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(To be filled by candidate)

Code : TC047

Name of Candidate : MOHIT GUPTA

Roll No. : AIM24GCRA017

Registration Number : ..... **Date of Examination :** .....

Exam Centre : Old Rajinder Nagar ☑ Bhopal ☐ Online ☐

MTS - Sectional Length Test (Plus)-1 : 2023

GENERAL INSTRUCTIONS

This Question-cum Answer (QCA) Booklet contains 56 pages. Immediately on receipt of the booklet, please check that this QCA booklet does not have any misprint or torn or missing pages or items, etc. If so, get it replaced by a fresh QCA booklet.

Candidates must read the instructions on this page and the following pages carefully before attempting the paper.

Candidates should attempt the questions strictly in accordance with the instructions specified in the question paper and in the space prescribed under each question in the booklet. Any answer written outside the space allotted may not be given credit.

Question paper will be provided separately and can be taken by the candidates after conclusion of the exam.

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SUBJECT/PAPER
GENERAL STUDIES

Invigilator's Sign. : .....

(For filling by Examiners only)

Evaluator Code :

Q.No	Pg No.	Maximum Marks	Marks	Total
1	5			
2	7			
3	9			
4	11			
5	13			
6	15			
7	17			
8	19			
9	21			
10	23			
11	25			
12	28			
13	31			
14	34			
15	37			
16	40			
17	43			
18	46			
19	49			
20	52			
Grand Total				

Signature

MACRO COMMENTS

IMPORTANT INSTRUCTIONS

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2. Do not write anything other than the actual answers to the questions anywhere inside your QCA Booklet.
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2. Write your registration number and other particulars, in the space provided on the cover of QCA Booklet.
3. Write legibly and neatly. Do not write in bad/illegible handwritings.
4. For rough notes or calculation, the last two blank pages of this booklet should be used. The rough notes should be crossed through afterwards.
5. If you wish to cancel any work, draw your pen through it or write "Cancelled" across it, otherwise it may be evaluated.
6. Handover your QCA Booklet personally to the invigilator before leaving the examination hall.

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Q.1 रूसी क्रांति को प्रभावित करने वाले कारक कौन–कौन से हैं तथा इस क्रांति के क्या–क्या परिणाम हैं ? भारतीय राष्ट्रीय आंदोलन पर इसके प्रभाव की विवेचना कीजिए। (150 शब्दों में उत्तर दीजिए) 10 अंक

What are the factors that led to the Russian revolution and what are the consequences of this revolution? Discuss its influence on the Indian national movement. (Answer in 150 words) 10 Marks

Ans) Russian Revolution happend in October 1917, changing social & political discourse in Russia-

Factors leading to Russian Revolution

(1) Political : (i) Grievances of people were not addressed in bodies like Duma-

(ii) Despotic rule of King Tsar- Nicholas II-

(iii) Rise of socialist parties gaining public support- Ex: Bolsheviks led by Lenin.

(2) Economic factors : (i) Poor conditions of peasants & backwardness in agriculture.

(ii) Pauperisation of industrial workers

(3) Heavy loss of men & material in World War I.

(4) Failure of Kerensky's provisional government

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to deliver it's promises.

Consequences of Russian Revolution

1. Establishment of socialist rule in Russia led by Lenin.
2. Nationalisation of industries & bank.
3. Closed inward looking economy.
4. Withdrawal from World War I
5. Declaration of Rights of people empowering masses socially & politically.

Inspiring militant revolutionaries.
↑ Eg:- Bhagat Singh & Sukhdev.

Influence on Indian National Movement

- Demand of independence gained currency
- Rise of Communist leaders.
- Socialistic promises by Indian National Congress post independence.

Russian Revolution accelerated decolonization process throughout the world.

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Q.2 स्वतंत्रता पश्चात् के भारत की पहचान विज्ञान और प्रौद्योगिकी के क्षेत्र में इसकी उल्लेखनीय प्रगति रही है। इस काल में हुए वैज्ञानिक विकास ने भारत को किस हद तक आधुनिकता के पथ पर अग्रसर किया?

(150 शब्दों में उत्तर दीजिए) 10 अंक

'The hallmark of post-Independent India has been its remarkable strides in science and technology'. To what extent did scientific development during this period put India on the path of modernity?

(Answer in 150 words) 10 marks

Ans 2) India has put emphasis on development of science and technology since Nehruvian times and it continued till date.

Impact of scientific development & contribution to Indian modernity

① Establishing higher education institutes for dual demand of research & development along with scholars trained par with global standards.
Eg:- Establishing IITs & IISc.

② Space Technology:- Establishing Indian Space Research organization and funding its missions →
- Soft power with space diplomacy.
- Navigation system for indigenous use
- Countless satellites for agro and land resource mapping.

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③ Medical / Biotechnology :- Developing affordable healthcare solution for masses.

Ex :- - Indigenous COVID Vaccines

- Cheaper secondary & tertiary healthcare

④ Defence Technology :- to ensure strategic interests and security of India. Ex :- Brahmos Missile & IAC Vikram.

⑤ Modern Information Technology :- Digital Public Infrastructure for easy administration & inclusive growth. Ex :- Digital Banking infrastructure delivering Direct Benefit Transfer.

⑥ Preserving traditional knowledge for scientific use. Ex :- Traditional Knowledge Digital Library

→ Due to it's prudent investments in development of science, India today claim of developed status.

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Q.3 पृथ्वी की सतह पर तापमान के असमान वितरण के लिए उत्तरदायी विभिन्न कारकों की चर्चा कीजिए।

(150 शब्दों में उत्तर दीजिए) 10 अंक

Discuss the various factors responsible for the uneven temperature distribution on Earth's surface.

(Answer in 150 words) 10 Marks

Ans) Temperature distribution is a result of geographical factors & local climatic conditions.

Factors affecting uneven temperature distribution

(1) latitudinal factor determining angle of incidence of sunrays.

(2) Albedo of the surface. Ex:- Poles have higher albedo & lower temperature.

(3) Cloudiness / Transparency of troposphere.

~~Rotta~~ Less clouded area experience higher temperature.

(4) Global wind systems. Ex:- Polar winds lowering temperature in winters in Europe

Candidates must not write on this margin

(5) Global ocean currents. Ex:- Gulf Stream raises temperature on eastern American coast.

(6) Vegetation / Green Cover. Low Vegetation Cover can result in higher temperatures in cities.

(7) Greenhouse gas emissions. Ex:- Crowded City like Delhi experience higher temperature.

(8) Moderating influence of ocean. Ex- oceans act as heat sink & have lower temperatures than continent at same latitude.

→ Temperature Profile of a place affect patterns of human settlement and economic opportunities.

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Q.4 पृथ्वी की आंतरिक संरचना की हमारी समझ में भूकंपीय अनुसंधान किस हद तक योगदान करता है? इसके महत्त्व का विस्तार से विश्लेषण कीजिए। (150 शब्दों में उत्तर दीजिए) 10 अंक

To what extent does seismic investigation contribute to our understanding of the Earth's interior structure? Analyze its significance in detail. (Answer in 150 words) 10 Marks

Ans 4) Study of seismic waves help us uncover composition and structure of earth's interior.

Significance of seismic investigation

(1) Study of shadow zones helped us study the extent of core and mantle. Ex :- S-waves do not travel through core.

(2) Seismicity reveals composition of interiors based on their ~~the~~ velocity change and intensity recorded. Ex :- Waves pick up velocity when they travel through solid crust.

(3) Discover discontinuities among layers of Earth. Ex - Based on earthquake's study mantle was divided in three zones.

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(4) Study the movement of plate tectonics.
Eg:- Atlantic spreading through seismicity on ocean floor.

(5) Study the distribution of convection currents in mantle. This will uncover the process of tectonic plate formation.

(6) Evolution of earth's ~~structure~~ interior by understanding energy profile of earth.

Limitations of seismic study

(1) Unpredictability of seismic occurences.

(2) Limited instruments to accurately measure magnitude & energy profile.

(3) Most studies are post-event, leading to loss of information.

→ Seismic studies hold great significance for compositional study as well as disaster mitigation.

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Q.5 जलवायु परिवर्तन के कारण हिमनदों के पिघलने का पारिस्थितिकी तंत्र और मानव समाज पर गंभीर प्रभाव पड़ता है। हिमनदों के पिघलने के कारण पर्यावरण पर पड़ने वाले प्रभावों और इस मुद्दे के समाधान के लिए किए जा सकने वाले उपायों पर चर्चा कीजिए। (150 शब्दों में उत्तर दीजिए) 10 अंक

The melting of glaciers due to climate change has serious implications for the ecosystem and human society. Discuss the effects of melting glaciers on the environment and the measures that can be taken to address this issue. (Answer in 150 words) 10 Marks

Ans (5) According to IPCC Report 2021, 66% of global glacier deposits will melt away by 2050.

Implications of glacial melting on environment

(1) Source of rivers will get depleted:- This will result in reduced flow of rivers.

(2) Global temperatures will rise giving rise to extreme weather events like drought.

(3) Reduced freshwater availability
- → Threat to food security.
- → water scarcity for human consumption
- → water conflicts will rise.

(4) Disasters will impact environment & human settlements.
- → Glacial Lake Outburst Floods
- → River Floods
- → Landslides

Candidates must not write on this margin

(5) Minimum ecological flow of rivers will be disturbed leading to death of river biodiversity, issue of river pollution etc.

(6) Decreased aquifer recharge leading to groundwater table depletion.

→ Threat to forest & mangrove ecosystem

↓

Human Displacement & forced migration

↓

Desertification of land

Measures to address this issue

(1) Lowering global temperatures by lowering Greenhouse gas emissions.

(2) Decreased glacial contamination Ex:- lowering Carbon black & microplastic use.

(3) Reducing disturbance to ecology. Ex - Minimum infrastructure creation in Himalayas.

⇒ Glaciers are a global resources and their melting will endanger millions of lives.

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Q.6 श्वेत क्रांति भारत के पश्चिमी भाग में सर्वाधिक सफल रही। श्वेत क्रांति की इस क्षेत्रीय सफलता के कारकों की विवेचना कीजिए। (150 शब्दों में उत्तर दीजिए) 10 अंक

The White Revolution was most successful in the Western part of India. Discuss the factors for this regional success of the White Revolution. (Answer in 150 words) 10 Marks

Ans 6) White Revolution refers to high milk production and success of milk cooperatives in certain regions of India.

Factors aiding Regional success of White Revolution

(1) Milk Cooperatives setup by Dr. Verghese Kurien were able to procure vast quantities of milk by rapid expansion of membership.

(2) Mechanisation of processing ensured that milk products quickly reached ~~market~~ market as they have limited shelf life.

(3) Presence of milk associations in Gujarat eased their integration with Amul supply chains.

Candidates must not write on this margin

(4) Presence of nearby urban markets with high demand (like Delhi, Bombay etc') ensured quick & stable returns.

(5) Readiness of ~~[illegible]~~ owners to experiment with cross-breeding and artificial insemination thus producing high milk-yielding cows.

(6) Availability of cheap labour to work in Cooperatives.

⇒ This success of Milk Revolution has inspired Cooperative Revolution in milk industry both within India (ex- Nandini in Karnataka) as well as across the globe.

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Q.7 कोयला आधारित विद्युत संयंत्रों से नवीकरणीय ऊर्जा उत्पादन की ओर गमन का संरचनात्मक परिवर्तन कोयला समृद्ध राज्यों में मानव विकास को कैसे प्रभावित करेगा? (150 शब्दों में उत्तर दीजिए) 10 अंक

How will the structural shift from coal-based power plants to renewable energy generation impact human development in coal-bearing states? (Answer in 150 words) 10 marks

Ans 7) Rising emphasis on green energy has necessitated shift from coal-based to renewable energy forms.

Impact on human development in coal bearing states

(i) Negative impacts :- in loss of livelihood due to massive job loss in coal mining as well as thermal power plants, both of which are labour intensive.

(ii) Reduction in state revenue, drying up of funds for state welfare schemes.

(iii) Resources employed in coal & thermal sector such as machines & land will become wasteful

Candidates must not write on this margin

(iv) Rise in absolute poverty levels.

(2) Positive impacts :- (i) lower land, water & air pollution leading to better health standards.

(ii) Freeing up of labour force from unskilled manual labour. They can then be trained for employment in other better-paying industries.

(iii) Funds wasted for mitigating pollution can now be used for human welfare.

(iv) Land degradation & tribal displacement due to mining will stop.

Although there are some positives yet challenge massive unemployment should be central consideration while designing policies for shift to green energy.

Candidates must not write on this margin

Q.8 तापमान और वर्षण किस सीमा तक मृदा के गुणधर्मों को निर्धारित करने वाले सबसे महत्त्वपूर्ण कारक हैं?

(150 शब्दों में उत्तर दीजिए) 10 अंक

To what extent temperature and precipitation are the most important factors that determine soil properties?

(Answer in 150 words) 10 marks

Ans 8) Temperature and precipitation determine texture, productivity etc. of soil, and are two most important determinant of soil properties.

Temperature determining soil properties

(1) Insolation affects wind systems thus determining composition of soil as the major process of soil formation is due to weathering action of wind.

(2) Temperature determine moisture content. Ex's- During high temperature, water vapourises and develop cracks.

(3) Temperature determines organic content in soil. Ex- Tropical rainforests have higher temperatures, high microbe activity & low organic content.

Candidates must not write on this margin

(4) Excess temperature reduce soil fertility by destroying it's nutrients. Ex:- fertility loss during stubble burning.

Precipitation determining soil properties

(1) Aridity / Moisture levels are dependent on precipitation. Ex:- Black soil having high moisture content.

(2) Precipitation shape texture of soil.

(3) Responsible for erosional & depositional action by water determining soil composition.

(4) Precipitation ensure subsurface moisture levels aiding soil fertility.

Geographical location, anthropogenic influence Climatic Variations etc are other factors in determining soil properties.

Candidates must not write on this margin

Q.9 अरब सागर में प्रचंड और तीव्र चक्रवात एक नियमित घटना क्यों बनते जा रहे हैं? उदाहरणों सहित सिद्ध कीजिए।
(150 शब्दों में उत्तर दीजिए) 10 अंक

Why are severe and intense cyclones becoming a regular phenomenon in the Arabian Sea? Substantiate with examples.
(Answer in 150 words) 10 marks

Ans) Cyclone Biparjoy, 2023 on western coast indicate rising cyclonic formation in Arabian Sea.

Reasons for severe & intense cyclones in Arabian Sea

(1) Rising temperature of Arabian Sea due to global warming.

(2) Arabian Sea is surrounded by Continental deserts: This brings in excess heat to Arabian Sea aiding cyclone formation. Ex:- Arabian countries recorded highest temperatures in 2022.

(3) Intensification of Equatorial current in Indian Ocean leading to marine heatwaves and warmer waters.

Candidates must not write on this margin

(4) Increased influx of warmer water from African Coast due to rising temperature along ~~Some~~ African Horn.

(5) Development of low pressure centres in Arabian Sea.

(6) As cyclonic intensity increase in Bay of Bengal, their landfall is increasing on western Coast due to ~~coris~~ Coriolis deflection.

⇒ Cyclone formation & intensification in Arabian Sea will threaten lives & livelihood along western coast.

Candidates must not write on this margin

Q.10 इंग्लैंड की औद्योगिक क्रांति ने न केवल आर्थिक परिदृश्य को बदल दिया बल्कि इसके दूरगामी सामाजिक और सांस्कृतिक प्रभाव भी पड़े। विवेचना कीजिए। (150 शब्दों में उत्तर दीजिए) 10 अंक

'England's Industrial Revolution not only transformed the economic landscape but also had far-reaching social and cultural impacts'. Discuss. (Answer in 150 words) 10 marks

Ans (b) Industrial Revolution (1760–1840s) marked rapid rise in use of mechanical power and coming up of factories in England.

Consequences of Industrial Revolution in England

(1) Economic :- (i) Shift from manual subsistence production to factory based mass production.

(ii) Colonization was necessary to procure raw material cheaply & newer markets for industrial goods.

(iii) Enclosure movement produced surplus labour for factories - This resulted in menial wages and long working hours.

Candidates must not write on this margin

(2) Socio-cultural impacts :- (i) Traditional social relations broke down. Alcoholism, gambling, high crime rates etc. now dotted urban landscape.

(ii) Industrial cities developed overcrowded, unhygenic & plague ridden slums.

(iii) Familial relations broke down.

(iv) Socio-economic inequalities skyrocketed.

(v) Colonial interests led to oppression & exploitation by British in colonies like India.

(vi) Western machine produced goods created deurbanisation & deindustrialization in colonies.

(vii) Growth of education and politico-intellectual movements (Ex- Chartist Protest in England for labour laws) was a positive fallout.

Industrial revolution was not merely economic albeit a socio-cultural revolution too.

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Q.11 स्वतंत्रता पश्चात् भारत को कई युद्ध लड़ने के लिए विवश किया गया था। हमारे द्विपक्षीय संबंधों पर भारत–पाक और भारत–चीन युद्धों के कारणों और प्रभावों पर प्रकाश डालिए। (250 शब्दों में उत्तर दीजिए) 15 अंक

India was forced into numerous wars post Independence. Highlight the causes and impact of the Indo-Pak and Indo-China wars on our bilateral relationships. (Answer in 250 words) 15 Marks

Ans (1) Due to hostile & aggressive neighbours on multiple fronts, India has been repeatedly forced into wars.

Causes & impact of wars on independent India

(1) Indo-China War, 1962 :- Causes → (i) Aggression by China and its occupation of Aksai China area of Ladakh.

(ii) Aggressive posturing of China due to political instability in India.

(2) India-Pakistan War, 1965 :- Causes → (i) Operation Floodlight aimed at civil disturbance and riots in Kashmir.

Candidates must not write on this margin

(ii) Malicious intent of capturing Kashmir & Sir Creek by force.

(3) India Pakistan war 1971 ° Causes → (i) Rejecting results of 1971 elections and arresting Sheikh Mujibur Rehman.

(ii) Refugee crises in India as Pakistani Army started violence against East Pakistan inhabitants

(iii) Crossing over of LoC in Kashmir.

(4) Kargil war, 1999 ° Causes → (i) Pakistan wanted to take control of Siachen & trans-Karakoram tract.

(ii) Rapid building up of troops all along LoC.

(5) Recent clashes with China ° (i) China unilaterally invaded Doklam threatening Choking up of Siliguri Corridor.

(ii) Wolf warrior Tactics in Galwan 2020 & violation of bilateral treaty.

Candidates must not write on this margin

Impact of wars on bilateral relationships

① Political impact :- Complete isolation of Pakistan & minized interaction with China pending border issue.

② Economic impact :- (i) Ceased trade relations with Pakistan.

(ii) Diversion of resources for military infrastructure along line of Actual Control.

③ Geographical impact :- Unresolved issues of Pakistan occupied Kashmir and illegal occupation of Aksai Chin.

④ Geopolitical impact :- Complete isolation of Pakistan & protest against Chinese military aggression.

⇒ India despite propounding peace & bilateral cooperation through Panchsheel, have faced multiple wars due to hostility of neighbours.

Candidates must not write on this margin

Q.12 'आर्थिक रूप से सर्वाधिक सक्रिय गलियारे (कॉरिडोर) आज भारत में पूर्व हरित क्रांति क्षेत्रों के साथ अतिव्यापित करते हैं'। स्वतंत्रता पश्चात् के भारत के संदर्भ में हरित क्रांति ने भारत में किस प्रकार कृषि उत्पादकता में योगदान दिया है, लेकिन पीछे मुड़कर देखने पर लगता है कि इसने असमान विकास के भूगोल को जन्म दिया?

(250 शब्दों में उत्तर दीजिए) 15 अंक

'The most economically active corridors today overlap with the former green revolution regions in India'. In the context of post-independent India how has Green Revolution in India contributed to agricultural productivity but in hindsight produced a geography of uneven development?

(Answer in 250 words) 15 Marks

Ans) Green Revolution was result of using high yielding varieties of seeds & modern technological interventions like use of Chemical Fertilizers.

Contribution of Green Revolution to agricultural productivity

(1) Ensuring food security by food grain availability. Eg:- From importing grain from America in 1960s to one of the biggest agro exporters in ~~###~~ 2022.

(2) Drastic rise in per unit productivity of land.

(3) Shortening of harvest cycle leading to multiple crop cycles in a year.

(4) Minimized crop loss due to use of pesticides.

Candidates must not write on this margin

(5) Government assured procurement served dual purpose → Food security for poors. → Stable returns for farmers.

(6) Gains made through green Revolution were used in development of other sectors. Ex:- Haryana today has industrial corridors as well as thriving service sector.

Uneven Development due to Green Revolution

(1) Only certain states like Punjab and Haryana saw rise in agricultural productivity. other regions like Odisha, Bihar etc. still suffer from poor GDP output.

(2) Income disparity rose both within region as well as among regions. Ex- Only big farmers gained from capital intensive agriculture.

Candidates must not write on this margin

③ Excessive production of water intensive crops (Rice & Wheat) created water scarcity in adjacent regions as well. Ex — Drying up of Yamuna in Haryana.

④ Policy focus on certain crops led to ignoring other crops like Millets, Oilseeds etc. Farmers of these crops remained poor & their overall production also came down.

⑤ Reckless use of chemicals led to salinization & degradation of vast land tracts.

⑥ Industrial backwardness of various states is because of uneven distribution of gains from Green Revolution.

Though Green Revolution marked a paradigm shift for food & nutritional security it also exacerbated inter-regional disparities.

Candidates must not write on this margin

Q.13 प्रथम विश्व युद्ध की घटनाओं और उसके तत्काल बाद की घटनाओं ने अफ्रीका और एशिया में राष्ट्रवाद के पुनरुत्थान को किस तरह से बढ़ावा दिया? (250 शब्दों में उत्तर दीजिए) 15 अंक

In what ways did the events of World War I and its immediate aftermath foster the resurgence of nationalism in Africa and Asia? (Answer in 250 words) 15 Marks

Ans (3) World war I was fought among global superpowers but had far reaching consequences in Asia & Africa.

Impact of WWI on Rise of nationalism in Asia & Africa

(1) Using men & material of colonized countries for personal interests questioned the true intentions of colonizing powers. Ex- Post war Indian National Congress raised demand of Compensation for loss of Indian lives.

(2) Despite democratic outcry of powers like Britain & USA they themselves were engaged in imperialist expansionism. This made masses aware of hypocrisy of colonial powers.

Candidates must not write on this margin

(3) Factories & industries got developed to serve war requirements from colonies. Instead these new class of capitalists raised demands of economic empowerment. Ex- One way Free Trade Policy was abolished in 1924.

(4) Rise of socialist ideology gave currency to demands for resource redistribution and political power.

(5) Militant revolutionaries arose inspired from Russian Revolution which was an outcome of WW I. Ex- Rise of Hindustan Socialist Republic Army in 1925.

(6) Colonial exploitation during the war created common feeling of deprivation among Asian and African masses.

Candidates must not write on this margin

(7) League of Nations failed to deliver on it's promise of human rights as it was misused by global superpowers. This urged the national leaders to take matters in own hand.

(8) Rise of aggressive nationalist ideologies justified independence even through violent means. Ex - Subash Chandra Bose took help from rising fascist powers.

⇒ World war I had far reaching consequences. It made masses aware & leaders started demanding immediate independence which culminated in decolonization wave post second world war.

Candidates must not write on this margin

Q.14 महासागरीय नितल का विन्यास उन भूगर्भीय प्रक्रियाओं के बारे में आवश्यक जानकारी प्रदान करता है जिन्होंने पृथ्वी की सतह को आकार दिया है। महासागरीय नितल की प्रमुख विशेषताओं और समुद्र विज्ञान के अध्ययन में उनके महत्त्व की चर्चा कीजिए। (250 शब्दों में उत्तर दीजिए) 15 अंक

The configuration of the ocean floor provides essential information about the geological processes that have shaped the Earth's surface. Discuss the major features of the ocean floor and their significance in the study of oceanography. (Answer in 250 words) 15 Marks

dw/4) Ocean relief features have been cited as major evidences in all studies of geological evolution.

Major features of ocean floor

(1) Continental Boundaries
- Continental Shelf
- Continental slope
- Continental rise

Significance :- (i) Study of distribution of minerals & Composition of plate boundaries.

(ii) Evolution of relief features along ocean-Continental boundary

(iii) Impact of tides on coast.

(2) Paleomagnetic bands of Ocean :- They are useful to establish Plate Tectonic

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Theory as the presence of same direction confirms sea floor spreading.

(ii) Study the sites of rise of mantle convection.

(3) Underwater Relief Features :- (i) Hills and Mountains :- to study erosion and depositional processes inside ocean.

(ii) Mid Oceanic Ridges :- to study underwater Vulcanism, formation of basaltic lava & evolution of tectonic plates.

(iii) Cracks & Crevices :- to study the flow of sediments from land to ocean.

(iv) Mariana Trench :- studying composition of oceanic crust. Ex :- Challenger Deep in Mariana Trench.

(4) Impact on ocean currents :- Ocean Relief

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and temperature profile also impact ocean currents & watermass movement. Ex:- Atlantic Meridional Circulation is influenced by Mid Oceanic Ridge.

⑤ Compositional study of ocean bed can help to harness resource. Ex:- Petroleum drilling in Bombay High, Polymanganese nodules in Indian ocean etc.

⇒ Oceans are part of global commons & have the potential to solve resource crisis of the world.

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Q.15 भारतीय मानसून विभिन्न जलवायविक कारकों से प्रभावित एक जटिल परिघटना है। भारत में मानसूनी वर्षा की तीव्रता और वितरण के निर्धारण में महासागरीय और वायुमंडलीय कारकों की भूमिका का आलोचनात्मक परीक्षण कीजिए।
(250 शब्दों में उत्तर दीजिए) 15 अंक

The Indian monsoon is a complex phenomenon influenced by various climatic factors. Critically examine the role of oceanic and atmospheric factors in determining the intensity and distribution of monsoon rainfall in India.
(Answer in 250 words) 15 Marks

Ans(15) Indian Monsoon is characterised by seasonal reversal of winds and is a result of various factors operating simultaneously.

Role of oceanic & atmospheric factors in aiding Indian Monsoon

(1) Shifting of low pressure trough over Indian mainland due to curvature in Inter-tropical Convergence Zone (ITCZ). This attracts monsoon winds in India.

(2) Northward shift of Subtropical Westerly Jet Stream aiding development of low pressure over India.

(3) Tropical Easterly Jet Stream creates High Pressure in Indian Ocean aiding

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monsoonal winds.

(4) High Pressure in South Indian Ocean due to development of Mascarene High.

(5) local ocean currents like Somalian Current & wind systems like Somali jet aid crossing over of monsoon winds through equator.

(6) Division of monsoon winds into Arabian Sea Branch & Bay of Bengal Branch ensures distribution over Indian mainland.

(7) High temperature of ocean ensures high humidity, thus leading to normal Monsoons.

(8) Southward Shifting of Subtropical Westerly Jet & ITCZ is characterised by withdrawl of Monsoon. However, retreating wind system gains moisture from Bay of Bengal & bring rainfall on Coromandel Coast which otherwise

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See full Pain.

Ocean-atmospheric factors weakening Indian Monsoon

① Unusual warming of Eastern Pacific i.e. El-Nino event weakens walker cell. This weakens monsoon winds & result in deficient rainfall as warm oceanic currents stagnate at Peru coast.

② Abnormal marine heat waves induce high pressure in Indian Ocean weakening monsoon winds.

③ Intense low pressure system over Horn of Africa weakens Monsoon.

⇒ Monsoon is a complex phenomena of oceanic & atmospheric factors. Study of these factors will help in better prediction & ensure greater readiness for variability in Monsoon.

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Q.16 तापमान व्युत्क्रमण वायुमंडलीय दशाओं को कैसे प्रभावित करता है और स्थानीय मौसम प्रतिरूप और वायु प्रदूषण स्तरों के लिए इसके क्या निहितार्थ हैं? (250 शब्दों में उत्तर दीजिए) 15 अंक

How does temperature inversion affect atmospheric conditions and what are its implications for local weather patterns and air pollution levels? (Answer in 250 words) 15 Marks

Ans 16) Temperature inversion is a situation where mass of warm air is trapped between colder airmasses as shown in Fig (1)

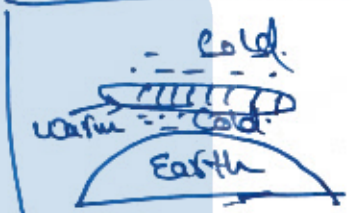


Fig (1)

Effect on atmospheric Conditions

(1) As warm air lies above cold air, this leads to atmospheric stratification.

(2) Stratification induces stability in atmosphere as Convectional upwelling and downwelling decrease.

(3) Temperature Profile rises with increase in height contrary to lapse rate.

(4) Colder surface temperature promote Condensation & precipitation. Eg:- Formation of dew & frost.

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Impact on local weather conditions

(1) Stable atmospheric conditions leading to clear skies in case of Radiation inversion

(2) In case of valley inversion, cold airmass rapidly descends thus reducing valley temperature. Frost & mist are common phenomenon which also aid local agricultural products like Coffee.

(3) Absence of wind & high temperature creating uneasy weather in Radiation inversion.

(4) Frontal inversion can result in rainfall (mild) followed by stable atmosphere. Ex:- Cold front in temperate cyclones.

Impact on local pollution levels

(1) Due to absence of convection currents,

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particulate matter & other pollutants will remain suspended close to earth surface.

(2) This will result in unusually high pollution levels.

(3) Intermixing of air pollutants with fog will result in smog causing respiratory problems and reduced visibility.

(4) Bronchitis, Asthama etc. can happen if inversion is prolonged.

Temperature inversion can cause multiple problems like Delhi Air Pollution issue, while at other places it can be beneficial like Valley cultivation in Kashmir.

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Q.17 दुर्लभ पृथ्वी तत्त्वों (दुर्लभ मृदा धातुएँ) की बढ़ती माँग के साथ, उनका वितरण वैश्विक अर्थव्यवस्था का एक महत्त्वपूर्ण पहलू बन गया है। वैश्विक स्तर पर दुर्लभ पृथ्वी तत्त्वों के वितरण, उनके उपयोग और उनके निष्कर्षण के पर्यावरणीय प्रभावों पर चर्चा कीजिए। (250 शब्दों में उत्तर दीजिए) 15 अंक

With the growing demand for rare earth elements, their distribution has become a critical aspect of the global economy. Discuss the distribution of rare earth elements across the world, their uses, and the environmental impact of their extraction. (Answer in 250 words) 15 Marks

Ans (Q) Distribution of rare earth elements have given rise to geopolitical competition as they are main raw material of electronics & semiconductor industry

Distribution of rare earth elements

(1) Lithium → 80% deposits in lithium triangle consisting of Argentina, Bolivia & China

(2) China has high concentration of Heavy & Light rare earth elements (REEs) with highest processing capacity.

(3) Central Africa including Congo, Sudan etc. have high concentrations of Praseodymium, Terbium etc.

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(4) Indian scenario : Monazite sands on Coasts Contain extractible quantities of REEs.

Uses of REEs and possible applications

(1) Most important raw material for electronic industries owing to their unique magnetic properties.

(2) Semiconductor fabrication & development of Integrated Circuits.

(3) Military equipments such as guided missile systems and modern artillery.

(4) Electronic Vehicles industry as ~~the~~ rechargeable batteries are based on REEs.

(5) Scientists are exploring it's possibility in Robotics, aviation and even Carbon sequestration equipments.

(6) Used in thermonuclear reactor shields.

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Environmental impacts of REE extraction

(1) Deep mines increase structural strength of nearby land.

(2) Air and water pollution in mining procedure
Ex:- Fine dust from mines.

(3) Displacement of human inhabitants & biodiversity. Ex:- Congo government forcefully evicted villages for mining.

(4) Land degradation and desertification of exhausted mines. Ex:- Soil contamination.

(5) Processing of REEs releases toxins into atmosphere

⇒ Though REE are critical for growth of multiple industries, however their extraction demand proper Environmental Impact Assessment & strict regulation.

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Q.18 चीनी उद्योग की अवस्थिति को प्रभावित करने वाले भौगोलिक और आर्थिक कारक कौन–कौन से हैं, और वे भारत और विश्व के विभिन्न भागों में इस उद्योग के विकास में किस प्रकार योगदान करते हैं?

(250 शब्दों में उत्तर दीजिए) 15 अंक

What are the geographical and economic factors that influence the location of the sugar industry and how do they contribute to the growth of the industry in India and different parts of the world?

(Answer in 250 words) 15 Marks

Ans:B) Sugar industry acts as essential Raw material supplier for multiple industries and is a critical component of food processing chain in India.

Factors influencing location of sugar industry

① Geographical factors : (i) As it is a weight loosing industry, proximity to sugar fields is must.

(ii) Ideal conditions for sugarcane production :
- High temperature
- High Humidity
- well drained soils

(iii) Availability of irrigation facilities or natural source of water

② Economic Factors : (i) Quick processing

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fast harvest to minimize loss.

(ii) Availability of Connectivity & transportation from farm to fields.

(iii) Industrial agglomeration of sugar supply chain.

Contribution to growth of industry in India & around the world

(1) Ideal geographical conditions increased productivity per unit of land.

(2) Availability of nearby industries minimize transportation cost, thus lowers burden on end consumer.

(3) Provision of Fair & Remunerative Pricing ensures minimum stable income for farmers.

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(4) Food processing value chains gain from optimum location of sugar industry. Ex:- Cheaper production from Mega Food Parks.

(5) Use of ~~waste~~ sugar industry waste (bagasse) to generate Compressed bio gas ~~and ethanol~~ & ethanol have opened new avenues for integration of green energy with sugar industry.

(6) Due to continuous success, India is highest exporter of sugar. This brings in foreign exchange for India.

⇒ Sugar industry has delivered both for farmers as well as to economic growth. However certain issues like high debt levels & geographical confinement of sugar industries still needs to be resolved.

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Q.19 पहाड़ी राज्यों में पर्यटन, इस क्षेत्र की पारिस्थितिक वहन क्षमता से अधिक हो जाने का खतरा है। इस प्रवृत्ति के लिए योगदान करने वाले कारकों का विश्लेषण कीजिए और इस घटना के संभावित पर्यावरणीय प्रभावों का मूल्यांकन कीजिए। इन राज्यों में धारणीय पर्यटन को सुनिश्चित करने के लिए क्या उपाय किए जा सकते हैं?

(250 शब्दों में उत्तर दीजिए) 15 अंक

Tourism in the hilly states is threatening to exceed the ecological carrying capacity of the region. Analyze the factors contributing to this trend and evaluate the potential Environmental impacts of this phenomenon. What measures can be taken to ensure sustainable tourism in these states?

(Answer in 250 words) 15 Marks

Ans 19) Tourism in hilly states has seen drastic rise due to their geographical location & climatic conditions increasing resource stress in these regions.

Factors contributing to this trend

(1) Cool climatic conditions along with scenic Himalayan background has made it tourist hotspots.

(2) Rampant urbanisation in certain cities (Kullu, Manali etc) catering to tourist needs.

(3) Infrastructure creation (Ex:- Bharatmala Pariyojana) easing accessibility to hilly terrains.

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④ Rising disposable incomes & pent up demand post COVID resulted in tourist boom.

Potential Environmental Impacts of exceeding Carrying Capacity

① Increased stress on natural resources like land and water, threatening native of hilly regions.

② Unplanned urbanization and rampant infrastructure creation in geologically fragile Himalayas can result in increased earthquakes, landslides etc.

③ Increased Vehicular & Commercial GHG emissions. Domino Effect will trigger avalanches & melting of glaciers.

④ Increased pollution levels specially water & land pollution.

⑤ Threat to biodiversity in these areas.

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Measures to ensure sustainable tourism

1. Decentralized tourism with emphasis on village tourism.
2. Limited permits per season to avoid exceeding carrying capacity.
3. Regulatory crackdown on illegally created tourist facilities like resort.
4. Proper Environmental Impact Assessment before infrastructure creation.
5. Unique initiative like Digital Plastic Refund of Uttrakhand government to minimize pollution & littering.

→ Himalayas are important not only to the inhabitants but also for its central role in climatic and riverine flow.

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Q.20 भारत में मैंग्रोव वनस्पति के लिए उत्तरदायी भौगोलिक कारक कौन–कौन से हैं? जलवायु परिवर्तन भारत में मैंग्रोव वनस्पति के लिए कैसे खतरा पैदा कर रहा है? (250 शब्दों में उत्तर दीजिए) 15 अंक

What are the geographical factors responsible for mangrove vegetation in India? How does climate change pose a threat to mangrove vegetation in India? (Answer in 250 words) 15 Marks

Ans) Mangrove Vegetation are sites of high biodiversity as they are located at meeting point of two ecosystems.

Geographical Factor responsible for mangrove vegetation

(1) Confluence of salty oceanic water along with fresh river water provide ideal conditions for mangrove.

(2) Large river deltas formed by rivers.
Ex's- Ganga-Brahmaputra forming Sundarban delta.

(3) Perennial flow of rivers ensure continuous freshwater supply.

(4) Sedimentation by rivers ensure hanging roots of mangroves can grow.

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⑤ Areas of high temperature, high humidity & high precipitation

Climate Change posing a threat to mangroves

① Erratic Rainfall pattern leading to reduced river flow.

② Global warming leading to rise in tidal surges leading to excess salinity.

③ Increased pollution levels due to rise in toxins carried by rivers.

④ Rise in tropical cyclones leading to uprooting of mangroves.

⑤ Reduced biodiversity unbalancing ecological productivity of mangroves.

⑥ Increased floods will lead to submergence of breathing roots

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& death of mangroves.

Measures to minimize mangrove loss

① Reducing global warming by reducing GHG emissions.

② Rationalising storage infrastructure like dams to ensure maintainenance of minimum ecological flow of water.

③ Reducing toxin release in rivers.

④ Restoring mangroves with help of coastal communities.

MISHTI initiative for conservation of mangroves will help in ensuring that lives of coastal communities are not threatened by minimizing loss & restoration.

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Rough Work

NEXT IAS