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Code : TC047

Name of Candidate : NISHCHAL JAIN

Roll No. : MT23SLTON009

Registration Number : ..... **Date of Examination :** 08.08.2023

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.

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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.

.....

SUBJECT/PAPER
GENERAL STUDIES

Invigilator's Sign. : .....


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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

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6. Handover your QCA Booklet personally to the invigilator before leaving the examination hall.

Candidates must not write on this margin

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

Russian revolution refers to upsurge in Russia against Czar Nicholas, the ruler of Russia due to his inefficient administrative policies.

Factors leading to Russian revolution

---

1) Upper class hegemony: Their control over resources and social norms.

2) Extravagant royal spending: on the royal rituals and ceremonies.

3) Economic inequality among elites and common citizens

4) Poor economic growth of country

5) Slavery.

6) Inflation - rising prices of bread.

Candidates must not write on this margin

Consequences of Russian revolution

1) Rise of new political order: under the leadership of Lenin

2) Rise of communist order – Russian adopted communistic policies.

3) New bunch of leaders: like Stalin and Lenin.

4) Equitable distribution of resources in the society.

Influence on Indian national movement

1) Ideological backing to Communist Party of India: under M.N. Roy, Dange etc.

2) Shaping general economic discourse among freedom fighters – economic plans included heavy public industries

3) Revolutionary activities increased, eg

4) Violent form of struggle Eg HSRA.

5) General consensus over public ownership of resources.

Candidates must not write on this margin

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

Our first Prime Minister, Nehru, has envisioned India to guide the world in 21st century through means of science and technology.

Remarkable strides in science and technology
- → India's space mission
- → agricultural R&D.
- → biotechnology
- → nanotechnology

It has put India on path of modernity as:-

1) Green Revolution: HYV seeds by Normal Borlaugh and Swaminathan lead to prosperity in agriculture sector

2) India's space mission.

Candidates must not write on this margin

↳ India - first country to have successfully complete Mars mission in first attempt.

3) Biotechnology

↳ CoVaXIN - vaccine for COVID-19 acted as saviour in pandemic.

4) Information Technology

↳ Contribute to 30% of GDP directly or indirectly

↳ a huge share in export of services.

5). Artificial Intelligence

↳ Robots ~~and~~ performing tasks in museums

6). Big data

↳ helped in Aarogya-Setu Portal.

7) Cellphone networks

↳ Communication revolution in India.

Thus Science and Technology has potential to leap towards developed country by 2047.

Candidates must not write on this margin

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

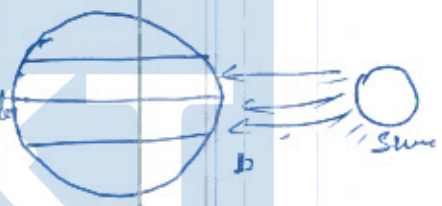
Discuss the various factors responsible for the uneven temperature distribution on Earth's surface.

(Answer in 150 words) 10 Marks

From 55°C in Al-Aziziyah (Libya) to -40°C in Siachin, Earth surface temperature distribution has very wide range attributed to various factors.

Factors responsible are:

1) Latitude: Lower latitude areas receive direct sun rays, tends to get heated more. Than upper latitudes



2) Altitudes: Higher altitude ⇒ lower terrestrial radiation ⇒ less temperature

3) Insolation also blocked due to clouds
: Thus maximum insolation not on equator but slightly northwards due to more clouds near equator

Candidates must not write on this margin

4) Ocean currents : Cold ocean currents tend to cool down a place.

5). Tilt of Earth's axis : Due to 23 ½° tilt, polar areas are severely cold.

6) Greenhouse gas effect : It traps the heat and tend to make surface warm.

7) Proximity to water bodies : Continental areas gets heated up and cool down easily

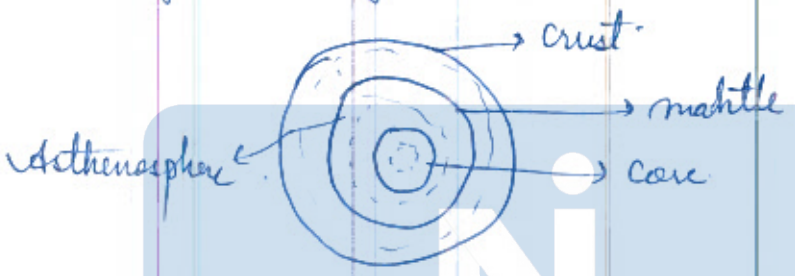
8). Precipitation : Higher precipitation has moderating impact on land temperature

Candidates must not write on this margin

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

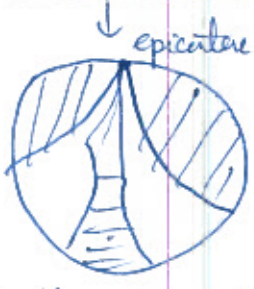
Earth's interior structure is made up of pimarily 3 layers – crust, mantle, core.



Understanding earth's interior structure
- → direct sources (e.g. deep ocean drilling magma etc)
- → Indirect sources (seismic, magnetism, meteroids etc)

Seismic investigation contributing our understanding

1) able to identify shadow zones to P-waves and S-waves.



Shadow zone – 105°-145°



Shadow zone – beyond 105°

Candidates must not write on this margin

2) Helps in understanding ~~on~~ mentallic and non-metallic composition of earth.
   ↳ Ni Fe layers in core.

3) Surface waves and body waves helps in analysing crusts' material.
   ↳ SiAl and SiMa in crust.

4) Surface waves (Love wave and Raleigh wave) travels faster and cause damage.

Significance of seismic investigation

1) ~~B~~ S-waves travels only through solid, thus helps in identifying liquid material.

2) Seismic investigation can help in analysing plate tectonics and identifying faults.

3) Predicting Earthquake beforehand.

4) Deep sea mining and drilling could be complemented.

Candidates must not write on this margin

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

Recently, Europe has seen its highest ever temperature in history (UK's Temperature reaching 40°C) which was mainly attributed to melting of glaciers.

Effects of melting of glaciers:

1) Environmental and ecosystem.

a) Melting of ~~the~~ Arctic ocean leading to biodiversity loss.

b) Loss of habitat for species like polar bear.

c) Flooding in plains – rivers originate from plains.

d) Permafrost melting ⇒ cause for ~~new~~ advent of new microorganism → new diseases.

Candidates must not write on this margin

2) Human society

a) Rising water levels in rivers.

b) Habitat loss for human like living in mountains (e.g. Igloo people.)

c). Less rainfall

d) Rising sea level — coastal communities under threat.

e) Ocean melts — new trade point for Russia-US

Measures to address this issues

1) Reduce / arrest global warming.

↳ reduce emissions of greenhouse gases.

2) Check depletion of Ozone layer.

3). Increase albedo over glaciers to reduce insolation absorbed by glaciers.

Thus we can help checking melting of glaciers which may cause havoc in future.

Candidates must not write on this margin

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

White Revolution refers to increase in production of milk and milk based products which was credited to Verghese Kurian in India.

Eg Rise of Anand Milk Union Ltd. (AMUL).

SUCCESS: India is the largest milk producer in world.

Success in Western India due to

1) Cooperatives : helped in channelising milk from farmers collectively.

2) Branding : Gujarat being industrialised state has complemented AMUL in branding

3). Effective leadership : Verghese Kurian had,

Candidates must not write on this margin

clear roadmap in his mind to take white revolution forward.

4) Marketing : competing with best global brands helped in inculcating best marketing practices

e.g. Amul Cartoons ; Saras slogans.

Reason for lesser success in other region

1) Lack of political will : states like Bihar, U.P., West Bengal never showed much interest.

2) Unavailability of capital

3) Lack of access to trading centres
   ↳ Mumbai being far from Eastern areas.

4) Excessive emphasise on food crops.

5) Lack of Research and development in livestock breeding etc.

6) Not able to diversify products e.g. Paneer,

Candidates must not write on this margin

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

India's Panchamrit target (as declared in COP 26 Glasgow) emission to have 50% energy production from renewable sources by 2030. It essentially implies backing down on coal-based power plants.

Structural shift impacting human development in coal bearing areas:



Short Term impact

1) Loss of livelihood for coal mines labours: mainly come from impoverished background.

2) Deindustrialisation – lack of development

3) Leading to worsening already poor indicators due to poverty.

Candidates must not write on this margin

4) Reducing life risks posed by coal mines.

5) Improving health indicators due to less exposure to gases like CO.

Long Term impact

6) May lead to shift in employment rather than losing it.

7) Renewable energy plants in those states may lead to overall safe and healthy development.
e.g. Solar tree in Bengal.

8) Helps in tackling climate change which will help to protect environment.

9) New technological interventions in renewable may bring change in their life as well.

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

Soil is the fundamental building block of our ~~lake~~ Earth's surface which mainly forms due to mechanical disintegration or chemical decomposition of rocks.

Temperature determining soil properties

---

1) High temperature → contraction and rarefaction → weakening bonds in soil → more weathering.

2). High temperature may leads to proliferation of microbes in soil affecting its properties. e.g. Gangetic plains.

3) Low temperature may help in giving strength to the soil

e.g. in Himalayas

Candidates must not write on this margin

Precipitation determining soil properties

1) High precipitation ⇒ rich loamy soil.
   ⇒ forming alluvial ⇒ good for crops like rice and wheat.

2). Low precipitation ⇒ dryness in soil
   ⇒ sandy soil.

3) Precipation affecting composition of Nitrogen, potash and phosphorus in the soil.

Other factors determining soil properties

1) Time : More the time soil left open, more it endures.

2) Microorganism : biological decomposition
   e.g. Leguminous bacteria.

3) Pressure of atmosphere

4) Quality of weathered rocks.

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

Cyclones are ~~deee~~ anticlockwise wind systems hovering around low pressure systems and causing intense wind speeds.

Severe and intense cyclones — regular phenomenon in Arabian Sea

---

1) High sea — temperature ~ 27°C : ideal for tropical cyclone. eg Tauktae cyclone.

2) Coriolis force present on these latitudes : formation of tropical cyclones.

3) Calm Ocean and wind over it.

4) Biparjoy cyclone showed that it gained speed from moisture of Arabian sea.

Candidates must not write on this margin

5) Arabian sea surrounded by land from 3 sides — more influx of freshwater → better condition for cyclone formation

6) Nivar cyclone caused damages to power and communication lines.

7) Intense low pressure in Arabian sea.

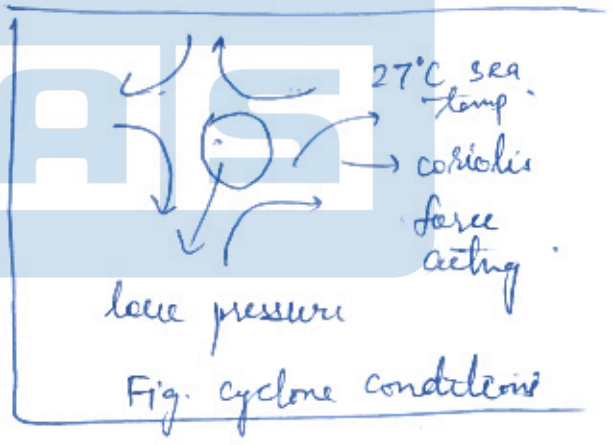


Fig. cyclone conditions

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

Industrial Revolution is phase beginning from 1760s bringing changes in manufacturing processes using steam engines and hydel power etc.

Impacts of Industrial revolution

(I) ECONOMIC.

1) Absorbing excess agricultural labour.
2) Mechanisation of agriculture
   ↳ helped by 'Enclosure movement'
3) Rising income of capitalists.
4) Excess money for investment in other countries
5) ~~Standing~~ Rapidly increasing GDP of England.

Candidates must not write on this margin

(II) SOCIO-CULTURAL

1) Urbanisation - large-scale migration of labour to cities.

2) Rising disparities in society.

3) Ghettoization in Urban landscape of labours

4) Promoted culture of slavery

5) Male-oriented jobs : financial exclusion of women.

6) Colonialism : Proceeds of Industrial Revolution funded colonial aspirations of Britishers

7) Westernization of Asia-African countries.

8) More exploitation of Asia-African countries in search of raw material.

Industrial Revolution was significant in beginning the colonial race in Europe.

Candidates must not write on this margin

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

India, though follows the policy of peace and tranquility in neighbourhood, was forced into ~~was~~ numerous wars by neighbours post independence.

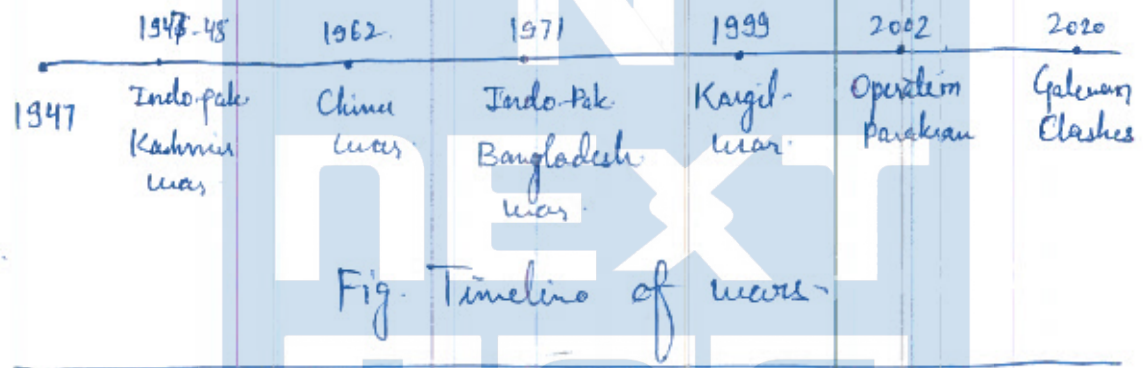


Fig. Timeline of wars.

Causes of wars:

(I) Kashmir war (1947-48).
- Pakistan aggressive action
- Tribal infiltration from NWFP
- Refusal to accept instrument of accession.

(II) China war (1962)
- India's inadequate defence capabilities
- China's rising ambitions
- Refuge to Dalai Lama.

Candidates must not write on this margin

(III) Bangladesh war (1971)
- → Atrocities against Bengalis
- → migrant crisis in India
- → Pakistan's surprise attack on Indian Army's bases

(IV) Kargil war (1999)
- → infiltration of Pak army in face of militants
- → Ambitions to capture peaks in Kargil valley
- → blocking Srinagar-Jammu Highway

(V) Galwan Clashes (2020)
- → China's internal anger ↳ govt. diverting attention
- → violating 1996 Border agreement

Impacts of wars

(I) INDO-PAK

1) Sense of perpetual cynicism in both establishments about each other's activities

Candidates must not write on this margin

2) Exposed Pakistani deep state i.e. Army

3) ISI Changing policy → terrorism which worsened relation

4) Confusion over trade policies
   ↳ India discontinued after Pulwama.

5) Multilateralisation of issues.

(II) INDO-CHINA

1) China's agressive policies → India not comfortable in Arunachal, Ladakh.

2) Growing people-to-people antagonism

3) Trade issues
   eg → India banning Chinese apps in 2020 due to privacy concerns.

4) Inability of both countries to restore peace.

Way Forward-
- → India's neighbourhood policy subject to reciprocity
- → Trade only if peace restored.

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

Green Revolution refers to series of reforms in agricultural practices in India at each level in order to achieve food security.

Economically active corridors overlapping with former green revolution regions in India
- → Gurugram, Noida and Delhi being industries hub
- → Grand Trunk route seeing prosperity
- → areas like western Uttar Pradesh reaping benefits of economic development.
- ↓ Poor states like Bihar yet to fight in the race.

Candidates must not write on this margin

Green Revolution- contributed to agricultural productivity

1) HYV seeds : leading to high production of rice and wheat.

2) Pesticides and Herbicide : resistance from pests → reducing crop damage.

3) Nutrient based fertilisers : improving soil fertility and thus productivity

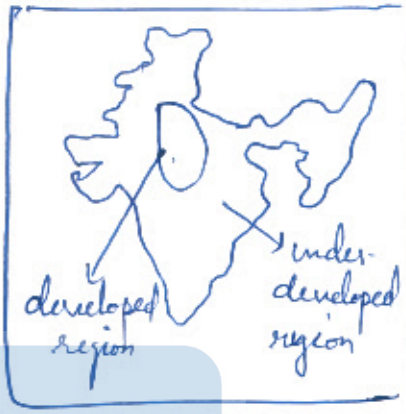
4) Irrigation system : wide network of canals (eg. Indira Gandhi Canal in Ganganagar). reducing dependence on rain
↳ tackling famine like situation

5) Overflowing FCI godowns are testimony of high productivity.
eg. FCI has 2.7 time more foodgrains than its capacity

Candidates must not write on this margin

Geography of uneven development.

1) Supply of raw material for food based industry is easy.



2) Better electricity and road infrastructure

3) More capital due to proceeds of green revolution

4) Areas like Bihar, Jharkhand have their agriculture in distress, Moreover less access to industries and jobs.

5). Poor facilities for agriculture increasing migrant crisis in those area.

Way ahead-

- Inclusive development with respect to regions
- Ease of doing business for deprived states
- Focus of evergreen revolution (i.e. organics + natural farming).

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

World War I, which was considered as landmark event in the history of Europe and Western countries had also far-reaching impacts on the Asian and African countries.

World War-I + consequences → Resurgence of nationalism in Asia and Africa

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1). Use of soldiers from Asia and Africa for colonial interests.

↳ feeling of discontent and anger.

eg> Non-cooperation movement has one of the causes – World War I.

2) It exposed internal contradictions within

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the colonial powers → helped in raising ~~diff~~ disaffection in colonies.

3) Breaking the notion of colonial superiority.

4). Proactive role played by Japan instilled sense of self confidence in colonies.

5) Wartime inflation leading to misery of the poor in colonies

6). Lack of resources in colonial powers. due to war expenses
↳ ideal time for revolutionaries to act.

7) Act of upseating 'Khalifa' of Ottoman empire didn't go well with Muslims of the world

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Eg ⇒ Khilafat Movement in India

8) Treaty of Versailles showed colonial greed → feed for revolutionaries

9). Ottoman revolution (under Mustafa Kamal Ataturk).

10). Disenchantment against colonial power due to breaking promises.

Eg ⇒ Montagu statement in India.

Thus these events ultimately led to independence of various countries in next 3 decades.

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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

Ocean floor consists of several topographic features which have been shaped through geological processes over million of years

Feature of ocean floor	Significance in study of oceanography
1) Mid-oceanic ridges (eg. Mid atlantic ridges)	→ It shows divergent plate boundaries through which new landforms develop.
	→ similarity in either side of ridges testifies seafloor spreading theory.
2) Trenches. eg Mariana Trench.	→ Shows convergent oceanic-continental plate boundaries.

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Features	Significance.
3) Deep sea plains (Abyssal plains)	→ They are relatively newer rocks than continental rocks. substantiating plate tectonics theory.
4) Continental slope.	→ It is steep slope which generally ends up in trenches → Shows bending due to convergence of plates.
5) Continental Shelf	→ Consists of numerous resources for extraction. eg Mumbai High Petroleum.
6) Pacific ring of fire.	→ Consisting of volcanoes.



Candidates must not write on this margin

Features	Significance
7) Mid oceanic ridges Eg Phillipines, Indonesia.	They are made up of deep sea ridges viewed as islands from top.
8) Atoll Eg Addu Atoll in Maldives.	Land area circumscribing water body. 

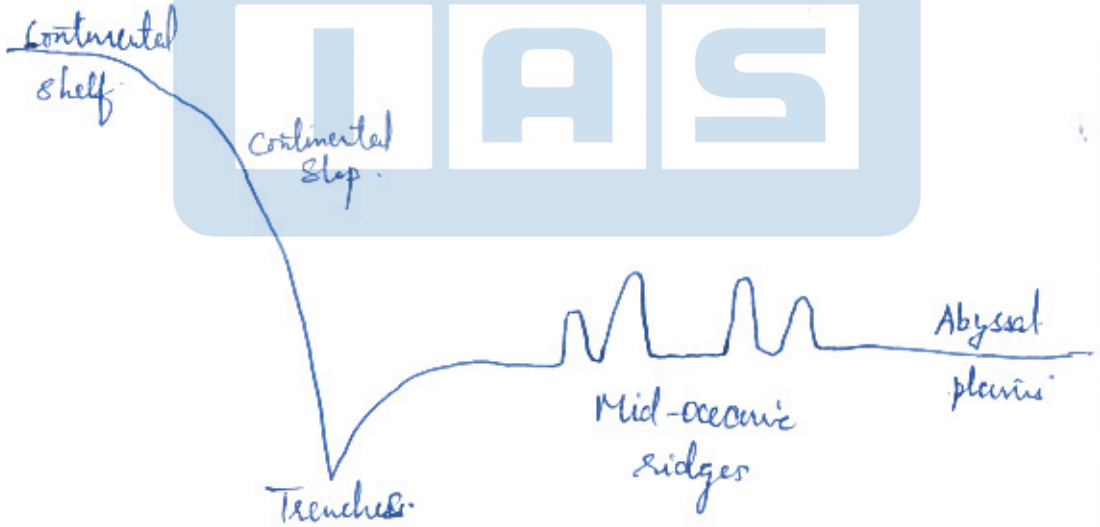


Fig. Ocean floor.

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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

Indian monsoon is characterised by the winds which brings rainfall in the summer months as well as winter months. It is influenced by several factors.

Role of various factors influencing Indian monsoon.

(I) OCEANIC

1) Differential heating of land and ocean is prime moving force for monsoon.

2). Proximity to sea → more rainfall.
↳ monsoonal rainfall decreases from coast to central plains

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3). Moisture carried by winds causing rainfall → oceans contributing to moisture.

4). Support to trade winds by monsoon.

5). Arabian sea and Bay of Bengal playing role in south-west and retreating monsoons respectively.

However, there are certain atmospheric factors also.

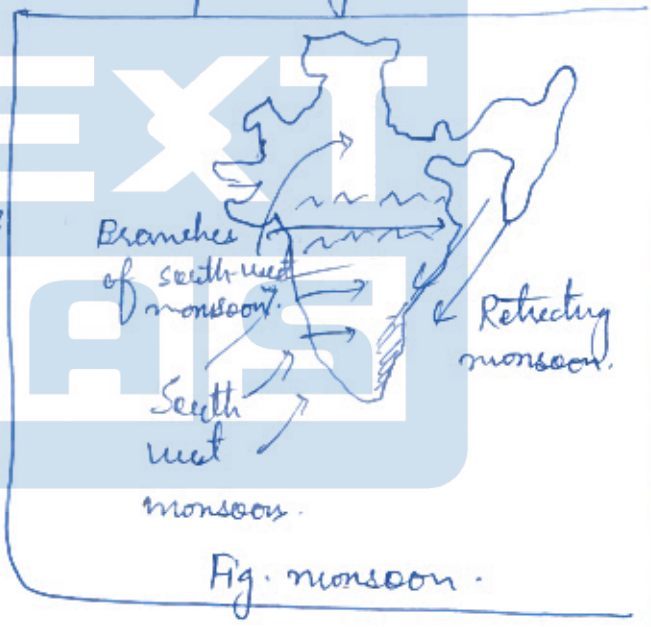


Fig. monsoon.

(II) Atmospheric factors are-

1) Changing direction of trade winds due to Coriolis force in Northern Hemisphere

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2) Jet streams
   - Westerly sub tropical jet stream retreating
   - onset of easterly tropical jet stream

3) Monsoon breaks due to shifting of ITCZ. (Inter tropical convergence zone).

4) Monsoon troughs near Himalayan foothills causing rainfalls in Gangetic valley.

5) Tropical depressions in North-Eastern states – rainfall in Meghalaya.

6) Land and sea breezes contributing to monsoon rainfall.

Thus monsoon is distributed unevenly in India.

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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

Temperature inversion is the phenomenon in which lower layers have less lower temperature than higher layers of troposphere.

Conditions for temperature inversion
- → long and clear night sky.
- → cold night.
- → no precipitation.
- → lesser wind speed.

Temperature inversion
- Plains inversion
- Polar inversion
  - → warm air
  - → cold air
- Valley inversion.
  - warmer air
  - cold air sliding down

Affects atmospheric conditions

1) Cooler land surface temperature.

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2) Warmer upper layers → air rising and may lead to cloud formation

3) High pressure winds on land and. Low pressure in air.

4) Stability in atmospheric conditions

Implications for local weather patterns

1). Trapping cold air between land and warmer air

2). May bring precipitation if warm air rises with moisture.

3) Low wind speed means. ~~be~~ less volatile weather.

4) It is phenomenon for 2-3 days in plains.

5) Temperature inversion — common in poles.
→ Keeping weather cold.

Candidates must not write on this margin

Implications for air pollution levels.

1) Keeping pollution for days as wind can't wipe it away.

2) Ideal conditions for smog in air.

3) May accentuate pollution as if pollutant continues to float in atmosphere

4) May cause health hazards in cities like Delhi.
   Eg air pollution levels in Delhi in winters.

5) Floating of hygroscopic nuclei which attracts pollutants.

6) However temperature inversion also helps crops by keeping them away from frosts.

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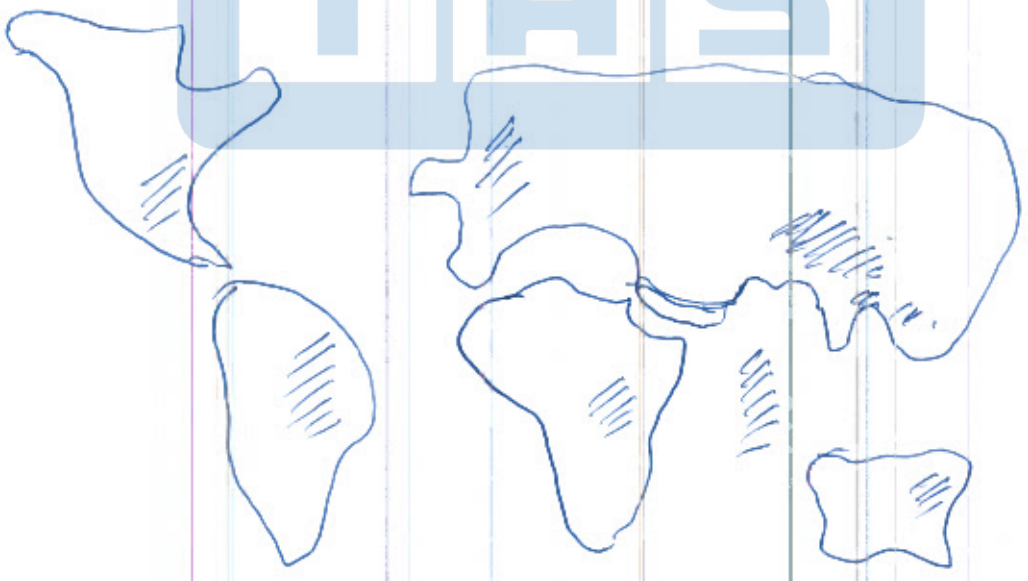
Q.17 दुर्लभ पृथ्वी तत्त्वों (दुर्लभ मृदा धातुएँ) की बढ़ती माँग के साथ, उनका वितरण वैश्विक अर्थव्यवस्था का एक महत्त्वपूर्ण पहलू बन गया है। वैश्विक स्तर पर दुर्लभ पृथ्वी तत्त्वों के वितरण, उनके उपयोग और उनके निष्कर्षण के पर्यावरणीय प्रभावों पर चर्चा कीजिए। (250 शब्दों में उत्तर दीजिए) 15 अंक

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

Rare-earth elements are those elements which are found rarely on earth and have major application in new cutting-edge technology.

Eg → Titanium, Helibedynium etc.

Distribution of rare-earth elements



Rare-earth minerals

China, Taiwan, USA, India (Arunachal, Karnataka)

Africa (Congo) etc.

Candidates must not write on this margin

Applications of Rare-earth elements (REE)

1) Semiconductor industry : Semiconductor chips needed REE in their manufacturing

eg> Taiwan leading producer of Chips

2) Mining appliances and tools :

3) New age gadgets and device calls for REE like Molybednum

4) Energy production : Lithium ion batteries needed to produce energy.

↳ 'Batteries of the future'.

5) Transistors : requires elements which have superconductivity

6) Applications in nanotechnology

eg> ~~nanosensors~~ nanosensors made up of spitium .

Candidates must not write on this margin

Environmental impacts of extraction of REE

1) Deep-earth mining : poses risk of seismic hazards [eg] Earthquake (collapse)

2) Deep sea mining : threat to biodiversity of oceans [eg] planktons, fishes.

3) Greenhouse gase emission due to mining activities

4) Threat to corals and mangroves near sea.

Thus. REE needs to be used effectively keeping in mind its environmental hazards.

Candidates must not write on this margin

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?

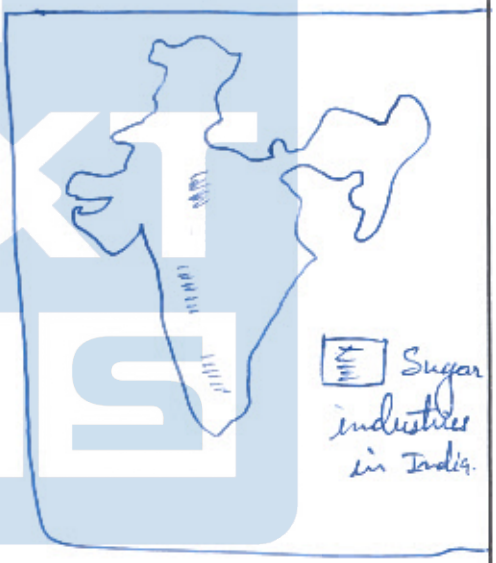
(250 शब्दों में उत्तर दीजिए) 15 अंक

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

India is the second largest producer of sugercane in the world which makes it crucial for our agricultural economy.

Factors influencing sugar industry



(I) GEOGRAPHICAL

1) Rainfall : 165-200 cm rainfall needed.

2) Temperature : 25-30°C.

3) Soil : Rich decay soil is preferred for sugar production

4) Wind : dry wind are harmful for sugar industry.

Candidates must not write on this margin

(II) ECONOMIC.

1) Availability of Raw materials : near sugar producing regions.

2) Availability of cheap labour.

3) Proximity to market.

4) Industrial policy of govt.
   eg: FRP, SAP on sugarcane.

5) Proximity to ports due to its export potential.

6) Access to ~~kaasa~~ cheaper capital.

Contributing to growth of sugar industry

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1) Prosperity among sugarcane farmers due to FRP (Fair and Remunerative Price) and SAP (state advisory Price).

2) Sugar is ~~as~~ common component of many cuisines → more demand.

Candidates must not write on this margin

3) Sugar being ~~a~~ weight-losing industry need to be set up near sugarcane farms.

4) sugar industries also contributing to production of biofuels.

5) Diverse location of sugar industry throughout the world due to bigger market



Fig distribution of sugar industry

Thus ~~fo~~ above factors contributes to the growth of sugar industry.

Candidates must not write on this margin

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

Recently, Joshimath videos gone viral on social media which showed tough reality of land-subsidence. It posed us with question regarding over the future of hilly states.

Tourism → exceeding ecological carrying capacity of region

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1) Overburdened mountains: mountains not able to cope up with movement of this much tourists

2) Unchecked developmental activities

e.g. Border infrastructure in Uttarakhand

- Tourist hotels and homes.

Candidates must not write on this margin

3) Adventurous activities
↳ adventure parks in Rishikesh etc affecting ecology.

4) Loss of habitat of local species.

5) Increased greenhouse gas emission leading to melting of glaciers.

6) Many religious sites are attracting tourists more.
eg. Kedarnath, Amarnath.

7). Mountains are preferred for trekking.

8) Hydropower projects like Joshimath leading to soil liquifaction

9) Himalayas are seismically sensitive zone and need to be treated accordingly.

Candidates must not write on this margin

Measures – for sustainable tourism

1) Guidebook for tourists consisting of do's and don't's.

eg don't threaten any tree / do take care of species.

2). Rationalise tourist quantity on hills.

eg issuing permits.

3) Trekking and other fun activities should be restricted to non-religious sites only.

↳ equalise tourist pressure.

4). Environmental Impact assessment of ~~and~~ big projects for attracting tourists.

eg Char Dham projects.

5) Capacity building of locals and seek integrated piecemeal approach.

6) Hefty fines and penalties in case of damage to environment.

Candidates must not write on this margin

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

Mangroves are forest vegetation near oceans / seas acting as a natural barrier against floods & and have several ecosystem significances.

e.g Sundarbans mangroves in India.

Geographical factors responsible for mangroves in India.

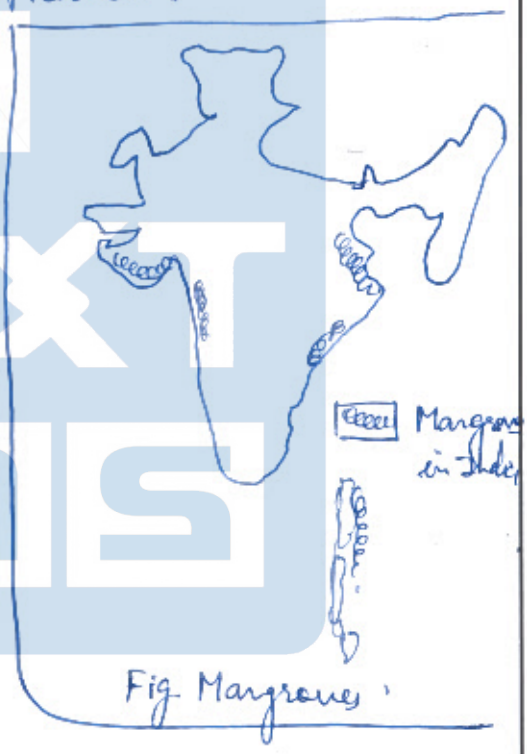


Fig Mangroves in India

1) Proximity to oceans.
   ↳ Mangroves could be seen near Bay of Bengal and Arabian sea.

2) Warm and Humid climate
   ↳ as favourable for mangroves production

Candidates must not write on this margin

3) High Precipitation : Mangrove need rainfall more than 200 cm which could is easily present in coastal areas.

Eg Rainfall in Nicobar ⇒ flourishing mangroves.

4) Temperature in the range of 30°C.

5) India lies in tropical zone which contributes to the growth of mangroves.

Climate change – threat to mangroves.

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1) Erratic monsoon and rainfall.
↳ not supporting mangroves

2). Excessive salty water : threat to mangroves roots i.e. pneumatophores

3). Global warming : exceeding temperature bearing capacity of mangroves.

Candidates must not write on this margin

4). Melting of glaciers : more influx of water in oceans.

5). Climate change posing threat to complementing biodiversity and species of mangroves.

6) Mangroves helps in protection from disasters like cyclones and Tsunami. but its roots getting weakened due to changing soil properties.

'Mangroves for Future' and 'Alliance for Mangroves' could be proven as saviour at global level. Meanwhile Indian program of MISHTI can help to reduce the threat of to mangroves.

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Rough Work

NEXT IAS