

SCIENCE AND TECHNOLOGY

Time Allowed: 3 hrs.

Max. Marks: 250

Q.	Marks	Instructions to Candidate
1.		<ul style="list-style-type: none">• There are 20 questions.• All questions are compulsory• The number of marks carried by a question is indicated against it.• Answer the questions in NOT MORE THAN 200 words each. Contents of the answer is more important than its length.• Answers must be written within the space provided. <p>Any page or portion of the page left blank in the Question-cum-Answer Booklet must be clearly struck off.</p>
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Name Hendra Pratap Singh

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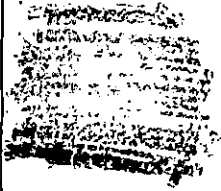
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Date 09/10/2016

Signature Hendra Pratap Singh

REMARKS

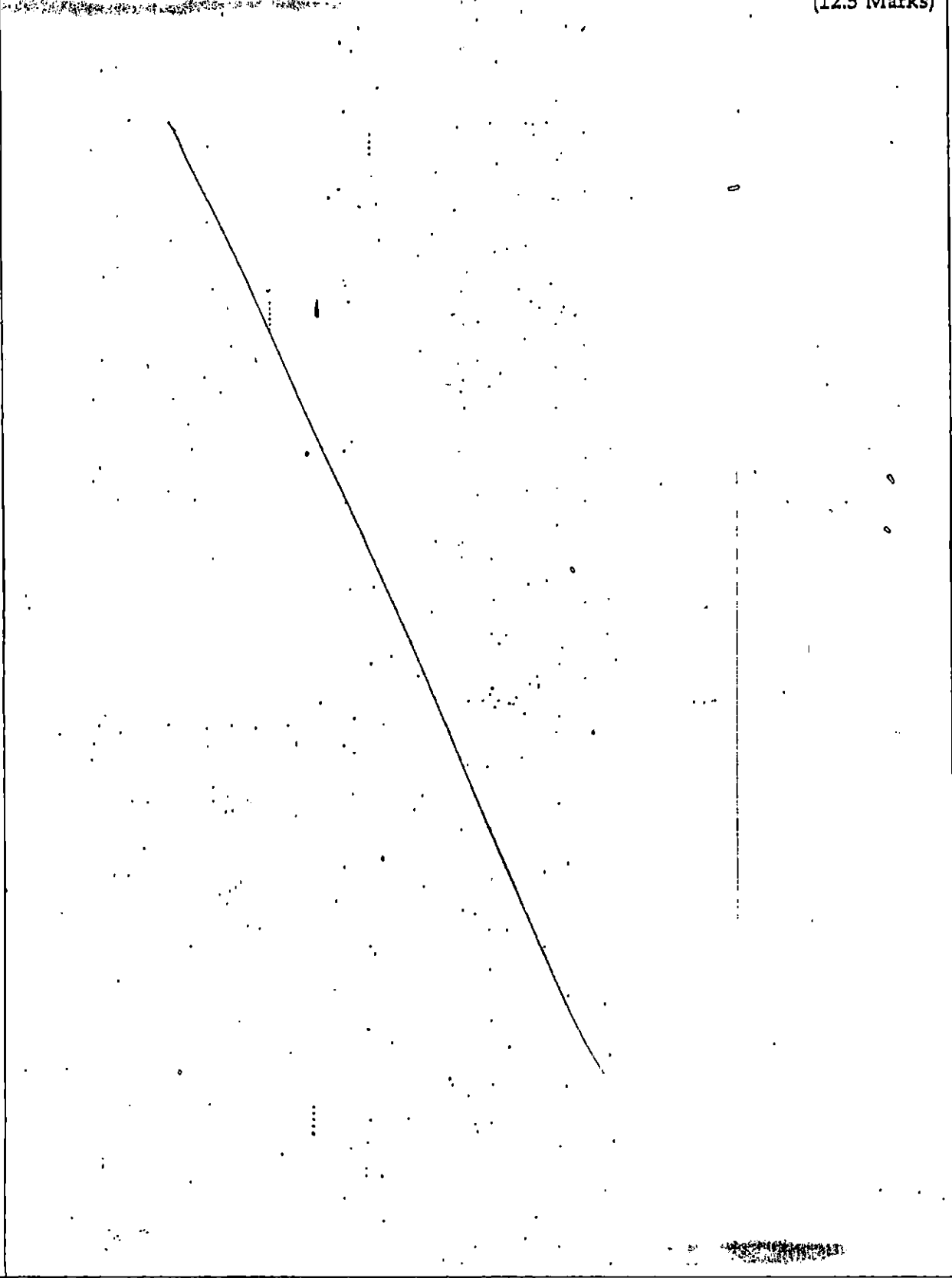
GS SCORE
GS MAINS TEST SERIES 2016



Roll No: _____

Q1. "Money does not grow on trees but gold can". Elaborate in context of phyto-mining. Compare its advantages and challenges compared to conventional mining.

(12.5 Marks)



Remarks

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Remarks

Q2. What are the physical and medical challenges of living in high altitude location like Siachen glacier? How modern technology can help protecting the life of soldiers in such rough terrains? (12.5 Marks)

There are many physical and medical challenges associated with living in high altitude locations. They are as follows.

1. Frostbite - The term frostbite refers to excessive exposure of any or entire body part to the cold. This at times makes the body part defunct even in the recent avalanche, some Indian soldiers in Siachen were found to be affected by this.

2. Avalanches - Avalanche is a landslide kind of phenomenon in glacial areas. This is one of the major challenge in living in the locations like Siachen glacier.

3. Availability of oxygen - Since the glacier is located at an height of almost 10000 meters from sea level. Availability of oxygen is quite less as compared to other areas.

4. Other challenges - Due to severe conditions, soldiers there face problems like memory loss, deafness etc.

Mention about more medical problems faced

Remarks

How technology can help these soldiers - Technology can be effectively used in these areas to mitigate many of the effects of severe climatic conditions.

- Technology can be used to provide soldiers with clothes which resist the exposure of their body to outside heat.

Mention the name of the technology

- In the long-run after successful diplomatic efforts, soldiers can be withdrawn from the theater and technology can be used to effectively monitor these areas. In this situation, modern radar technology and UAVs can be of immense help.

- Silica Aerospace
- Radio-signal emitter
- Portable fuel cell system
- surveillance camera etc.

Refer with

Q3. Highlight the objectives of India's new IPR policy and major changes from the previous policy. Critically examine its provision in fostering innovation and research in India. Also discuss how it will contribute to 'Make in India'? (12.5 Marks)

India recently unveiled its new IPR policy to replace the previous IPR policy which was criticised for not fostering innovation.

The main objective of the new IPR policy is to boost innovation in the country along with enhancing foreign investment. The new IPR policy is also completely in sync with the provisions of WTO.

Major changes from the previous policy-

The new IPR policy aims to create a stricter IPR regime in the country by strengthening the provisions of IPR protection.

New policy also provides for protection to genetic drugs. The provision was highly controversial due to heavy pressure mounted by US Trade representative.

The new IPR policy has strengthened provisions with respect to enforcement of patents. This will stop companies from getting patents on some frivolous grounds.

It also includes new fields for patent grants such as films, music and industrial drawings apart from books & publications.

Remarks

Thus the new LPR policy is quite innovative in the sense that it allows for effective LPR protection at the same time giving Indian government to issue generic licenses. The policy is expected to provide a predictable LPR regime in the country which will attract foreign drug manufacturers ~~and~~ others companies in India. Thus in this way it will also help in 'Make in India' campaign of the government.

Being more specific points.

Remarks

Q4. India is augmenting its capacity in astrophysics research; whereas at the same time the country suffers from so much abject poverty and inequality. Is it not a wasteful expenditure given the circumstances? Elaborate. (12.5 Marks)

In recent times India is augmenting its capacity in astrophysics manifold. Very recently India developed its own geographical positioning system - NAVIC. Also ISRO has launched many satellites in previous few years. It has recently tested a reusable launch vehicle as well as ~~GSAT~~ GSLV launch vehicle.

Allegations have been made from certain quarters that in a country of abject poverty and inequality this is a wasteful expenditure. But on a closer look we find that it is not a wasteful expenditure which is clear from following points-

use in Agriculture - India is primarily an agricultural country. Thus to remove poverty, agricultural income has to be boosted and agriculture has to be made disaster proof. In this sector ISRO has launched remote sensing satellites which help find out real time agriculture data such as sowing pattern, affected areas due to draught

Remarks

cyclone etc). This data is processed by the government to formulate better targeted policies.

Use In Education - ISRO has launched education

satellite like edusat which is helping people in far off locations to get quality education.

Other uses - By launching foreign satellites

ISRO earns valuable foreign exchange which is used for the development of the country.

Thus the astrophysics research of India is highly committed towards removing poverty and inequality and it is wrong to say that it is

a wasteful expenditure.

But it cannot remove poverty alone.

There are also other sectors where lacunas can be regulated and funds can be used for poverty alleviation.

Remarks

Q5. Discuss how new Defence Procurement Policy would help in indigenisation of technology and establishment of defence manufacturing ecosystem in India? Also elaborate, how it would contribute to 'Make in India'. (12.5 Marks)

Union cabinet recently approved new defence procurement policy whose two main features are as follows -

- ① The policy provides for clear cut guidelines for procurement of defence products from foreign manufacturers.
- ② It encourages the domestic defence manufactures by putting an emphasis upon domestic procurement of defence products.

The policy also talks about increasing FDI cap in defence sector. Thus the overall emphasis of the policy is on the more and more indigenisation of technology. The policy tries to attract foreign investment in defence sector in the form of Joint Venture or otherwise.

The newly unveiled policy will be highly useful for 'Make in India' campaign of the government as defence is one of the components of Make in India campaign and

Remarks

policy puts an emphasis on domestic defence production. even recently a US company has agreed to set-up its subsidiary in India for the production of defence products. Also as the policy puts an emphasis on domestic procurement, it will improve domestic defence production in the country.

Too general approach

Thus, overall the policy is quite innovative but, its proper implementation is a challenge as 'Make in India' in defence has still not taken-off.

Challenges such as encouraging private players for production etc

Mention about FDI etc

Refer hints

Remarks

Q6. In light of recent development, examine the significance of neutrinos and their potential applications. Also highlight the India's position in neutrino research. (12.5 Marks)

Neutrinos are second most abundant particles in the universe. In previous few years neutrinos have got attention for their significance which are as follows:

Neutrinos can be used to better understand many of the physical phenomenon → which physical phenomenon?

Neutrinos don't deviate and they don't have mass so they can penetrate into any area without being identified. This important property of neutrinos can be used to create potential radar which will not have fear of being identified.

Thus, due to this significant property neutrinos have potential application in defense, National security and medical field etc.

India was one of the pioneers in the neutrino research but later on this got slowed down. Recently India has re-intensified its efforts in neutrino research with building

Remarks

Mention about its various applications.

9/2

a new neutrino research centre in Bodi-hills underground. The project got delayed due to concerns of environmental impact but as per the recent reports the project is quite safe. And once the project starts India will again be able to gain good ground in neutrino research.

Too general approach

Being point which are more specific like

- its potential use is
- Space technology - sending information
 - Medical field - detecting geological defects
 - Detect minerals and oil deposits in the earth etc.

Refer hints

Remarks

Q7. Recently ISRO has successfully tested scramjet engine. What is the significance of this technology for India? Discuss persisting challenge in its adoption. (12.5 Marks)

Scramjet engine Scramjet is a new technology for launching the satellites. Under this technology the vehicle is able to 'breathe' by using outside oxygen and in this way a huge amount of load in the form of liquid oxygen will get reduced. → Improper way of conveying ideas.

The technology once adopted will reduce the load of the launch vehicle as well as help in cost cutting. This will help ISRO in becoming more competitive globally in lucrative space launch market. Also the successful test of this technology has boosted the confidence of ISRO and increased the trust of people in ISRO.

But the technology is not without challenges. First of all the technology is quite costly to adopt for general use purposes and in a country ~~which~~ where there are multiple demands.

Remarks

for funds, it may not be easy to get funding. Secondly the technology is still in its formative stage and it may take time to completely adopt this technology by DRDO.

Mention about the challenges also.

Thus certainly scramjet technology is a major boost to DRDO but it will have to face some challenges in the adoption of this technology.

Refer hints.

Remarks

Q8. India has introduced the Human DNA Profiling Bill, 2015. What are advantages of Human DNA profiling to India. Discuss various concerns raised in Human DNA Profiling Bill, 2015. (12.5 Marks)

Human DNA profiling Bill, 2015 was introduced in the parliament.

Remarks

Remarks

Q9. National Optical Fibre Network (NOFN) project is an important pillar in achieving the dream of Digital India. Elaborate how it will help in creating a digital society. Discuss the various challenges in its implementation. (12.5 Marks)

National Optical Fibre Network (NOFN) is a flagship project of the government to bridge the digital divide. The aim of the project is to connect all the Gram Panchayats with high speed broadband.

NOFN project will help in creating a digital society. With the completion of the project, broadband connectivity will reach to the remotest corner of the country and in this way it will help in disseminating digital information/literacy to the people. Also it will help in getting effective real time data about various schemes and enhance participation.

Challenges - There are multiple challenges that

the project may face in its implementation.

Some of them are as follows -

① Huge literacy and digital divide itself is a challenge for the effective take-off of the scheme. There are apprehensions that even if

Remarks

connectivity is provided, villagers may not be able to use it due to unawareness.

Don't be confined with the limited points

Here Information, Education & communication (IEC) campaigns can be of immense help. Also digital training needs to be provided for capacity building.

Bring in relevant points

Large geographical diversity may create a condition where certain areas can't be provided with broadband accessibility. There are mountain areas as well as forest areas where connectivity may not be available.

Thus, there are multiple challenges to this ambitious scheme, govt. needs to carve out an appropriate strategy to overcome these challenges.

- These are other issues which need to sort out first for better implementation of this policy like:
 - Continue - 24x7 electricity
 - Proper infrastructure etc.

Remarks

Q10. What is optogenetics? Elaborate on its significance in field of mental health.

(12.5 Marks)

Optogenetics:- The term optogenetics is made up of two terms optics & genetics. The term stands for use of optics principles to the treatment of genetic problems. The technology is becoming quite successful in recent times.

Mention the complete points.

Remarks

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Remarks

Q11. Give brief account of Ozone Depleting Substances? What are the recent controversies regarding proposed amendment to the Montreal Protocol to phase down the harmful greenhouse gases? What is India's stand on this issue? (12.5 Marks)

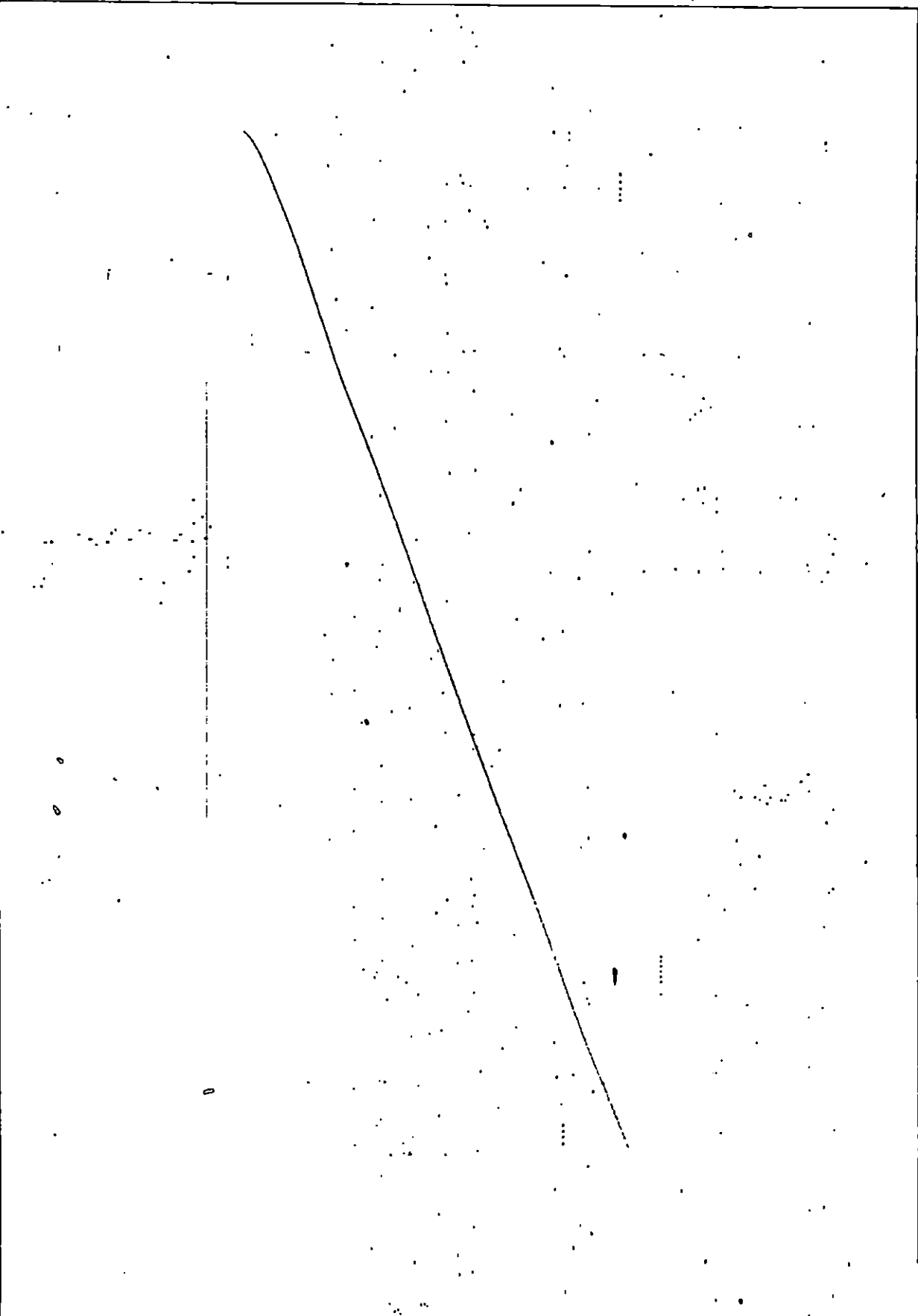
Ozone Depleting Substances (ODS) are those substances which once released in the atmosphere, are able to reach upto stratosphere and deplete the ozone layer there. These are very stable substances which last in the atmosphere for many years.

Some of the ODSs are as follows-

Chlorofluoro Carbon (CFC), Hydrochlorofluoro Carbon (HCFC), Halons etc.

Mention all the dimensions.

Remarks



Remarks

Q12. How the promotion of tourism in National Parks and bio-sphere reserves is helping in wildlife conservation and prevention of ecological hotspots? Elaborate its contribution in bringing down the poaching and illegal hunting? (12.5 Marks)

Promotion of tourism in national parks and bio-sphere reserves has in a sense given a new lease of life ~~to them~~. It is helping in conservation and preservation of ecological hotspots. 4

The promotion of tourism activity in National parks helps in earning revenue. It also helps in generation of employment to people living in nearby areas. Thus the revenue earned can be utilised for better management of National Parks and bio-sphere reserves. Also as it helps in generation of employment, the people in nearby villages are no longer forced to take to poaching or hunting for their livelihood. Thus in this sense it also helps in curbing the phenomenon of poaching and hunting.

Also tourism in National Parks helps create much needed awareness towards

Remarks

Importance of nature in people's minds. This
in the long run will stop them using
items made of animal's skin. Thus in this
way also, the tourism activity helps in
bringing down poaching and hunting.

Bring more
points

Conclusion?

Remarks

Q13. What are the potential applications of UAV in public sphere and the challenges in the realization of their full potential? How do the draft guidelines issues by DGCA try to address such challenges? (12.5 Marks)

Unmanned aerial vehicles (UAVs) have recently shown their potential in use in public sphere. Some uses of UAVs in public sphere are as follows-

(i) They can be used for keeping a vigilance in the cities (esp. in night). Delhi police has decided to use UAVs in night in the wake of increasing cases against women for women security.

(ii) They can be used to collect data with regard to traffic management.

(iii) In distress time (eg. flood) they can be used to locate the stranded people and hence help can be provided to them.

(iv) They can be used for better urban planning.

Also for commercial use by various online vendors

But at the same time there are multiple challenges of use of UAVs for public purposes. The first major challenge is absence of any clear-cut guideline for use of UAVs for public purposes. This makes the situation

Remarks

confusing in the use of UAVs. Also since the sky above the cities is becoming quite busy due to heavy air traffic, a potential great of collision between plane and UAVs cannot be ruled out. Also there are issues with regard to privacy as well.

Security
disturbance
can also
be
of
great
concern
used by
terrorist
organisations

In this scenario, recently DGCA issued a draft guideline asking all the public agencies as well as private parties to use UAVs only after its approval. The guideline was issued to make the use of UAVs more predictable.

Unique
Identification
Number for
each UAV with
license for
flying

Refer link.

Q14. What are the challenges faced by organ transplant sector in India? Is it necessary to frame a new policy for the sector, given so much cases of organ trafficking coming up regularly? Give reason in support of your answers? (12.5 Marks)

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Remarks.

Q15. The communication sector is undergoing momentous changes with emergence of new technologies like VoIP, quantum communication? While discussing these technologies, also elaborate their potential benefits. (12.5 Marks)

Remarks.

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Remarks

Q16. "Draft encryption policy instead of providing the security and confidentiality on the cyber world could hamper the growth of cyber world." In light of the above statement analyse the need of National Encryption Policy and analyze what were the lacunas in Draft Encryption Policy? (12.5 Marks)

Encryption is a process of encoding a message to be able to be decoded by reader. The idea is to keep the information confidential. 4/2

Recently government approved draft encryption policy which was seen more as a threat to the growth of cyber world.

The most contentious provision in the policy was the need to keep two months information about conversation ready. This provision made almost everyone a violator of the law.

In the wake of increasing digitisation in the country, India certainly needs a draft encryption policy. The reason being - draft encryption policy will provide a predictable regime in the use of encoded information.

Also it will provide with the better growth of the cyber world.

Remarks

But the draft encryption policy unveiled by the government was certainly a step back rather than being a step forth. The policy provided for unhindered access of private information to to security agencies which is a breach of right to privacy which is a fundamental right under article 21.

Talk about
more lucid

Thus the need of the hour is to provide an encryption policy which is more sensitive to the needs of citizen. Widescale participation of citizen in framing of policy should be ensured to achieve this.

Refer words

Remarks

Q17. Recently, there has been a proliferation of bilateral and regional free trade agreements containing TRIPS-plus provisions. What can be the effects of such provisions on India?

(12.5 Marks)

TRIPS-plus provisions are those provisions which provide for stricter IPR protection, labour laws and environmental protection regime than WTO provisions.

Recently in many agreements like Trans-Pacific Partnership (TPP) Trans Atlantic Trade & Investment Partnership (TTIP) these provisions were adopted as a norm. There are multiple challenges that India may face due to adoption of these provisions.

Due to lenient labour standards, IPR policy India may face market loss as these provisions may act as a new type of non-tariff barriers imposed by countries for trade. ~~But~~ At the same time these provisions will force India to make its IPR regime stricter, as well as improve labour standards which will increase the cost of production and thus Indian products may

Remarks

no longer remain competitive. Also there are apprehensions that these regime may adversely affect India's generic drug industry.

Bring more points possible impacts on India's

explain with more relevant points.

Thus it can be said that there are possible negative fallouts of these provisions on India but India should resist to adopt any such change.

Refer hints.

Remarks

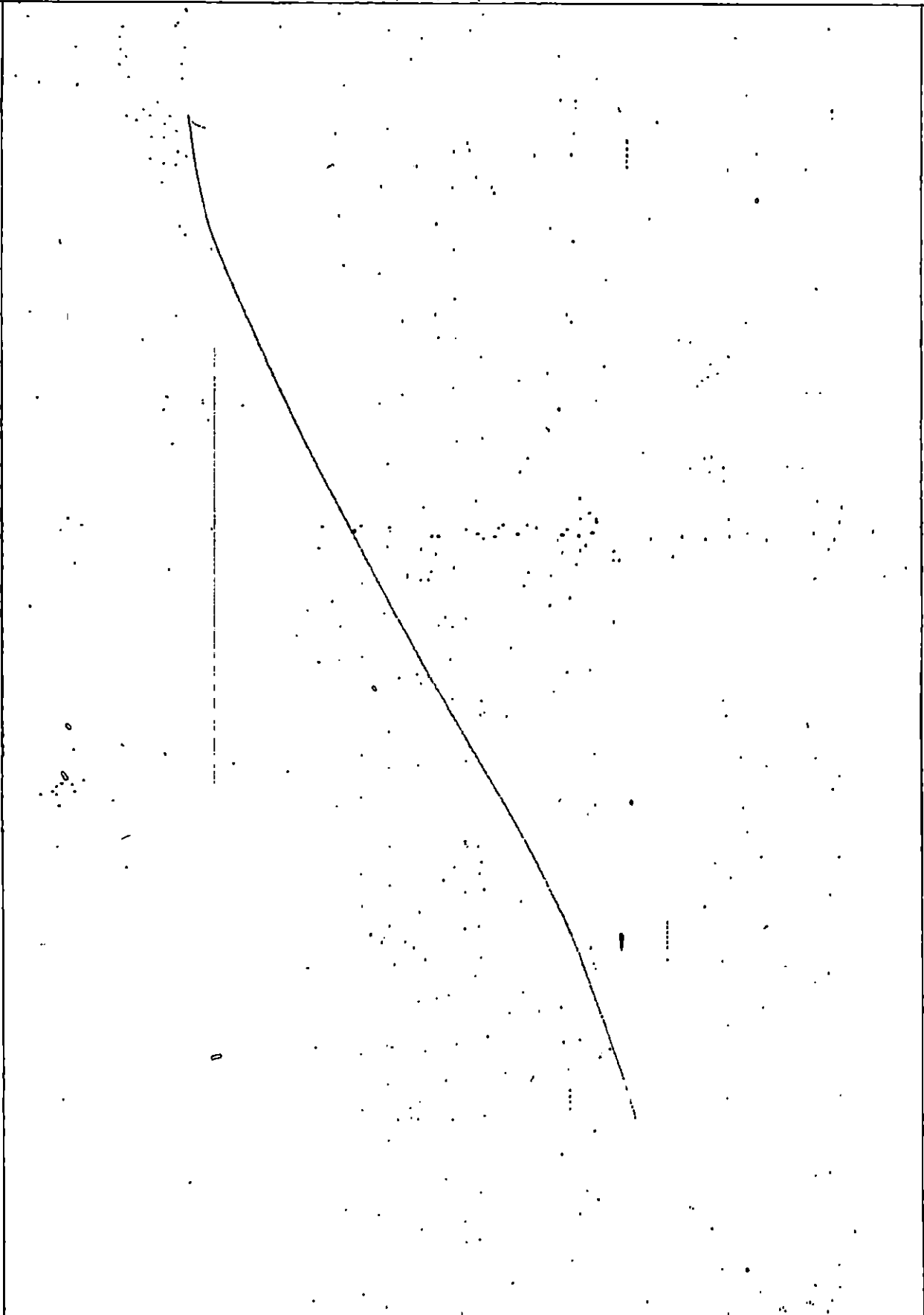
Q18. The success or failure of green economy paradigm will depend on green governance. Elaborate. (12.5 Marks)

The term green economy stands for an economy which uses more green resources (like renewable resources) for its growth.

The success or failure of green economy paradigm certainly depends upon green governance in the country. Government will have to certainly promote green behaviour among masses. Also it will have to try to use more renewable resources like solar energy, wind energy etc.

Being the complete dimensions.

Remarks



Remarks

Q19. The achievement of parity between the cost of producing solar power and thermal power will unleash a new revolution that would be akin to the invention of steam or diesel engine and electricity supply. Critically analyze. (12.5 Marks)

Remarks

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Remarks

Q20. Environmental governance introduced by international bodies aims at improving the quality of human living within the carrying capacity of supporting ecosystems. Elaborate with respect to role played by UN in sustainable development. (12.5 Marks)

Remarks

Remarks