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GENERAL STUDIES (TEST CODE : 2213)

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Medium Eng./Hindi	English	Registration Number	1365836
Center	Delhi	Date	24-7-2022

INDEX TABLE

Q. No.	Maximum Marks	Marks Obtained
1	10	
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17	15	
18	15	
19	15	
20	15	

Total Marks Obtained:

Remarks:

INSTRUCTIONS

- Do furnish the appropriate details in the answer sheet (viz. Name, Registration Number and Test Code).
उत्तर पुस्तिका में सूचनाएं भरना आवश्यक है (नाम, प्रश्न-पत्र कोड, विद्यार्थी क्रमांक आदि)।
- There are **TWENTY** questions printed in **ENGLISH & HINDI** इसमें बीस प्रश्न हैं अंग्रेजी और हिन्दी में छपे हैं।
- All questions are compulsory.**
सभी प्रश्न अनिवार्य हैं।
- The number of marks carried by a question/part is indicated against it.
प्रत्येक प्रश्न/भाग के अंक उसके सामने दिए गए हैं।
- Answers must be written in the medium authorized in the Admission Certificate, which must be stated clearly on the cover of this Question-Cum-Answer (QCA) Booklet in the space provided. No marks will be given for answers written in medium other than the authorized one.
प्रश्नों के उत्तर उसी माध्यम में लिखे जाने चाहिए जिसका उल्लेख आपके प्रवेश पत्र में किया गया है और उस माध्यम का स्पष्ट उल्लेख प्रश्न-सह-उत्तर (क्यूसीए) पुस्तिका के मुख्य पृष्ठ पर अंकित निर्दिष्ट स्थान पर किया जाना चाहिए। उल्लिखित माध्यम के अतिरिक्त अन्य किसी माध्यम में लिए गए उत्तर पर कोई अंक नहीं मिलेंगे।
- Word limit in questions, if specified, should be adhered to.
प्रश्नों में शब्द सीमा, जहाँ विनिर्दिष्ट है, का अनुसरण किया जाना चाहिए।
- Any page or portion of the page left blank in the Question-Cum-Answer Booklet must be clearly struck off.
उत्तर पुस्तिका में खाली छोड़ा हुआ पृष्ठ या उसके अंश को स्पष्ट रूप से काटा जाना चाहिए।

16-B, 2nd Floor, Above National Trust Building, Bada Bazar Marg, Old Rajinder Nagar, Delhi-110060

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Delhi- 110009

EVALUATION INDICATORS

1. Contextual Competence
2. Content Competence
3. Language Competence
4. Introduction Competence
5. Structure - Presentation Competence
6. Conclusion Competence

Overall Macro Comments / feedback / suggestions on Answer Booklet:

1.

2.

3.

4.

5.

6.

All the Be

1. An effective approach to green budgeting is underpinned by strong strategic framework, tools for evidence generation and an enabling budgetary governance framework. Discuss. (150 words) 10

हरित बजट के लिए एक प्रभावी दृष्टिकोण को सुदृढ़ रणनीतिक ढांचे, साक्ष्य निर्माण हेतु उपकरण और एक सक्षम वजतीय शासन ढांचे द्वारा सुदृढ़ता प्रदान की जाती है। विवेचना कीजिए।

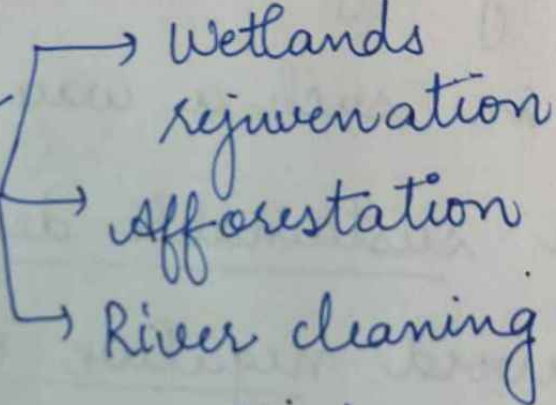
Green Budgeting refers to designing finance and expenditure in such a way so as to promote sustainable development and avoid negative environmental externalities.

Approach to Green Budgeting

- Including negative externalities in development projects.
- Designing disaster resilient

infrastructure. Eg - Embedded
~~systems~~ for flooding alerts.

→ Mechanisms for checking energy
efficiency of buildings. Eg - GRIHA,
BEE ratings, etc.

→ Budgetary
allocations
for 
Wetlands
rejuvenation
Afforestation
River cleaning - Eg -
Clean Ganga Mission

Thus, Green Budgeting has
become the need of the hour.
Evidence based approach to achieve
sustainable Development Goals
must be adopted.

2. State the need for circular economy in India and the challenges associated with it. Also, discuss the measures that are required to build a circular economy in India.

भारत में चक्रीय अर्थव्यवस्था की आवश्यकता और इससे जुड़ी चुनौतियों का उल्लेख कीजिए। साथ ही, भारत में एक चक्रीय अर्थव्यवस्था के निर्माण के लिए आवश्यक उपायों पर चर्चा कीजिए।

(150 words) 10

Circular Economy involves use of products and bringing it back to system by way of recycling and recovery.

Eg - Recycling of plastic boxes, metal tins, etc.

Need for Circular economy -

①. For effective solid waste management. Eg - Plastic bags, electronics

②. To mitigate the effects of Climate change. (limiting temp rise to 1.5°C above pre-industrial levels)

Challenges associated

- ①. Poor Research ecosystem - lack of alternatives of plastic material.
- ②. Affordability and Accessibility
- ③. Lack of Awareness regarding circular economy.

Measures Required -

- ①. Robust R&D to develop economies of scale for alternatives
 - ②. Extended Producer Responsibility for manufacturers, business owners, brand-owners, etc.
 - ③. Effective Implementation of waste Management Rules.
- Circular Economy has a transformational potential.

3. The Major Port Authorities Act, 2021, seeks to grant greater autonomy and flexibility to the major ports and professionalise their governance. Discuss.

(150 words) 10

प्रमुख बंदरगाह प्राधिकरण अधिनियम, 2021, प्रमुख बंदरगाहों को अधिक स्वायत्तता और लचीलापन प्रदान करने तथा उनके शासन को पेशेवर बनाने का प्रयास करता है। विवेचना कीजिए।

Governance of major and non-major ports in India come under separate heads causing various issues of lack of coordination and inefficiency.

Major Port Authorities Act, 2021

↳ Greater Autonomy to ports ⇒ decide for themselves ~~tariff~~ tariff rates.

↳ Logistics improvement - reducing turnaround time.

- Customization of approach
- Decongestion of Traffic
- Independence from executive
↓
efficient governance.

Need of the hour →

- ①. Port-led development as envisa-
ged under Sagarmala programme
- ②. Reducing Turnaround time (India
- 3 days, World Average - 24 hrs).
- ③. Ease of doing business by
linking ports to rural and remote
areas.
- ④. Skill development of port
personnel.

4. Analyse the need for shifting from presumptive land titling to conclusive land titling system in India. Also, highlight the hurdles in its implementation.

(150 words) 10

भारत में अनुमानित भूमि स्वामित्व से निर्णायक भूमि स्वामित्व प्रणाली में स्थानांतरण की आवश्यकता का विश्लेषण कीजिए। साथ ही, इसके क्रियान्वयन में आने वाली बाधाओं को रेखांकित कीजिए।

86% of farmers hold land less than or equal to 2 ha which is not under conclusive titling.

Need to shift from presumptive to conclusive titling -

①. To avoid land disputes and related violence. Eg - Tribal women burnt alive in MP.

②. To promote women empowerment by ownership rights. (33% women land under women labour).

③. To promote land consolidation.

and benefits of scale. Eg - FPOs, cooperatives, Contract Farming.

④. To gauge the collateral for credit needs of farmers.

⑤. For redistribution of land to landless.

Hurdles in Implementation

①. Emotional attachment with land

②. Rich farmer - Politician nexus.
(Land reforms unsuccessful in various areas).

③. Ineffective digital infrastructure - preventing digitisation of land record

Karnataka Model and Swamitva Scheme focussing on digitisation of titles must be implemented in true spirit.

5. What do you understand by methanol economy? Critically discuss its role in achieving India's energy security and economic prosperity. (150 words) 10

मेथनॉल अर्थव्यवस्था से आप क्या समझते हैं? भारत की ऊर्जा सुरक्षा और आर्थिक समृद्धि प्राप्त करने में इसकी भूमिका की समालोचनात्मक विवेचना कीजिए।

Methanol economy refers to use of methanol in traditional fuels & in various proportions to achieve fuel efficiency.

Methanol can be obtained from by-product of sugarcane processing.

g.r

Role of Methanol →

- ①. Clean fuel { high energy density
emits less amount of green house gases
↓
Transport sector - 80% of pollution
- ②. Can curtail import Bill. (India)

dependent on imports for 80% of its energy needs).

③. Can replace coal gradually. (70% of India's energy needs from coal).

④. India sugar surplus (2nd largest producer) $\Rightarrow$ diversion to methanol production feasible.

⑤. Help in achieving India's nationally determined contributions (33-35% reduction in GHG emissions).

Methanol blending in petrol can mitigate the impact of fossil fuel induced Global warming and hence, must be scaled up in all sectors.

6. Discuss the role of geospatial technologies in developing effective approaches for disaster risk reduction and disaster management.

आपदा जोखिम न्यूनीकरण और आपदा प्रबंधन के लिए प्रभावी दृष्टिकोण विकसित करने में भू-स्थानिक प्रौद्योगिकियों की भूमिका की विवेचना कीजिए। (150 words) 10

Disaster is an unavoidable phenomenon but its impact can be reduced by strengthening our vulnerabilities through use of technology.

Geospatial Technology helps by providing information of accurate location of an event occurring on earth.

Role in Disaster Management

- ①. Provides information about impact and intensity of disaster.

②. Information provided without physically going there. Eg - Dam-
aged roads route can be avoided.

③. Mapping of disaster-prone zones.
Eg → landslides in Western Ghats,
Earthquakes in Himalayas.

④. Distribution of aid to affected persons. Eg - Using GPS based drones, helicopters.

Thus, Geospatial technology based on satellites is revolutionary and helps in preventing, mitigating and making disaster-resilient strategies.

7. The focus of Environmental Impact Assessment (EIA) needs to shift from utilization and exploitation of natural resources to conservation of natural resources. Discuss. (150 words) 10

पर्यावरणीय प्रभाव आकलन (EIA) का मुख्य ध्यान प्राकृतिक संसाधनों के उपयोग और दोहन से हटाकर प्राकृतिक संसाधनों के संरक्षण पर केंद्रित होना चाहिए। विवेचना कीजिए।

Environmental Impact Assessment

measures the potential impact that a development project can have on ecology and people living there.

Eg - EIA of roads & highways cutting across forests.

EIA of Neutrino Observatory in Theni district of TN showing submergence of Periyar Tiger Reserve.

Current EIA -

- ①. Development projects at the cost of environment.
- ②. Penalty based approach - "Polluter Pays" Principle

③. Damage already ~~done~~ done compensated in form of money.

Need to shift to conservation of resources

①. Conservative ecology friendly approach based development project

- Afforestation at the site of project
- fertile lands not acquired
- livelihood of tribals not impacted.

②. Principle of "Prevent Pollution" by using green technologies & energy efficient buildings.

EIA as a tool to measure impact must be aligned with sustainable development goals.

8. What do you understand by hybrid warfare? Discuss India's preparedness in this context. (150 words) 10

हाइब्रिड वारफेयर से आप क्या समझते हैं? इस संदर्भ में, भारत की तैयारियों की विवेचना कीजिए।

Hybrid Warfare is use of mix of biological, chemical, cyber weapons along with traditional military weapons.

Eg - Cyber attacks on Critical Information Infrastructure like Transport, defence equipment, etc.
(3,18,000 in 2019 alone)

India's Preparedness -

① India signed Chemical weapons Convention, Biological weapons Convention.

② Cyber policy, CERT-IN for national cyber emergence response

③. Space based technologies . Eg -
Mission Shakti - ASAT missile for Anti
Ballistic Missile Defence.

④. Military and other collaborative
Exercises . Eg - Malabar, SITMEX,
Yudh Abhyas, etc.

⑤. ~~6% R&D~~ 6% of GDP spent on
Defence R&D

Way Forward -

Although India has developed
capabilities to tackle hybrid
warfare but miles to go on
this front . Need is to coordin
-ate and cooperate among various
agencies .

9. Discuss the challenges associated with inclusion of women in armed forces, particularly in combat roles in India. How can these challenges be addressed?

(150 words) 10

सशस्त्र बलों, विशेष रूप से भारत में युद्धक भूमिकाओं में महिलाओं को शामिल करने से संबंधित चुनौतियों पर चर्चा कीजिए। इन चुनौतियों का समाधान कैसे किया जा सकता है?

Supreme Court in recent judgem
ent said that women can parti
cipate in Short Service Commission
army combat roles.

Challenges
associated

- Lack of physical and defence training
- Stereotypical attitudes. Eg - Women's pregnancy, menstruation seen as hurdle
- Poor Participation rate of women in defence roles. Eg -

CAPF, CDS, etc.

Thus, participation along with empowerment crucial.

Measures Required -

- ①. Spreading awareness through social media channels & movies.
Eg - Gurjaran Saxena, Neerja.
- ②. Historical examples of Rani Laxmi Bai, Kalpana Dutt, Rani Gairardinlu etc. must be cited.
- ③. Proper R&D to debunk myths around difference in biological strengths.
Participation of other half of population can protect sovereignty & integrity of nation

10. S. Chandrasekhar was one of the greatest scientists of the 20th century whose prolific contributions spanned across astrophysics, space and mathematics. Elaborate.

(150 words) 10

एस. चंद्रशेखर 20वीं सदी के महानतम वैज्ञानिकों में से एक थे, जिनका खगोल भौतिकी (एस्ट्रोफिजिक्स), अंतरिक्ष और गणित के क्षेत्र में विपुल योगदान था। सविस्तार वर्णन कीजिए।

S. Chandrasekhar was an Indian

- American astroscientist who made significant contributions to this society.

Significance

→ Study of evolu
- tion of stars.

→ Age of stars
resulting in
formation of
Black-holes.

→ Chandrasekhar
limit
in space.

→ Study of
various phenomenon
like gravitational
waves.

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Applications of his research

- ①. Study of black holes $\Rightarrow$ gravitational lensing effect.
- ②. Space communication & sources of energy in space.
- ③. Dark energy and Dark matter concepts.

S. Chandrashekhar did tremen-
-dous work such that NASA
named one of its laboratories
on his name. He also has
an asteroid on his name.

11. State finances in India present a worrying picture, with debt sustainability being a major concern. Discuss in context of the recent RBI report on state finances. (250 words) 15

भारत में राज्य वित्त एक चिंताजनक स्थिति प्रस्तुत करता है, जिसमें ऋण संधारणीयता एक प्रमुख चिंता का विषय है। राज्य वित्त पर आर. बी. आई. की हालिया रिपोर्ट के संदर्भ में विवेचना कीजिए।

Debt Sustainability of India

depends upon Growth rate - Inter
-est rate differential as menti
oned in Economic Survey.

Recent RBI
Report on
State Finances

→ States under
huge debt burden
→ breached their
fiscal deficit
targets
→ Covid recovery
still not upto
measure.

Suggested Steps →

- ①. Limits imposed by FRBM Act, 2013 must be adhered to (Centre-State debt percentage at 60-40).
- ②. Borrowing for capital expenditure (Recent Report - Majority revenue expenditure).
- ③. Deepening of financial markets. Eg - RBI Retail Direct Scheme.
- ④. State finances for populist policies to be curbed. Eg - Farm loan waiver, etc.

Thus, debt must be used for infrastructure investments to initiate virtuous cycle. This will avoid asset-liability mismatch and make debt sustainable.

12. The Indian experience provides several lessons of an inclusive digital economy model that enables formal digital governance structure at a low cost and with easier access. Discuss. (250 words) 15

भारतीय अनुभव एक समावेशी डिजिटल अर्थव्यवस्था मॉडल के कई सबक प्रदान करता है जो कम लागत पर और आसान पहुंच के साथ औपचारिक डिजिटल शासन संरचना को सक्षम बनाता है। विवेचना कीजिए।

Digital economy consists of 14-15% of total economy and is expected to grow further.

Indian Experience →

① India has come a long way from no mobile phones in rural areas to being second largest internet subscribers base and highest data-use.

② Digital economy earlier limited to few sectors has

pervaded all areas now:

Agriculture Finance Education Health

③. JAM Trinity → Jan-Dhan
Accounts (45 cr.)
has made financial inclusion the reality.
→ Aadhar enabled
payment system
→ Mobile phones

④. Online education during Covid
Pandemic through DIKSHA platform.

⑤. End-to-end Computerisation of
Govt. Schemes. Eg - National Food
Security - PDS.

Lessons from e-Governance -

- ①. easy, simpler, transparent provision of services. Eg - Co-win platform
- ②. Single window Clearance - ease of doing business.
- ③. One stop solution for all services - Eg - myGov app

Hence, Digital economy has made governance more inclusive helping to attain the goal of Good governance & Pro-poor.
(G2) (P2)

13. Dairying is a viable livelihood option for a large section of the population. In this context, discuss the significance, challenges faced and associated government initiatives for the dairy sector in India.

(250 words) 15

डेयरी व्यवसाय, आबादी के एक बड़े हिस्से के लिए आजीविका का एक व्यवहार्य विकल्प है। इस संदर्भ में, इसके महत्व, विद्यमान चुनौतियों और भारत में डेयरी क्षेत्र के लिए सरकार द्वारा की गयी पहलों की विवेचना कीजिए।

India is the largest producer of milk in the world. Also, the no. of cows and buffaloes is one of the highest in India.

Significance

① Dairy sector → pro-poor (Amul)
→ pro-women

② Dairy products → milk
→ cheese in
→ curd

huge demand for protein-based needs.

③ provides employment to labour

during lean season of agriculture

④. Promotes Integrated Farming

↓
Fodder for
livestock

↓
Manure
available from
cow-dung, cow-
urine (ZBNF)

⑧. Challenges associated -

①. Various virus-based and bacterial disease - Eg - Foot & Mouth disease, Brucellosis.

②. Ineffective artificial insemination.

③. Low productivity of

Indian cow breeds.

- ④. lack of infrastructure →
- Markets
 - Roads
 - Refrigerated pack houses

Govt Measures →

①. Dairy Infrastructure Developm
-ent Fund - to promote infrastru-
-cture

②. National Dairy Cokul Mission

↙ To develop indigenous breeds
↘ To prevent diseases.

③. Skill development of youth.
Livestock sector (25% contribu-
-tion to agriculture) must be
developed at scale.

14. The imperative to increase farmers' income must shift to creating value chains and must not be reliant on the MSP regime and subsidy bias prevalent in the current Indian agricultural system. Examine.

(250 words) 15

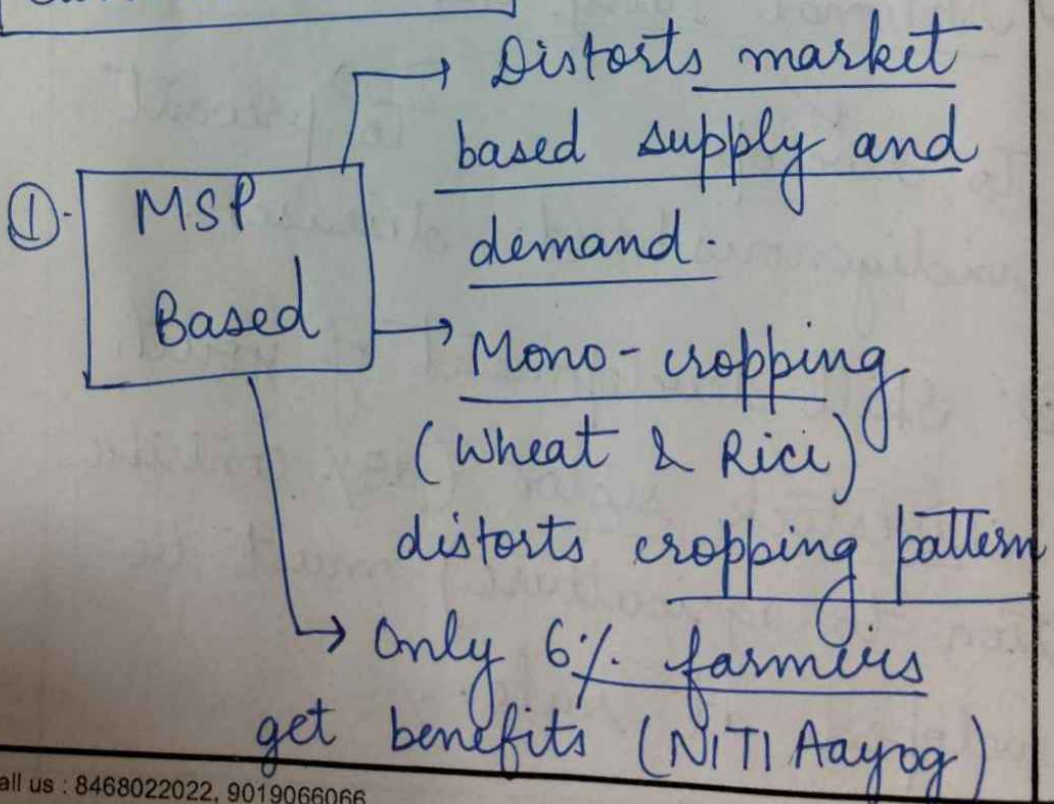
किसानों की आय बढ़ाने की अनिवार्यता को मूल्य श्रृंखलाओं के सृजन से जोड़ा जाना चाहिए और इसे वर्तमान भारतीय कृषि प्रणाली में प्रचलित एम. एस. पी. व्यवस्था एवं पूर्वाग्रहयुक्त सब्सिडी पर कतई निर्भर नहीं होना चाहिए। परीक्षण कीजिए।

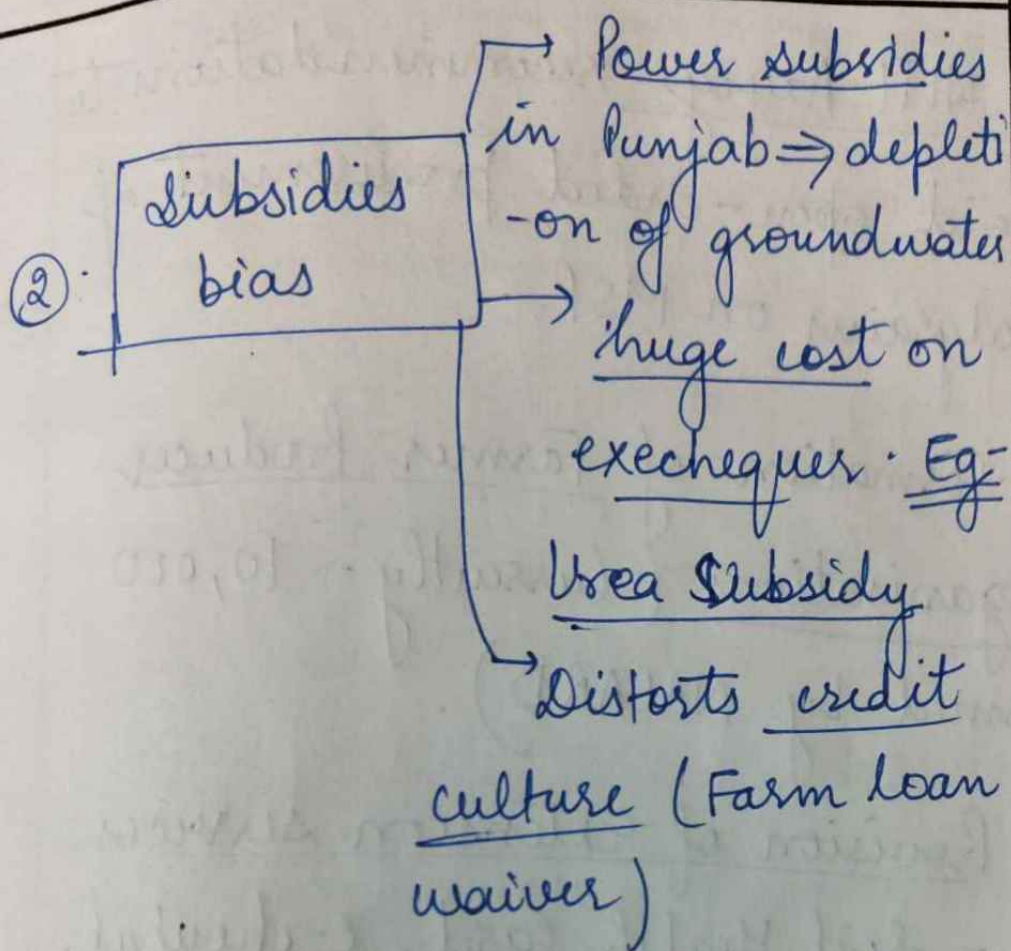
Ashok Dalwai Committee recomm

- ended to double farmer's income.

In this regard, Govt. adopted various policies and programmes.

Current Policies -





Shift to creating Value Chains

- ①. Infrastructure development
- ↳ pack houses & cold storage (to avoid food wastage)
 - ↳ Roads, railways to support forward linkage.

- ②. NITI Aayog recommendations to avoid open-ended procurement of foodgrains on MSP.
- ③. Formation of Farmer Producers Organisations (currently - 10,000 formed by NABARD).
- ④. Provision of extension services
Eg - Soil Health Card, e-choupal, weather based.
- ⑤. Smart Agriculture → Satellites based tech to support precision agriculture

Hence, need is to provide & strengthen backward & forward linkages to ensure productivity based income.

15. What are the challenges in ensuring sustainable river management in urban areas? Highlight the remedial measures that can be taken for river management with a special focus on the recently launched River Cities Alliance. (250 words) 15

शहरी क्षेत्रों में संधारणीय नदी प्रबंधन को सुनिश्चित करने में कौन-सी चुनौतियाँ विद्यमान हैं? हाल ही में प्रारंभ रिवर सिटीज एलायंस पर विशेष ध्यान देते हुए नदी प्रबंधन के लिए किए जा सकने वाले उपचारात्मक उपायों को रेखांकित कीजिए।

India has 17% of world's popula-
-tion dependent upon 4% of
world's water resources.

Thus, water prevention & manag-
-ement is of utmost importance

Challenges in river management

①. Unplanned urbanisation ⇒
encroachment on rivers, wetlands
& formation of urban heat
islands -

- ## Remedial Measures -

- ①. National Clean Ganga Mission
to be implemented effectively.

②. River Cities Alliance i.e. cities in which major rivers have drainage participating & coordinating with each other. Eg - Varanasi, Patna, Allahabad, etc. for Ganga river.

③. Collaboration at the level of
 { people
 Govt & people
 States with each other

④. Leading from front. Eg - PM. cleaning beach after Mamallapuram meeting.

Rivers are the source of life and initiators of civilization. Thus, must be managed sustainably to achieve SDG 5.

16. Haphazard growth and poor management make the Indian cities the locus of disasters, both large and small. Comment. Also, discuss the current gaps in policies in addressing these challenges. (250 words) 15

अव्यवस्थित विकास तथा निम्न स्तरीय प्रबंधन ने बड़े और छोटे दोनों प्रकार के भारतीय शहरों को आपदाओं का केंद्र बना दिया है। टिप्पणी कीजिए। साथ ही, इन चुनौतियों का समाधान करने में नीतियों में विद्यमान वर्तमान अंतराल पर चर्चा कीजिए।

Unplanned urbanisation leading to overcrowding, growth of slums [65.5 mn people - 2011 census], encroachment on natural resources. All this led to high frequency and intensity of disasters.

Disasters due to haphazard growth -

- ①. Encroachment on wetlands which act as flood buffer.
- ②. Construction in coastal

areas leading to more vulnerability of population. Eg - Resorts, hotels, etc.

③. Construction in ecologically fragile, unconsolidated lands in hilly areas $\Rightarrow$ landslides. Eg - Kerala landslides & floods (2019).

④. Chennai floods due to poor management of water supply.

⑤. Assam floods owing to indiscriminate tourism & deforestation.

⑥. Poor Dam management.

All This shows gaps in policy making which are

as follows :-

- ①. Ineffective regulation of urban lands. Eg - Mafias building poor buildings.
- ②. Mining in No-go areas. Poor EIA assessment
- ③. Poor solid waste management despite multiple rules.
- ④. Lack of focus on diversification of non-farm employment.

Curbing rural-urban migration and adopting policies like SMART cities Mission can play a great role in urban as well as disaster management.

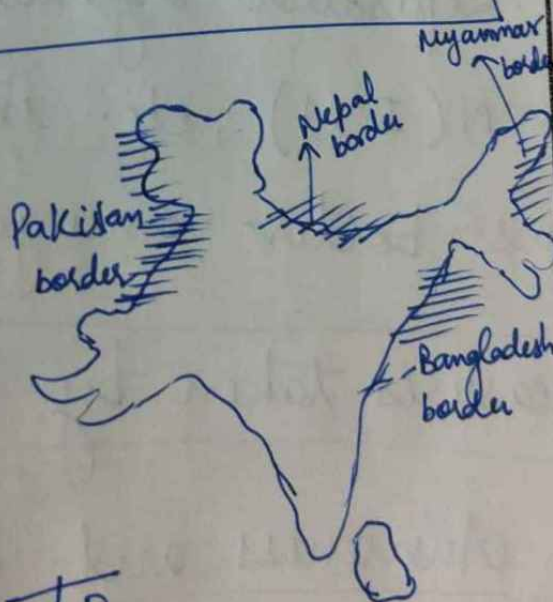
17. Discuss the extent of the problem of narco-terrorism in India. What measures have been taken by the government to counter and control this problem?

भारत में नार्को-आतंकवाद की समस्या के प्रसार पर चर्चा कीजिए। इस समस्या से निपटने और नियंत्रित करने के लिए सरकार द्वारा क्या उपाय किए गए हैं? (250 words) 15

Narco-terrorism refers to men
-ace of narcotics and drugs
destroying youth and proliferation
of criminal activities.

Problem of Narco-terrorism
in India

→ Illegal
smuggling
at various
borders.



→ Gives rise to
further criminal activities.

Eg. - Child and women trafficking
Arms smuggling, etc.

③. To fund various terrorist activities. Eg. - Punjab drug smuggling linked to Pakistan sponsored terrorism.

④. Black money laundering

⑤. Separatist organisations like NSCN (I-M), etc. involved in cross-border smuggling.

Measures taken by Govt. -

①. Awareness and Rehabilitation
centres opened in various
states.

②. Narcotics Drugs & Psychotropic Substances Act, 1985 - offences cognisable and non-bailable.

③. Border management

- Smart fencing (Pak borders)
- Integrated Check-posts (Nepal border - Raxaul Birgunj)
- Border Haats (Bangladesh to provide employment)

④. Collaboration with other countries - es to tackle this menace. Eg - Operation Sunrise with Arakan Army

Narco-Terrorism must be confronted from all sides and uprooted from nip & bud.

18. The dark web can be an ideal platform for several criminal and terrorist activities. Discuss with examples. Also, suggest measures to tackle the misuse of dark web. (250 words) 15

डार्क वेब कई आपराधिक और आतंकवादी गतिविधियों के लिए एक आदर्श मंच हो सकता है। उदाहरण सहित चर्चा कीजिए। साथ ही, डार्क वेब के दुरुपयोग से निपटने के उपायों का सुझाव दीजिए।

Dark web is inaccessible area of web which require special decryption keys to access. It is part of Deep web which is 95%. Hence, the web that we normally use is 5% i.e. tip of the ice-berg.

Misuse of Dark web →

- ①. Eg - for pornography - child, women, etc.
- ②. For terrorist activities.

Onion ring like encryption makes it difficult to access it.

③. Radicalization of youth.

④. Cyber crimes (3,13,000 cyber crimes in India in 2019 - C&RI-Ind)

⑤. Trafficking of men & women.

⑥. Organ smuggling rackets.

Measures required -

①. Collaboration with intermediaries. Eg - Google, Facebook.

②. Designing of policies & regulatory framework.

- ③. Net Neutrality can also help by identifying illegal activities & curbing them.
- ④. Awareness among citizens.
Eg - Using "Verify approach before believing".
- ⑤. Various laws related like Human Trafficking, Prevention of Terrorism, etc. must be cyber inclusive.

Dark Web provides anonymity to the criminal which is its biggest weapon. Hence, capability building must be done at all levels.

19. What is catalysis? Highlight the characteristics of catalysts. Also, elaborate why catalytic reactions are important for human beings. (250 words) 15
- उत्प्रेरण क्या है? उत्प्रेरकों की विशेषताओं पर प्रकाश डालिए। साथ ही, उदाहरण प्रस्तुत करते हुए समझाइए कि मानव के लिए उत्प्रेरकी अभिक्रियाएं क्यों महत्वपूर्ण हैं।

Catalysis is the process of speeding up the rate of a chemical / biological reaction by using a small amount of catalyst.

Characteristics of Catalysts

- ①. Speed up the rate of reaction.
- ②. Metals desorbed on gas surface are used. Eg - Ni/H_2 , Pt/Pd , etc.

③. Are easily recoverable after reaction gets over.

④. Have no effect on the reactants and products of reaction.

Importance for human beings -

①. For various life mechanisms.

Eg. - Breakdown of protein into simpler substances.

②. For disease prevention & treatment.

③. Biocatalysts present in cell drive growth of human body.

- ④. Agriculture - Eg - Haber's process used in formation of ammonia.
- ⑤. Organocatalysts - organic in nature, important for functioning of human body.

Therefore, Catalysts drive various reactions inside and outside the human body.

Thus, more R&D required to gauge their diverse applications.

20. Electric mobility offers solutions to the problems associated with climate change, growing fuel prices, and urban transportation issues. Discuss in the context of India. (250 words) 15

इलेक्ट्रिक मोबिलिटी जलवायु परिवर्तन, ईंधन की बढ़ती कीमतों और शहरी परिवहन के मुद्दों से जुड़ी समस्याओं का समाधान प्रदान करती है। भारत के संदर्भ में चर्चा कीजिए।

India has adopted the global goal of EV30 @ 30 i.e. increasing the sales of EVs by 30% by 2030.

Advantages of Electric Vehicles

- ① Reduces dependence on fossil-fuel based Internal Combustion engines.
- ② Reduction of Current Account Deficit due to huge imports (80%) of petrol.

③. Li-ion based battery $\Rightarrow$ Li metal can be recovered after use.

④. Provides employment in building -g charging stations, new batteries

⑤. Hybrid vehicles - both fuel & battery based can reduce global warming.

⑥. light-weight motility.
However, various challenges exist in scaling up the use of Electric Vehicles:-

①. Lack of charging stations.
(only 650 in India)

②. Shortage of Parking space
 $\Downarrow$
Non-feasibility in charging.

- ③. Range Anxiety among consumers.
- ④. Import dependence for li-ion battery on China.
- ⑤. Lack of R&D on Aluminium based batteries.
- ⑥. Higher costs as compared to traditional vehicles.

Thus, EVs provide a huge opportunity to curb climate change owing to transportation sector (80% contribution to fossil fuels in India). Challenges needed to be overcome to drive their growth.