Informal sector workers often lack job security, social security benefits, and legal protections, leading to vulnerability.

3. **Low Productivity:** The informal sector's low productivity hampers overall economic growth and development.

While globalization has brought economic benefits, its impact on formal sector employment has contributed to increased informalization, posing challenges for workers and overall development. Addressing this issue requires policies that promote formal sector growth, job creation, and social protection measures for workers in both formal and informal sectors.

Q2. Women empowerment in India needs gender budgeting. What are the requirements and status of gender budgeting in the Indian context? **(200 words) [12½]**

Approach to question:

Requirements and Status of Gender Budgeting in the Indian Context:

1. **Integration of gender perspective:** Gender budgeting requires the integration of a gender perspective into the entire budgetary process, ensuring that the needs and priorities of women are addressed.

2. **Gender-disaggregated data:** Accurate and comprehensive gender-disaggregated data is essential for effective gender budgeting. It helps

identify gender-specific issues, assess resource allocation, and evaluate the impact of policies and programs on women.

3. **Gender mainstreaming:** Gender budgeting necessitates mainstreaming gender concerns across all sectors and departments, ensuring that gender equality goals are incorporated into the budgetary decisions at every level.

While progress has been made in implementing gender budgeting, there is a need for further commitment and efforts to ensure its comprehensive adoption across all sectors and levels of governance.

Answer:

Women empowerment in India is crucial for achieving inclusive and sustainable development. Gender budgeting plays a significant role in addressing gender disparities and promoting women's welfare.

Requirements and Status of Gender Budgeting in India:

1. **Mainstreaming Gender:** Integrating gender perspectives into all government policies and programs is essential.

2. **Allocation of Funds:** Ensuring adequate budgetary allocations for women-centric schemes and initiatives.

3. **Monitoring and Evaluation:** Regularly assessing the impact of budgetary measures on women's empowerment.

4. **Sensitization and Training:** Building capacity among policy makers and administrators to implement gender-responsive budgeting.

5. **Status:** While India introduced gender budgeting in 2005, its effective implementation and impact remain a challenge.

Effective gender budgeting is vital to enhance women's empowerment and promote gender equality in India. Policymakers must ensure that budgetary allocations prioritize women's needs and promote their active participation in the nation's development. By integrating gender perspectives into financial planning, India can take significant strides towards achieving true women empowerment and fostering a more equitable and inclusive society.

Q3. **Pradhan Mantri Jan Dhan Yojana (PMJDY) is necessary for bringing the unbanked to the institutional finance fold. Do you agree with this financial inclusion of the poor section of the Indian society? Give arguments to justify your opinion.** **(200 words) [12½]**

Approach to question:

Yes, I agree with the necessity of Pradhan Mantri Jan Dhan Yojana (PMJDY) for bringing the unbanked to the institutional finance fold and achieving financial inclusion for the poor section of Indian society. Here are the arguments to justify this opinion:

1. **Access to financial services:** PMJDY provides banking facilities, including savings accounts, insurance, and credit, to individuals who previously had no access to formal financial services. This enables the poor to save, make transactions, and access credit for income generation and emergencies.

2. **Financial empowerment:** By providing a bank account, PMJDY empowers the poor to manage their finances more effectively, reducing their dependence on informal channels and promoting financial literacy and inclusion.

3. **Direct benefit transfers:** PMJDY facilitates direct benefit transfers (DBT) of government subsidies and welfare schemes, ensuring that the intended beneficiaries receive their entitlements directly into their bank accounts, reducing leakages and corruption.

It empowers the poor by providing them with access to banking services, insurance, credit, and direct benefit transfers. This promotes financial inclusion, improves financial literacy, and enables the poor to build assets, access credit, and enhance their socio-economic well-being.

Answer:

Pradhan Mantri Jan Dhan Yojana (PMJDY) aims to promote financial inclusion by bringing the unbanked population into the formal banking system. Whether PMJDY is necessary for financial inclusion of the poor section of Indian society can be evaluated through the following arguments:

Arguments in favor of PMJDY:

1. **Access to Banking Services:** PMJDY provides access to basic banking services like savings accounts, insurance, and overdraft facilities, empowering the poor with financial tools.

2. **Financial Literacy:** The scheme promotes financial literacy and awareness among the unbanked, enabling better financial management.

3. **Subsidy Direct Transfer:** PMJDY facilitates direct transfer of subsidies and benefits to beneficiaries, reducing leakages and ensuring efficient welfare delivery.

4. **Credit Accessibility:** PMJDY enables easy credit availability for income generation activities, boosting entrepreneurship and livelihood opportunities.

Pradhan Mantri Jan Dhan Yojana is instrumental in bringing the unbanked population under the institutional finance fold, fostering financial inclusion among the poor. By providing access to banking services, financial literacy, credit accessibility, and social security benefits, PMJDY empowers the marginalized and economically weaker sections of society, promoting their financial well-being and overall socio-economic development.

Q4. **What are 'Smart Cities'? Examine their relevance for urban development in India. Will it increase rural-urban differences? Give arguments for 'Smart Villages' in the light of PURA and RURBAN Mission.**

(200 words) [12½]

Approach to question:

Smart Cities and their relevance for urban development in India:

1. **Definition:** Smart Cities are urban areas that leverage technology, data, and innovation to improve the quality of life, sustainability, and efficiency of infrastructure and services.

2. **Relevance:** Smart Cities aim to address urban challenges such as congestion, inadequate infrastructure, pollution, and resource inefficiency. They promote sustainable development, enhance governance, and provide a better quality of life for residents.

Arguments for 'Smart Villages' in the light of PURA and RURBAN Mission:

1. PURA (Providing Urban Amenities in Rural Areas) and RURBAN Mission aim to bridge the rural-urban divide by developing rural areas with urban amenities, infrastructure, and services.

2. **Balanced development:** Smart Villages can promote inclusive growth by providing modern infrastructure, connectivity, healthcare, education, and technology access to rural areas, reducing the rural-urban gap.

By promoting Smart Villages through initiatives like PURA and RURBAN Mission, rural areas can benefit from improved infrastructure, livelihood opportunities, sustainability, and participatory development, fostering overall balanced and inclusive growth.

Answer:

'Smart Cities' are urban areas that use advanced technologies and data-driven solutions to improve infrastructure, services, and overall quality of life. Their relevance for urban development in India can be examined through the following points:

Relevance of Smart Cities for Urban Development:

1. **Infrastructure Improvement:** Smart Cities focus on enhancing transportation, waste management, and utility services, improving urban living conditions.

2. **Sustainable Development:** Smart Cities adopt eco-friendly practices to ensure environmental sustainability.

3. **Economic Growth:** By attracting investments and promoting entrepreneurship, Smart Cities contribute to economic development.

Smart Villages and PURA/RURBAN Mission:

1. **Balanced Development:** Smart Villages, in line with PURA and RURBAN Mission, aim to bridge the rural-urban divide by providing urban amenities and livelihood opportunities in rural areas.

2. **Inclusive Growth:** Smart Villages promote inclusive development, ensuring rural communities benefit from technological advancements.

3. **Decentralization:** Developing smart villages reduces the migration pressure on urban areas, fostering regional balance.

While Smart Cities are essential for urban development, the concept of Smart Villages, in alignment with PURA and RURBAN Mission, is equally crucial to achieve balanced and inclusive growth, reducing rural-urban disparities in India.

Q5. **Justify the need for FDI for the development of the Indian economy. Why there is gap between MOUs signed and actual FDIs? Suggest remedial steps to be taken for increasing actual FDIs in India.**

(200 words) [12½]

Approach to question:

Justification for the Need for FDI in the Indian Economy:

1. **Capital inflow:** FDI brings in significant capital investments that can address the funding gaps in various sectors of the Indian economy, promoting infrastructure development, technological advancements, and overall economic growth.

2. **Employment generation:** FDI contributes to job creation by establishing new businesses, expanding existing ones, and promoting entrepreneurship, thereby reducing unemployment rates and improving living standards.

Reasons for the Gap between MOUs and Actual FDIs:

1. **Implementation challenges:** Inadequate infrastructure, complex regulatory processes, bureaucratic hurdles, and policy uncertainties create obstacles in translating MOUs into actual FDIs.

The gap between MOUs and actual FDIs can be addressed by improving the business environment, ensuring policy stability, developing infrastructure, facilitating investors, and promoting skill development. These measures will attract more actual FDIs, fostering economic growth and development in India.

Answer:

Foreign Direct Investment (FDI) plays a crucial role in the development of the Indian economy. Justifying its need and addressing the gap between MOUs signed and actual FDIs require attention and remedial measures.

Importance of FDI for Indian Economy:

1. **Capital Infusion:** FDI brings in foreign capital, supplementing domestic investments for economic growth.

2. **Technology Transfer:** FDI facilitates technology transfer, promoting innovation and productivity.

3. **Employment Generation:** FDI leads to job creation, enhancing employment opportunities in various sectors.

Reasons for Gap between MOUs and Actual FDIs:

1. **Regulatory Hurdles:** Cumbersome regulations and bureaucratic procedures deter actual FDI inflow.

2. **Policy Uncertainty:** Frequent policy changes create an uncertain investment climate.

3. **Infrastructure Deficiency:** Inadequate infrastructure hampers investor confidence.

Remedial Steps for Increasing Actual FDIs:

1. **Ease of Doing Business:** Streamlining regulations and improving the business environment can attract more FDIs**.**

2. **Stable Policies:** Consistent and investor-friendly policies ensure long-term commitments.

3. **Infrastructure Development:** Enhancing infrastructure will boost investor confidence.

FDI is integral to the Indian economy's development, and bridging the gap between MOUs and actual FDIs necessitates investor-friendly policies, improved infrastructure, and a conducive business environment to attract greater foreign investment inflows.

Q6. Comment on the challenges for inclusive growth which include careless and useless manpower in the Indian context. Suggest measures to be taken for facing these challenges.

(200 words) [12½]

Approach to question:

Challenges for Inclusive Growth:

1. **Careless and useless manpower:** The presence of a significant portion of the workforce with inadequate skills, low productivity, and limited employability poses a challenge to inclusive growth in India. This hinders the effective utilization of human resources and slows down overall economic development.

Measures to Address the Challenges:

1. **Skill development programs:** Enhancing the skills and capabilities of the workforce through vocational training and skill development programs can address the issue of inadequate manpower. This will improve employability and productivity.

2. **Quality education:** Emphasizing quality education at all levels, with a focus on practical skills and competency-based learning, will ensure that the workforce is equipped with the necessary knowledge and abilities for meaningful employment.

By investing in human capital and creating an enabling environment for employment, India can achieve inclusive growth and ensure the meaningful participation of all sections of society in the country's development.

Answer:

Inclusive growth is essential for equitable development in the Indian context. However, challenges like careless and useless manpower hinder the realization of inclusive growth.

Challenges for Inclusive Growth:

1. **Unskilled Workforce:** A large portion of the population lacks employable skills, hindering their participation in economic activities.

2. **Low Productivity:** Careless and unskilled manpower leads to low productivity and inefficiencies in various sectors.

3. **Income Disparities:** Inadequate skill development perpetuates income disparities and widens the economic divide.

Measures to Address Challenges:

1. **Skill Development:** Promote skill development initiatives to enhance the employability of the workforce.

2. **Quality Education:** Improve the quality of education to foster a competent and skilled workforce.

3. **Vocational Training:** Encourage vocational training programs to meet industry demands.

4. **Labor Market Reforms:** Implement labor market reforms to improve productivity and job opportunities.

Addressing the challenges of careless and useless manpower requires concerted efforts in skill development, education, and labor market reforms. By equipping the workforce with the necessary skills and fostering a competent workforce, India can achieve inclusive growth and reduce income disparities.

Q7. What is water-use efficiency? Describe the role of micro-irrigation in increasing the water-use efficiency. (200 words) [12½]

Approach to question:

Water-use efficiency refers to the amount of crop yield or productivity achieved per unit of water used in agricultural practices. Here's how micro-irrigation contributes to increasing water-use efficiency:

1. **Precise water application:** Micro-irrigation systems, such as drip irrigation and sprinklers, allow for precise water application directly to the plant roots. This minimizes water loss due to evaporation or runoff, maximizing the utilization of water resources.

2. **Reduced water wastage:** Micro-irrigation systems deliver water slowly and in controlled amounts, ensuring that only the required amount of water reaches the plants. This reduces water wastage and optimizes water use efficiency.

3. **Targeted irrigation:** Micro-irrigation enables targeted irrigation, where water is delivered to specific areas where crops need it the most.

This ensures that water reaches the root zone, minimizing water loss and improving plant growth.

It is an effective tool for sustainable water management in agriculture, helping optimize crop productivity while minimizing water resources' impact on the environment.

Answer:

Water-use efficiency refers to the effective utilization of water in agricultural practices to maximize crop yield while minimizing water consumption. Micro-irrigation plays a crucial role in enhancing water-use efficiency.

Role of Micro-Irrigation in Increasing Water-Use Efficiency:

1. **Precision Irrigation:** Micro-irrigation delivers water directly to plant roots, reducing wastage and optimizing water distribution.

2. **Reduced Evaporation:** Drip and sprinkler systems minimize water loss due to evaporation, enhancing overall efficiency.

3. **Targeted Application:** Micro-irrigation allows precise control of water application, matching crop water requirements.

4. **Water Savings:** Compared to conventional irrigation methods, micro-irrigation can save up to 40% of water, leading to sustainable water use.

Micro-irrigation techniques like drip and sprinkler systems are instrumental in improving water-use efficiency, making agriculture more sustainable and ensuring optimal utilization of water resources. Adoption of micro-irrigation practices can significantly contribute to addressing water scarcity challenges and promoting agricultural productivity in India.

Q8. What is allelopathy? Discuss its role in major cropping systems of irrigated agriculture.
(200 words) [12½]

Approach to question:

Allelopathy is a biological phenomenon where one plant species releases chemical compounds into its environment, which affects the growth and development of neighboring plants. Here is the role of allelopathy in major cropping systems of irrigated agriculture:

1. **Weed suppression:** Certain crop plants release allelochemicals that inhibit the growth of weeds, reducing competition for nutrients, water, and light. This helps in weed control and promotes crop yield.

2. **Pest management:** Some crops exhibit allelopathic effects against pests and pathogens. Allelochemicals released by these crops can repel or inhibit the growth of pests and diseases, reducing the need for chemical pesticides.

In conclusion, allelopathy plays a significant role in major cropping systems of irrigated agriculture. It contributes to weed suppression, pest management, nutrient cycling, and sustainable agriculture practices. Understanding the allelopathic interactions between crops can help farmers make informed decisions

regarding crop selection, intercropping, and weed management strategies, leading to improved crop productivity and environmental sustainability.

Answer:

Allelopathy refers to the process by which one plant species produces biochemical compounds that influence the growth, development, or survival of other nearby plants. It plays a significant role in major cropping systems of irrigated agriculture.

Role of Allelopathy in Major Cropping Systems of Irrigated Agriculture:

1. **Weed Suppression:** Some crops release allelopathic compounds that inhibit weed growth, reducing the need for herbicides.

2. **Crop Rotation Benefits:** Allelopathic effects of preceding crops can positively influence subsequent crop growth and health.

3. **Disease Management:** Certain crops secrete allelopathic compounds that suppress soil-borne pathogens, aiding disease management.

4. **Nutrient Cycling:** Allelopathy influences nutrient availability and uptake, impacting crop productivity.

Allelopathy offers an eco-friendly approach to manage weeds, diseases, and improve crop performance in irrigated agriculture. Understanding allelopathic interactions is essential for sustainable and integrated pest management practices, contributing to efficient crop production and reduced environmental impact.

Q9. Discuss the role of land reforms in agricultural development. Identify the factors that were responsible for the success of land reforms in India. (200 words) [12½]

Approach to question:

Role of Land Reforms in Agricultural Development:

1. **Redistribution of land:** Land reforms aim to address the issue of land inequality by redistributing land to landless farmers, tenants, and marginalized sections of society. This leads to increased access to land and promotes agricultural productivity.

2. **Increased agricultural efficiency:** Land reforms, such as consolidation of fragmented landholdings, promote better land management practices, mechanization, and improved irrigation techniques.

Factors responsible for the success of land reforms in India:

1. **Political will:** Strong political commitment and leadership are crucial for the successful implementation of land reforms. Governments that prioritize land reforms and take proactive measures can achieve better outcomes.

2. **Legal framework:** An effective legal framework with clear land ownership rights, tenancy laws, and dispute resolution mechanisms is essential for the success of land reforms. It provides a basis for equitable land distribution and protects the rights of beneficiaries.

In conclusion, land reforms play a significant role in promoting agricultural development by redistributing land, improving agricultural efficiency, ensuring tenure security, and promoting social equity.

Answer:

Land reforms play a crucial role in agricultural development, aiming to address land ownership inequalities and enhance agricultural productivity.

Role of Land Reforms in Agricultural Development:

1. **Land Redistribution:** Land reforms facilitate the equitable distribution of land, providing opportunities to landless and marginal farmers.

2. **Tenure Security:** Ensuring secure land rights encourages farmers to invest in land improvements and adopt modern agricultural practices.

3. **Increased Productivity:** Land consolidation and proper land utilization enhance agricultural productivity.

Factors Responsible for Success of Land Reforms in India:

1. **Political Will:** Strong political commitment and leadership were crucial in implementing successful land reforms.

2. **Supportive Policies:** Enabling policies, regulations, and legal frameworks facilitated smooth land redistribution.

3. **Grassroots Participation:** Active involvement of local communities and beneficiaries ensured the success of land reforms.

4. **Land Records and Surveys:** Reliable land records and surveys were instrumental in identifying beneficiaries and avoiding disputes.

Land reforms have played a significant role in India's agricultural development, promoting land equity, increasing productivity, and empowering farmers. Political commitment, supportive policies, grassroots participation, and efficient land records were key factors that contributed to the success of land reforms in the country.

Q10. **Given the vulnerability of Indian agriculture to vagaries of nature, discuss the need for crop insurance and bring out the salient features of the Pradhan Mantri Fasal Bima Yojana (PMFBY).** **(200 words) [12½]**

Approach to question:

Need for Crop Insurance:

1. **Climate uncertainties:** Indian agriculture is highly vulnerable to natural disasters, erratic rainfall, droughts, floods, pests, and diseases. Crop insurance provides a safety net to farmers, mitigating the financial risks associated with crop failures.

2. **Income stabilization:** Crop losses can lead to significant income fluctuations for farmers, impacting their livelihoods and economic well-being. Crop insurance ensures income stabilization by compensating farmers for their losses.

Salient Features of Pradhan Mantri Fasal Bima Yojana (PMFBY):

1. **Comprehensive coverage:** PMFBY provides coverage for all food crops, oilseeds, and horticultural crops, protecting farmers against yield losses due to natural calamities, pests, and diseases.

2. **Premium subsidy:** The scheme offers premium subsidies, ensuring affordability for small and marginal farmers. The premium rates are based on the crop type, location, and coverage level.

PMFBY's comprehensive coverage, premium subsidies, technology integration, and farmer-centric approach make it an important tool for mitigating agricultural risks and supporting the well-being of farmers in the country.

Answer:

Indian agriculture is highly susceptible to natural calamities, making crop insurance a crucial risk management tool. The Pradhan Mantri Fasal Bima Yojana (PMFBY) was launched to address this need effectively.

Need for Crop Insurance:

1. **Mitigating Farmer's Risk:** Crop insurance protects farmers from losses due to weather uncertainties, pests, and diseases.

2. **Enhancing Investment:** Crop insurance instills confidence in farmers to invest in modern technology and practices.

3. **Socio-Economic Stability:** Insurance coverage ensures financial security and stability for farmers and their families.

Salient Features of PMFBY:

1. **Premium Subsidy:** The scheme provides premium subsidy, reducing the cost burden on farmers.

2. **Comprehensive Coverage:** PMFBY covers all food and oilseed crops, ensuring wide-ranging protection.

3. **Quick Claims Settlement:** The scheme ensures prompt and transparent claim settlements.

4. **Technology Integration:** PMFBY employs remote sensing and modern technology for crop loss assessment.

Crop insurance, exemplified by the Pradhan Mantri Fasal Bima Yojana, is vital to safeguard Indian farmers from agricultural risks and promote sustainable agricultural practices. The scheme's comprehensive coverage, premium subsidy, and prompt claim settlements make it a vital component in strengthening India's agriculture sector.

Q11. **Give an account of the current status and the targets to be achieved pertaining to renewable**

energy sources in the country. Discuss in brief the importance of National Programme on Light Emitting Diodes (LEDs).

(200 words) [12½]

Approach to question:

Current status and targets pertaining to renewable energy sources in India:

1. **Installed capacity:** India has made significant progress in renewable energy installations, with a total installed capacity of over 100 GW as of 2021, including solar, wind, biomass, and small hydropower.

2. **Solar energy:** India aims to achieve 450 GW of installed solar capacity by 2030, with a focus on utility-scale solar parks, rooftop solar, and floating solar projects.

Importance of the National Programme on Light Emitting Diodes (LEDs):

1. **Energy efficiency:** LEDs are highly energy-efficient, consuming less electricity compared to traditional lighting sources. The program promotes the widespread adoption of LED lighting, reducing energy consumption and carbon emissions.

2. **Cost savings:** LED bulbs have a longer lifespan and lower maintenance costs, resulting in substantial savings for consumers and reducing the financial burden on households and the government.

It supports India's ambitious targets for renewable energy adoption and contributes to the country's transition towards a sustainable and low-carbon future.

Answer:

Renewable energy sources play a crucial role in India's energy transition and sustainable development. The government has set ambitious targets to promote renewable energy adoption while emphasizing energy-efficient lighting through the National Programme on Light Emitting Diodes (LEDs).

1. **Solar Power:** India has made significant strides in solar energy, with a target of 100 GW of installed solar capacity by 2022.

2. **Wind Power:** The country aims to achieve 60 GW of wind power capacity by 2022, exploiting its vast wind potential.

3. **Hydropower:** The target is to achieve 60 GW of hydropower capacity while ensuring ecological sustainability.

Importance of National Programme on LEDs:

1. **Energy Efficiency:** LEDs are highly energy-efficient, reducing electricity consumption and cutting carbon emissions.

2. **Cost Savings:** LED bulbs offer substantial cost savings due to lower energy consumption and longer lifespan.

3. **Environmental Benefits:** Reduced energy consumption through LED adoption contributes to mitigating climate change.

India's renewable energy targets and the National Programme on LEDs are crucial components of the country's sustainable development agenda. By promoting renewable energy adoption and energy-efficient lighting, India can achieve its clean energy goals while contributing to global efforts in combating climate change.

Q12. Discuss India's achievements in the field of Space Science and Technology. How the application of this technology has helped India in its socio-economic development?

(200 words) [12½]

Approach to question:

India's achievements in the field of Space Science and Technology:

1. **Launch capabilities:** India has successfully developed the Polar Satellite Launch Vehicle (PSLV) and the Geosynchronous Satellite Launch Vehicle (GSLV), enabling the launch of satellites into various orbits.

2. **Remote sensing and Earth observation:** India's satellites like the IRS series and Cartosat provide valuable data for mapping, resource management, disaster management, and environmental monitoring.

Application of space technology in socio-economic development:

1. **Telecommunication and internet connectivity:** Satellite-based communication systems have bridged the digital divide, providing access to telecommunication and internet services in remote and rural areas, fostering socio-economic development.

2. **Disaster management and early warning systems:** Satellite data helps in monitoring natural disasters, facilitating early warning systems and timely response, saving lives and minimizing the socio-economic impact of disasters.

In conclusion, India's achievements in space science and technology have had a transformative impact on socio-economic development.

Answer:

India has made significant strides in space science and technology, positioning itself as a prominent player in the global space community. The application of space technology has brought numerous socio-economic benefits to the country.

India's Achievements in Space Science and Technology:

1. **Space Exploration:** India has successfully launched and operated various space missions, including Chandrayaan and Mangalyaan.

2. **Satellite Launch Capability:** ISRO has established a reliable and cost-effective satellite launch capability through the Polar Satellite Launch Vehicle (PSLV) and Geosynchronous Satellite Launch Vehicle (GSLV).

3. **Navigation System:** The Indian Regional Navigation Satellite System (IRNSS), now known as NavIC, enhances location-based services.

Socio-Economic Benefits of Space Technology:

1. **Agriculture:** Satellite data assists in precision agriculture, optimizing crop planning and water management.

2. **Disaster Management:** Remote sensing aids in assessing and managing natural disasters, enabling timely response.

3. **Communication:** Satellite-based communication networks bridge the digital divide, enhancing connectivity.

India's achievements in space science and technology have not only established its space capabilities but have also brought tangible socio-economic benefits. The application of space technology has improved agriculture, disaster management, communication, and navigation, contributing to India's socio-economic development and overall progress as a nation.

Q13. **Why is nanotechnology one of the key technologies of the 21st century? Describe the salient features of Indian Government's Mission on Nanoscience and Technology and the scope of its application in the development process of the country.**

(200 words) [12½]

Approach to question:

Reasons why nanotechnology is a key technology of the 21st century:

1. **Miniaturization and precision:** Nanotechnology allows manipulation and control of materials at the nanoscale, enabling the development of smaller, more efficient, and precise devices and systems.

2. **Multidisciplinary applications:** Nanotechnology finds applications in various sectors like healthcare, electronics, energy, environment, and materials science, leading to innovations in diverse fields.

Salient features of the Indian Government's Mission on Nanoscience and Technology:

1. **Research and development:** The mission focuses on promoting research and development in nanoscience and nanotechnology to foster indigenous innovation and knowledge creation.

2. **Infrastructure development:** It emphasizes the establishment of world-class infrastructure facilities, research centers, and fabrication facilities to support nanotechnology research and development.

Nanotechnology has vast scope in India's development process, including healthcare, energy, agriculture, electronics, IT, and environmental sectors, offering transformative solutions for societal challenges.

Answer:

Nanotechnology is a key technology of the 21st century due to its potential to revolutionize various industries with its unique properties and applications at the nanoscale.

Importance of Nanotechnology:

1. **Advanced Materials:** Nanotechnology enables the development of advanced materials with improved properties and performance.

2. **Medicine and Healthcare:** Nanomedicine offers targeted drug delivery, diagnostics, and innovative treatment approaches.

3. **Energy and Environment:** Nanotechnology contributes to efficient energy storage, renewable energy solutions, and pollution control.

Indian Government's Mission on Nanoscience and Technology:

1. **Objectives:** The mission aims to promote R&D in nanotechnology and facilitate its application in various sectors.

2. **Research Funding:** The government provides financial support for nanoscience research and infrastructure development.

3. **Skill Development:** The mission focuses on building skilled manpower in nanotechnology.

Scope of Nanotechnology in India's Development:

1. **Healthcare:** Nanomedicine can revolutionize healthcare delivery, diagnostics, and drug development.

2. **Agriculture:** Nanotechnology can enhance crop productivity, pest management, and water conservation.

Nanotechnology holds immense promise for India's development across various sectors. The Indian Government's Mission on Nanoscience and Technology supports R&D, skill development, and interdisciplinary collaboration to harness the potential of nanotechnology and drive India's progress in the 21st century.

Q14. **Rehabilitation of human settlements is one of the important environmental impacts which always attracts controversy while planning major projects. Discuss the measures suggested for mitigation of this impact while proposing major developmental projects.**

(200 words) [12½]

Approach to question:

Measures suggested for mitigating the impact of human settlement rehabilitation during major developmental projects include:

1. **Prioritizing participatory planning:** Involve affected communities in the decision-making process to ensure their needs and concerns are considered and integrated into the rehabilitation plans.

2. **Adequate compensation and resettlement:** Provide fair compensation for loss of land, property, and livelihoods, and ensure proper resettlement with access to essential services, infrastructure, and livelihood opportunities.

3. **Environmental impact assessment:** Conduct comprehensive assessments to identify potential environmental impacts of the project and develop strategies to minimize or mitigate them during the rehabilitation process.

By implementing these measures, the rehabilitation of human settlements can be carried out in an environmentally sustainable and socially inclusive manner, ensuring the well-being of affected communities while minimizing the adverse environmental impacts of major developmental projects.

Answer:

Rehabilitation of human settlements is a critical environmental concern during the planning of major developmental projects. Balancing development and minimizing adverse impacts on human communities is essential for sustainable progress.

Measures for Mitigation of Rehabilitation Impact:

1. **Comprehensive Social Impact Assessment (SIA):** Conducting a thorough SIA to identify potential displacement and assess social consequences.

2. **Participatory Approach:** Involving affected communities in decision-making and planning to address their concerns.

3. **Adequate Compensation and Resettlement:** Providing fair compensation, alternative land, and livelihood options to displaced families.

4. **Skill Development and Livelihood Restoration:** Training and supporting affected communities to develop new skills and livelihood opportunities.

5. **Infrastructure Development:** Ensuring proper infrastructure facilities in the resettlement areas.

6. **Social Safety Nets:** Implementing social safety nets to protect vulnerable communities during the transition.

7. **Monitoring and Evaluation:** Regularly monitoring the rehabilitation process and addressing any issues that arise.

Mitigating the impact of human settlements' rehabilitation in major projects requires a holistic approach that considers the welfare of affected communities. By conducting a comprehensive social impact assessment, involving stakeholders, providing fair compensation and support, and ensuring proper infrastructure and livelihood options, developmental projects can be designed to minimize adverse environmental and social consequences.

Q15. **The frequency of urban floods due to high intensity rainfall is increasing over the years. Discussing the reasons for urban floods, highlight the mechanisms for preparedness to reduce the risk during such events.**

(200 words) [12½]

Approach to question:

Reasons for urban floods due to high intensity rainfall:

1. **Rapid urbanization:** Increased concrete surfaces and reduced green spaces result in poor water absorption, leading to excessive runoff during heavy rainfall.

2. **Inadequate drainage systems:** Insufficient or poorly maintained drainage systems fail to handle the volume of water, causing waterlogging and flooding.

Mechanisms for preparedness to reduce flood risk:

1. **Improved urban planning:** Incorporate measures like proper land-use planning, green infrastructure, and retention ponds to manage rainwater and minimize flood risks.

2. **Enhancing drainage systems:** Invest in the maintenance and expansion of drainage infrastructure, including cleaning of drains and installation of larger capacity pipes.

By addressing these factors and implementing preparedness measures, the risk of urban floods due to high intensity rainfall can be reduced, minimizing the impact on lives, infrastructure, and the environment.

Answer:

Urban floods have become a growing concern in recent years due to the increasing frequency of high-intensity rainfall events. These floods pose significant risks to lives, infrastructure, and economic activities in urban areas. Understanding the reasons behind these floods and implementing effective preparedness mechanisms is essential to mitigate the impacts and reduce the risk during such events.

Reasons for Urban Floods:

1. **Urbanization:** Rapid and unplanned urbanization leads to the conversion of natural land into impervious surfaces like concrete, asphalt, and buildings, reducing the area for rainwater absorption and increasing surface runoff.

2. **Poor Drainage System:** Many urban areas lack efficient drainage systems, causing water to accumulate on roads and low-lying areas during heavy rainfall.

3. **Encroachment of Water Bodies:** Wetlands and natural drainage channels are often encroached upon, leading to reduced natural water retention capacity.

Preparedness Mechanisms to Reduce Flood Risk:

1. **Improved Infrastructure:** Developing and maintaining a well-designed and efficient drainage system to handle large volumes of water during heavy rainfall.

2. **Flood Mapping and Early Warning Systems:** Implementing advanced technology to monitor weather conditions and water levels, enabling timely alerts and evacuation plans.

3. **Flood-Resilient Buildings:** Promoting construction practices that incorporate flood-resistant materials and elevation of buildings in flood-prone areas.

4. **Green Infrastructure:** Incorporating green spaces, rain gardens, and permeable pavements to increase water absorption and reduce runoff.

In conclusion, addressing the increasing frequency of urban floods requires a multi-faceted approach that involves both understanding the reasons behind these floods and implementing preparedness mechanisms. By adopting sustainable urban development practices and prioritizing flood management, we can reduce the risk and build more resilient cities capable of withstanding such events.

Q16. With reference to National Disaster Management Authority (NDMA) guidelines, discuss the measures to be adopted to mitigate the impact of recent incidents of cloudbursts in many places of Uttarakhand.

(200 words) [12½]

Approach to question:

Measures to mitigate the impact of cloudburst incidents in Uttarakhand, as per the National Disaster Management Authority (NDMA) guidelines, include:

1. **Early warning systems:** Implement robust early warning systems to detect and forecast cloudbursts, enabling timely evacuation and preparedness measures.

2. **Strengthen infrastructure:** Build resilient infrastructure, including bridges, roads, and retaining walls, to withstand the force of cloudbursts and prevent infrastructure damage.

3. **Land-use planning:** Regulate construction activities in vulnerable areas, ensuring that buildings adhere to safety standards and avoid high-risk zones prone to cloudbursts.

4. **Reforestation and soil conservation:** Promote afforestation and soil conservation measures to reduce the risk of soil erosion and landslides triggered by cloudbursts.

5. **Training and capacity building:** Conduct training programs to enhance the preparedness and response capabilities of local communities, emergency personnel, and government officials.

6. **Public awareness:** Educate the public about cloudbursts, their risks, and necessary precautions through awareness campaigns, workshops, and community engagement.

Implementing these measures in line with NDMA guidelines can help mitigate the impact of cloudburst incidents in Uttarakhand, saving lives and minimizing the loss of property.

Answer:

Measures to mitigate the impact of recent incidents of cloudbursts in Uttarakhand, as per the National Disaster Management Authority (NDMA) guidelines:

1. **Early warning systems:** Strengthen the early warning systems to provide timely alerts about potential cloudbursts. This includes the installation of weather monitoring equipment, rain gauge stations, and weather radar systems to detect and track severe weather patterns.

2. **Risk assessment and mapping:** Conduct comprehensive risk assessments and mapping exercises to identify areas prone to cloudbursts. This information will help in developing targeted mitigation strategies and land-use planning measures to minimize the impact on vulnerable areas.

3. **Capacity building and training:** Conduct regular capacity building programs and training sessions for local communities, government officials, and emergency response teams.

4. **Infrastructure resilience:** Improve the resilience of critical infrastructure such as roads, bridges, and buildings to withstand the impact of cloudbursts. This can be achieved through the use of appropriate engineering techniques, including reinforced construction materials and drainage systems designed to handle excess rainfall.

5. **Public awareness and education:** Conduct extensive public awareness campaigns to educate the local population about cloudbursts, their risks, and the necessary precautions to be taken. This can be done through various mediums such as workshops, street plays, and the dissemination of informative materials.

6. **Post-disaster recovery and rehabilitation:** Develop comprehensive plans for post-disaster recovery and rehabilitation, including the provision of temporary shelters, medical assistance, and psychosocial support to affected individuals and communities. Focus on restoring essential services, infrastructure, and livelihoods.

In conclusion, mitigating the impact of cloudbursts in Uttarakhand requires a multi-faceted approach encompassing early warning systems, risk assessment, capacity building, infrastructure resilience, ecosystem conservation, community engagement, emergency

response strengthening, public awareness, post-disaster recovery, and international collaboration.

Q17. **The terms 'Hot Pursuit' and 'Surgical Strikes' are often used in connection with armed action against terrorist attacks. Discuss the strategic impact of such actions.**

(200 words) [12½]

Approach to question:

1. **Swift response:** Hot pursuit and surgical strikes allow immediate and targeted action against terrorist threats, enabling a quick and decisive response.

2. **Deterrence:** The strategic impact lies in deterring potential terrorists and their supporters by demonstrating the willingness and capability to swiftly respond and neutralize threats.

3. **Disruption of networks:** These actions disrupt terrorist networks, causing operational setbacks and undermining their ability to carry out attacks.

4. **Psychological impact:** The fear and uncertainty created by hot pursuit and surgical strikes can demoralize terrorists and create a sense of insecurity among their ranks.

In conclusion, hot pursuit and surgical strikes have a significant strategic impact by enabling swift response, deterring potential threats, disrupting terrorist networks, creating a psychological impact, conveying messages to adversaries, shaping international perception, garnering domestic support, dealing with cross-border threats, and providing strategic signaling. However, their execution should be balanced with careful considerations to minimize risks and ensure long-term stability.

Answer:

The terms 'Hot Pursuit' and 'Surgical Strikes' have gained prominence in the context of armed actions taken against terrorist attacks. These strategies involve swift and targeted military responses to counter terrorist threats. Understanding the strategic impact of these actions is crucial in comprehending their effectiveness in combating terrorism.

Strategic Impact of Hot Pursuit and Surgical Strikes:

1. **Deterrence:** Such actions serve as a deterrent to terrorist organizations, as they demonstrate a nation's commitment to defending its citizens and sovereignty.

2. **Precision and Minimization of Collateral Damage:** Surgical Strikes are designed to target specific terrorist assets, minimizing civilian casualties and collateral damage, thus reducing the risk of escalation.

3. **Psychological Impact:** These actions instill fear and uncertainty among terrorist groups, disrupting their operational capabilities and reducing morale.

4. **International Perception:** Properly executed operations garner international support,

portraying the state's resolve in countering terrorism and earning diplomatic leverage.

5. **Preventing Escalation:** By conducting targeted operations, the risk of full-scale conflicts between nations is minimized, as opposed to conventional large-scale military engagements.

6. **Restoring Public Confidence:** Successful actions boost public confidence in the government's ability to protect citizens and maintain national security.

7. **Cross-border Dynamics:** 'Hot Pursuit' operations enable swift action across borders, making it challenging for terrorists to find safe havens.

8. **Intelligence Gathering:** Such operations may yield valuable intelligence on terrorist networks, aiding in future preventive measures.

In conclusion, 'Hot Pursuit' and 'Surgical Strikes' are strategic tools used to counter terrorist attacks with a targeted and precise approach. When executed effectively, they have the potential to deter terrorists, minimize collateral damage, and demonstrate a nation's resolve in combating terrorism. However, the success of these actions also depends on the context, intelligence, and careful consideration of potential risks and consequences.

Q18. **'Terrorism is emerging as a competitive industry over the last few decades". Analyse the above statement.** **(200 words) [12½]**

Approach to question:

1. **Increased incidents:** There has been a rise in terrorist activities globally over the last few decades, indicating the growing prominence of terrorism as a competitive industry.

2. **Recruitment and funding:** Terrorist organizations compete for recruits, seeking individuals to join their ranks and carry out their violent agenda. They also compete for funding sources to sustain their operations.

3. **Propagation of extremist ideologies:** Terrorist groups vie for influence and strive to spread their ideologies, competing to attract sympathizers and supporters.

The analysis of the above statement indicates that terrorism has indeed emerged as a competitive industry in recent decades, characterized by increased incidents, recruitment efforts, funding competition, propagation of extremist ideologies, technological advancements, global networks, an arms race, and the recruitment of skilled individuals.

Answer:

The statement "Terrorism is emerging as a competitive industry over the last few decades" highlights the changing nature of terrorism, which has transformed from isolated incidents to a complex, interconnected, and competitive phenomenon. This analysis delves into the factors that contribute to terrorism becoming a competitive industry.

Analysis:

1. **Diverse Actors:** Terrorism is no longer limited to state-sponsored groups; non-state actors, extremist organizations, and even lone-wolf attackers now vie for attention, resources, and influence.

2. **Global Networking:** Advancements in technology and communication have facilitated cross-border cooperation among terrorist groups, enabling them to learn from each other's tactics and strategies.

3. **Media and Propaganda:** Terrorism leverages the media to amplify its message, attract recruits, and create fear, leading to a competition for sensationalism and coverage.

4. **Funding and Resources:** Terrorist groups compete for funding, territorial control, and access to illicit resources, which fuels their activities and sustains their influence.

5. **Ideological Rivalries:** Different terrorist ideologies and narratives create competition for dominance, as groups attempt to appeal to a broader base of supporters.

6. **Copycat Phenomenon:** Successful terrorist attacks inspire emulation, leading to a competitive cycle of violence and extremism.

7. **Social Media and Recruitment:** Online platforms have become battlegrounds for terrorists, who seek to radicalize individuals and recruit new members.

Terrorism's evolution into a competitive industry has led to an increasingly complex and interconnected landscape. Understanding the motivations, dynamics, and strategies behind this transformation is crucial for formulating effective counterterrorism measures. International cooperation, intelligence sharing, and addressing root causes are essential to tackle this multifaceted challenge and maintain global peace and security.

Q19. Border management is a complex task due to difficult terrain and hostile relations with some countries. Elucidate the challenges and strategies for effective border management.

(200 words) [12½]

Approach to question:

Challenges in border management:

1. **Difficult terrain:** Rugged mountains, dense forests, and vast deserts pose challenges in patrolling and surveillance.

2. **Hostile relations:** Tensions with neighbouring countries can lead to increased border violations and infiltration.

3. **Porous borders:** Lack of physical barriers and extensive border lengths make it difficult to monitor and control unauthorized crossings.

Strategies for effective border management:

1. **Enhanced surveillance:** Utilize advanced technologies like drones, sensors, and cameras for real-time monitoring.

2. **Infrastructure development:** Construct physical barriers, roads, and border outposts to facilitate patrolling and deter illegal activities.

3. **Bilateral cooperation:** Foster collaborations and information sharing with neighbouring countries to address common border challenges.

By addressing these challenges and implementing these strategies, effective border management can be achieved, ensuring national security and preventing illegal activities.

Answer:

The Border management is a challenging task for many countries, particularly when dealing with difficult terrain and strained relations with neighboring nations. This answer outlines the various challenges faced in border management and discusses strategies for effective and comprehensive border management.

Challenges in Border Management:

1. **Difficult Terrain:** Rugged mountains, dense forests, rivers, and deserts make surveillance and patrolling difficult, providing opportunities for illegal crossings and activities.

2. **Porosity of Borders:** Inadequate fencing and porous borders allow unauthorized movements, smuggling, and infiltration of terrorists and criminals.

3. **Hostile Relations:** Tense diplomatic relations with neighbouring countries can hinder cooperation on border security issues, leading to vulnerabilities along the border.

4. **Corruption and Bribery:** Inefficient enforcement agencies and corruption among border personnel can facilitate illegal cross-border activities.

5. **Population Movement:** Human mobility across borders for economic or social reasons can pose challenges in distinguishing between legitimate and illegitimate crossings.

Strategies for Effective Border Management:

1. **Technology Integration:** Implementing advanced surveillance technologies like drones, sensors, and thermal imaging to monitor remote and difficult terrains.

2. **Border Infrastructure:** Enhancing border infrastructure with well-designed fences, barriers, and checkpoints to control unauthorized crossings.

3. **Bilateral Agreements:** Diplomatic engagement and cooperation with neighbouring countries to address shared border security concerns.

4. **Capacity Building:** Training and equipping border security forces to respond effectively to threats and emergencies.

5. **Community Engagement:** Involving local communities in border areas to act as stakeholders in reporting suspicious activities.

Effective border management is crucial for national security and stability, especially when dealing with difficult terrains and strained relations with neighbouring countries. Combining technological advancements, cooperation, and capacity building can help address the challenges and create a robust border management framework to secure the nation's borders and protect its interests.

Q20. **Use of internet and social media by non-state actors for subversive activities is a major security concern. How have these been misused in the recent past? Suggest effective guidelines to curb the above threat.**
(200 words) [12½]

Approach to question:

Misuse of the internet and social media by non-state actors in recent times includes:

1. Propagation of extremist ideologies and recruitment.
2. Dissemination of terrorist propaganda and instructional content.
3. Communication and coordination for illicit activities.
4. Fundraising and financing through online platforms.
5. Cyberattacks and information warfare for disruptive purposes.

To curb this threat, effective guidelines include enhanced monitoring, counter-narratives, international cooperation, regulation, technological solutions, public-private partnerships, capacity building, responsible encryption practices, and awareness programs.

Answer:

The use of the internet and social media by non-state actors for subversive activities has emerged as a significant security concern. These platforms provide a means for extremist groups to spread propaganda, recruit members, and coordinate attacks, posing a serious threat to global security.

Misuse of Internet and Social Media by Non-State Actors:

1. **Propaganda and Radicalization:** Extremist groups use online platforms to disseminate propaganda and recruit individuals susceptible to radicalization.
2. **Fundraising and Financing:** The internet facilitates crowdfunding and financial transactions, enabling non-state actors to generate funds for their nefarious activities.
3. **Communication and Coordination:** Social media channels provide secure and encrypted communication channels for planning and coordinating attacks.
4. **Disinformation Campaigns:** Non-state actors use fake news and disinformation to exploit societal fault lines, sow discord, and further their agendas.

Guidelines to Curb the Threat:

1. **International Collaboration:** Foster international cooperation among governments, intelligence agencies, and tech companies to monitor and counter online extremist content.
2. **Regulation and Oversight:** Enact robust regulations and oversight mechanisms to hold social media platforms accountable for policing extremist content.
3. **AI and Algorithmic Solutions:** Utilize artificial intelligence and algorithms to proactively identify and remove extremist content, while respecting privacy and free speech concerns.
4. **Public Awareness and Education:** Promote digital literacy and critical thinking to empower individuals in recognizing and resisting online extremist narratives.
5. **Cybersecurity Measures:** Strengthen cybersecurity infrastructure to safeguard against cyber-attacks by non-state actors.

The misuse of the internet and social media by non-state actors poses a significant security threat in the modern world. Effective guidelines, combined with international collaboration, robust regulation, and proactive measures, are essential to curbing the spread of extremist content and maintaining global security in the digital age.