GS SCORE

GS MAINS TEST SERIES 2015

TEST - 06

79

SCIENCE & TECHNOLOGY AND ENVIRONMENT

Time Allowed: 3 hr. *Max. Marks: 250*

Q.	Marks
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Instructions to Candidate

- There are 20 questions.
- All questions are compulsory
- The number of marks carried by a question/part 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 in the space provided.

Any page or portion of the page left blank in the Question-cum-Answer Booklet must be clearly struck off.

Name Ashwini Pandey

Roll No. GSMT - 15396

Mobile No.

Date 11-12-15

Signature

vigilator Signature

vigilator Signature

Remarks

Roll No._____

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Q1. Nano-Technology is an "enabling technology" which influences a wide range of products and processes with far-reaching-implications for development. Discuss the applications of nano-technology in water purification and food processing sector and how can it contribute for societal development? (12.5 Marks)

Nano Technology deals with particles of nana (10^{-9} m) dimensions and has wide ranging applications viz. drug delivery, electronics, communication, water purification, industrial manufacturing etc. It has helped in solving various problems faced by humanity in cost effective way.

elaborate on use of membranes, catalysts, adsorbents

Application in Water Purification

Nano-filters help in water purification in cost-effective & environment friendly way. e.g. carbon nanotubes are being used to filter water and remove pollutant as well as E-coli.

Similarly Nano-filters can be designed to remove specific pollutant too based on requirement.

Application in Food Processing

- have helped in purification, filtering e.g. beverages, drinks
- Improving durability & shelf life of products
- various industrial processes involved in

elaborate on aspects like encapsulation & coating of layers

food processing like cooling, mixing, heating, fermentation can be made more effective by using nano-technology.

Societal Development

(1) Water is basic requirement, rising scarcity of water especially in developing world ⇒ Nano-technology can help in ensuring pure, safe, disease free water is available

(2) Food processing. ⇒ help in increasing availability, accessibility, longer shelf life, safe food

(3) Nano-fertilizers

(4) Nano-medicines.

(5) Nano-sensors etc.

These development can help in development of society by providing solution to water, food, energy, disease etc problems. There are several drawbacks viz. nano-pollution, nano particles affecting environment processes etc which need to be checked to utilise nano-tech for the betterment of humanity.

Q2. Recovery of radioactive wastes in Delhi's biggest scrap market, and the subsequent death and illnesses of the workers has raised serious concerns regarding the safe disposal of radioactive waste in India. Discuss the regulatory structure for dealing with waste in India and lacunas in it. (12.5 Marks)

Radio-active wastes have disasterous impact on health & environment. They pose long term impact, it is difficult to clean etc. Radio active waste has been increasing due to increased usage in energy production, health services, research in academic institutions.

Recent case in Delhi, brings out the urgent requirement to properly dispose of radio-active waste else it will pose danger on public health.

Regulatory structure in India dealing with radio-active waste is weak. Various agencies involved in nuclear waste are Atomic energy Regulatory Board (AERB) & NPCIL. AERB deals with disposing of nuclear waste & has formed guidelines & preventive actions need to be

taken. However it has various lacunes like :

(1) Lacks proper monitoring mechanism ⇒ various medical hospitals have nuclear material for radiological purpose ⇒ these are not properly monitored before disposal. Similarly Academic & Research institutes don't follow proper disposal regulation.

(2) No Accounting ⇒ Need is to properly account for all nuclear material

(3) Lacks clarity in Regulation

(4) Lacks expertise, capability in terms of manpower etc to properly inspect various facilities

Q3. The idea of empowering citizen and economic development just by increasing internet penetration through digital India programme is a misnomer. Discuss. (12.5 Marks)

(12.5)

In modern era, Information & Technology are powerful tools for empowering people. Digital India programme envisages to increase internet penetration which will :

(1) Help in increasing literacy.

(2) Access to information regarding government schemes which people in interior & rural area can utilise

(3) Linking rural economy to world economy ⇒ better economic development

(4) Help in dessimination of Technology viz. Technology in Agricultural practices will help in increasing productivity.

(5) Access to banking, insurance etc ensuring social security.

(6) Promote innovation & tapping potential present in rural areas.

(7) Aware & informed citizenty which will help developes themself

Thus empowerment of people will happen & they can better utilise their resources potential to achieve economic development However

various enablement needs to be done :

(1) Increasing literacy especially digital literacy
(2) Reliable digital infrastructure, 24x7 availability
(3) Removing linguistic barriers
(4) Power situation, availability
(5) Ensuring available information is easy to comprehend & understandable
(6) Preventing various cyber-crimes & protecting citizens

Road blocks

In addition to this their should be emphasis on :

(1) Health facilities, Education
(2) Infrastructure → Road, Rail connectivity
(3) Skill development → (Skill India)
(4) Economic / livelihood opportunities (MGNREGA, Make In India) etc.

Thus, Digital India with its emphasis on internet penetration can help in empowering citizens but that citizens needs to be educated, healthy, skilled to optimally utilise internet for economic development. Thus Digital India is a supplementing role along with Skill India, Health, Education, Make In India

Q4. To approve developmental projects in protected areas, monitoring and evaluation, strengthening of infrastructure, addressing man-animal conflict and raising awareness is required. None of these are possible only through meetings in Delhi, but require local action on the ground. Critically analyse with respect to the functioning of National Board for Wildlife. (12.5 Marks)

(4)

National Board of Wildlife is a apex institution for wildlife protection & management in India. It helps in implementation of Wildlife protection Act, 1972.

However wildlife protection is a multi-dimensional complex process which needs to be embedded in the local resources, local conditions & must utilise local peoples participation. Then only it will be able to become successful.

Examples

(1) Gir lion in Gujrat: Pro-active participation of Maldhara community led to increase in lion population

(2) Bishnoi Community in Rajasthan helps in protection of Black bucks Sambhar etc with the help of

authorities.

(3) In Kanha National Park also local community has been helpful

(4) On the other hand it is also important to take problems of local people into account e.g. local community not happy with increase of tiger population in Sundarban.

In this regard National Board for wildlife has mixed record. It needs to involve resource, forest department at district level along with the local community to ensure comprehensive sustainable development of wildlife.

Q5. Radio frequency spectrum is a limited natural resource, it should be used judiciously and for common good rather than for private gains. Discuss the above statement with respect to the issue of Net Neutrality.
(12.5 Marks)

Natural resources like minerals, forest, spectrum etc are limited in nature & they must be utilised in manner to ensure common good.

Recent issue of Net-Neutrality has brought this debate. Net-Neutrality refers to use, design, functioning of network in such a fashion that it remains neutral with respect to technology, kind of information etc. That is to ensure equality on net.

If the principles of Net-Neutrality are not adhered to it will cause monopoly of & financial benefit to some players. At the same time user will have access to limited option, thus curbing his/her freedom too.

Example: Recently Airtel planned to provide such services to its user. If its allowed then .....

(1) Only service provider on "Airtel Zero" platform will provide service & will capture market
(2) Users will not be able to use service of other service provider

Thus "spectrum", a natural resource that too limited will be used for monopolistic commercial intention of few corporate entity & will also curb rights & freedom of citizens.

Thus, Net-neutrality needs to be ensured so that spectrum is utilised for betterment of all.

Doctrine of cavolity?
of Net Neutrality -
economics of Net Neutrality -

refer book

Q6. For ensuring transparency in the clearance of land for development projects, government has started online submission of application for Environment and Forest Clearances. Discuss the lacunas of this process and steps needed for strengthening forest clearance projects. (12.5 Marks)

(4.5)

With increasing problems of climate change, fast depleting natural resource & ever-increasing demand of growth, it is important to ~~bank~~ balance developmental aspirations & environmental necessities.

To attract more investment and improve ease of doing business Government has started online submissions for clearance of land ~~for development~~ projects.

Benefits

(1) Improve transparency & accountability
(2) fast-tracking of process
(3) Improve Investors confidence, Curb Bureaucratic problems
(4) Ease of doing business

Lacunas

(1). Environmental needs can not be ignored in ensuring fast clearance.
(2). Proper environmental Impact assessment ~~may~~ needs to be done.
(3) It will sidetrack local people & citizens

(4) Collusion of Business & bureaucracy can lead to corruptions etc.

(8)

Steps

(1) Environmental Impact Assessment is a time taking process & it must be comprehensive, participative and must consider long term impact on environment. In race to ensure faster development, environment must not be abused.

(2) Participation of local communities

(3) Balance needs to be maintained between improving business environment & protecting environment

(4) More awareness, Education in local community

(5) Involvement of Scientific institutes Academics in evolving methodologies

(6) Survey of flora, fauna, air composition, water resource ⇒ to build a baseline of Environmental condition ⇒ often EIA don't have sufficient data to properly assess impact.

Q7. Smarter cities should be driven by goal of Self-sufficiency rather being hub of smarter technologies only. Discuss. —(12.5-Marks)

(5)

Urbanisation has been increasing in India (31% now) and Urban centre play a important role in Economy (60% of GDP). With rising pressure on urban centre need is to develope "Smart City"

However Smart City is not a well defined idea & its definition varies with person. However Smart City based on present & future requirements needs to be self sufficient- i.e.

(1) Self-Sufficient & Sustainable in terms of energy requirement. It needs to develop renewable sources like Solar, waste to energy etc.

(2) Self sufficient in terms of water needs i.e. it needs to utilise water harvesting, water recycle, reuse, so as to sustainably use water & not create negative pressure on its environment.

(3). It needs to develop healthy, environment friendly urban environment e.g. Parks, green belt, walking area, etc so as to have absorptive capacity

(4) Sustainable transport network e.g. BRTS, Metro, Mono-rail etc with integrated network

(5) Sustainable waste management system with proper seggregation, recycling section, disposal in environment friendly manner.

Thus Smart City is not a hub of smart technologies only but it will Utilise smart technologies e.g.

(1) Online Services for Citizen Services. e-payment of bills, e-complaint

(2) Use of Technology to curb wastage e.g. auto ON-OFF of public lights,

(3) better design of infrastructure → energy saving buildings

etc

Thus Self-sufficiency & sustainability is the end of smart cities & use of smart technology is means to achieve that end.

Good

Q8. What do you understand by Environmental Justice? Discuss the role played by National Green Tribunal in achieving the Environmental Justice in India. Also elaborate the major hurdles faced by NGT.
(12.5 Marks)

Environmental Justice refers to fairness in utilising environmental services. It is important in ensuring better, healthy existence of individual. It is provided for under Right to life. elaborate on its concept of environmental justice.

National Green Tribunal was established under NGT Act in 2010 to exclusively deal with various environment related laws & provide speedy Justice. NGT has emerged as an effective forum to provide Environmental Justice e.g.

(1) Recent Judgement on stopping more than 10 year old diesel vehicle in delhi to curb ever-increasing pollution in Delhi ⇒ PM 2.5 of 153 mg/L as compared to WHO limit of 10 mg/L ⇒ as harmful to children, elderly ⇒ Environmental Justice.

(2) Flood construction companies working in Bangalore impacting wetlands. Wetlands provide many environmental services.

(3) Judgement to revive Yamuna by preventing pollution & taking steps to revive.

(4) Judgement to curb illegal sand mining from rivers

Thus NGT has gone into various cases & dimensions to protect environment & citizens.

Hurdles

(1) No Suo-moto power

(2) Often State, Central government do not support in implementing its orders.

(3) Many times its Judgements are idealistic in nature neglecting the practical realities of Administrative Capabilities.

(4) Increasing number of cases & pendency

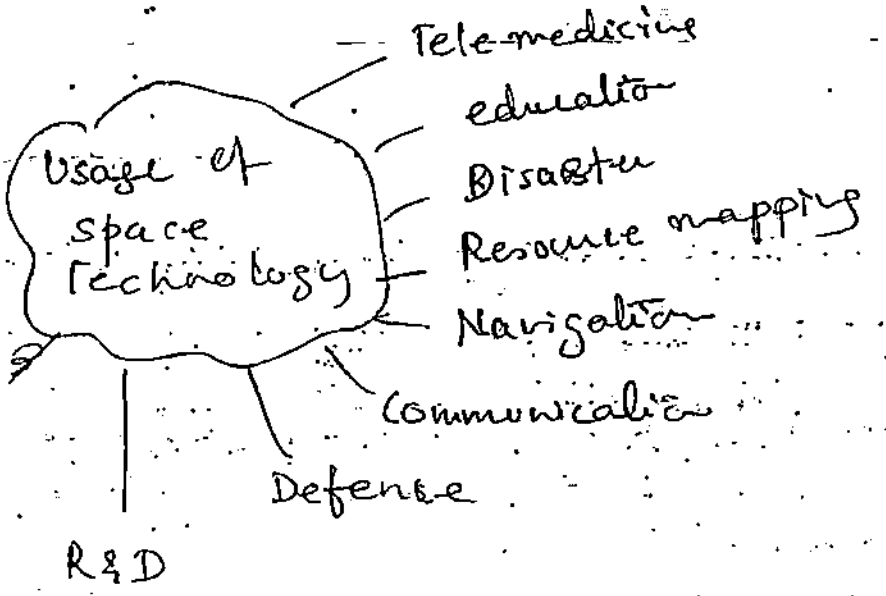
(5) Dependence of MoEF & CC for finances

(6) Debate on its power to go into substantial matter of law

Q9. With the increment in the space initiatives in India formulation of National Space Act for regulating space activities in India is must. Illustrate the contemporary issues for handling of which Space Act is needed. (12.5 Marks)

Space is an important resource to help in development. Recently there has been tremendous increase in space activities like:

(1) Satellites
(2) Missile testing
(3) Missions for other planetary bodies like Chandrayan, MoM
(4) Space telescope (Astrosat)



Contemporary Issues

(1) Increasing space pollution → due to rising number of missions

many old satellite, debris carry space pollution ⇒ Need proper handling & management to prevent future accidents

(2) Privacy issue, snooping

(3) Mapping of India's resource defence establishment ⇒ security issues ⇒ Google map shows where Indian military base is etc.

These issues needs to be addressed through a Space Act

Q10: Clean Ganga Mission is old wine in a new bottle with the same focus on sewerage treatment plants. Elaborate. Discuss the major roadblocks in achieving the objectives of the project. (12.5 Marks)

(12.5)

Clean Ganga Mission aims to have Aviral (continuous) & Nirmal (Pure) stream in Ganga. It emphasises on building capacity along the ~~the~~ Ganga river for sewage treatment, preventing pollution ~~in Ganga~~ etc.

Earlier programmes like Ganga Action plan which started in 1985 also aimed at building sewage treatment plants in urban centres along ganga. However it ~~failed to~~ build its capacity commensurate with the requirement.

(Compare its objectives with Ganga Action Plan)

Roadblocks in achieving Objectives

(1) Building capacity : Population in ganga plain ∞ keeps rising, more & more number of urban centres are emerging ⇒ Need to ~~too~~ ~~do~~ build capacity keeping future requirement in mind.

(2) Financial requirement for ~~this~~ such much capacity will be huge

(3) Optimal functioning : Often sewage is bypassed treatment plant & dumped directly into rivers.

(4) Power Situation : STP need continuous power ⇒ U.P., Bihar have power shortage.

(5) No network of sewage in Cities & Sewage flows into rivers through streams (difficult to divert all that to STP)

(6) Local bodies are institutionally, financially weak ⇒ lack skilled, expert manpower, lack financial resource.

Refer hints

(7) People are indifferent, unaware, apathetic.

(8) Other aspects also need to be integrated along with sewage treatment.

If various problems can be curbed, Ganga can be cleaned providing likelihood to lakhs along Northern plains of India.

Q11. What is Digital Locker? Highlights the major benefits of Digital Locker system. How does Digital Locker differ from other such systems?
(12.5 Marks)

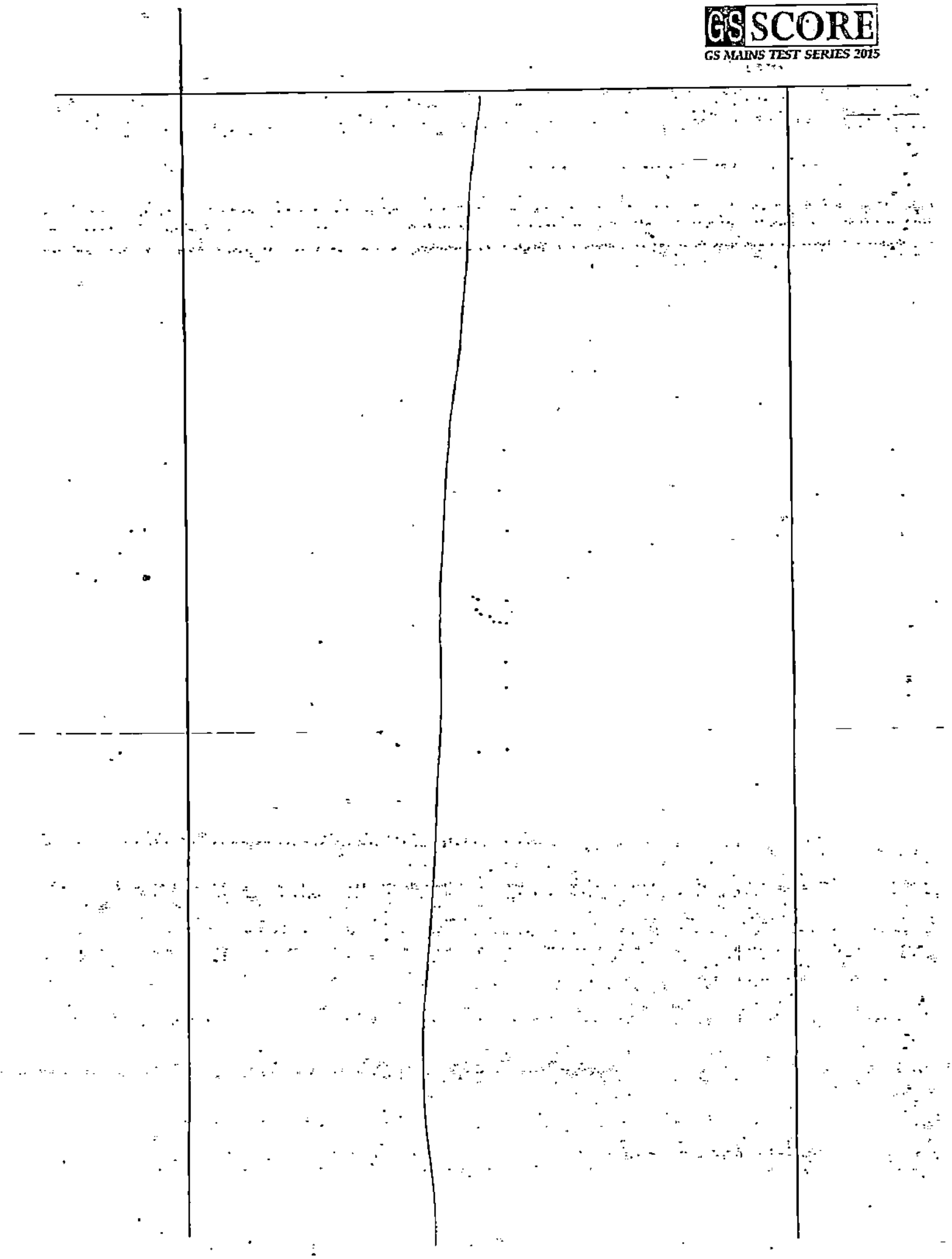
2

Digital Locker : refers to protected space being provided by government to store some digital files e.g. certificates etc so that it can be accessed from anywhere, anytime.

Benefits

(1) No need to carry certificates everywhere
(2) Easy to access, easy to use
(3) Will curb fraudulent practices
(4) More reliable, easy for companies
(5) Aadhaar linked

Incomplete
refer link



Q12. Discuss the major factors responsible for increasing Urban Air Pollution in developing countries like India. Also suggest some concrete measures to overcome this problem. (12.5 Marks)

(4.5)

Major Factors

(1) Increasing Vehicular traffic : pollution : e.g. in Delhi number of vehicles has increased tremendously leading to increase in pollutant level. Moreover engine efficiency, type of traffic flow etc increases pollution

Uncontrolled growth of Urban population ; increased per capita carbon foot-print

(2) Industrialisation, Power Plants : Increasing number of industries and coal based power plant increases Urban air pollution. Many power plants exist near urban centres e.g. NTPC plant in Padri ⇒ air pollution in Delhi

(3) Biomass burning : For cooking purpose ; solid waste burning ; incineration of waste ⇒ increase pollution in urban area

(4) Construction Activities : also increases dust, particulate matter in urban air

Steps to Curb

(1) Public Curbing Vehicular Pollution:

(a) Public transport System eg. Metro, BRTS

(b) Better quality fuel BSV, BSVI etc. available

(c) Curbing older vehicles: NGT order recently

(d) Strict Rules & their implementation

(2) Strict implementation laws of industrial pollution; Electrostatic Separator on effluent; filters etc to curb pollutants

(3) Not burning solid waste eg: Recent NGT order to stop burning of solid waste by MCD

(4) A Ring road, bypass of Truck Traffic

(5) Green belts; Parks development

(6) Awareness & Participation of people

Q13. Discuss the major physical and economic effects of climate change on water resources across the globe. (12.5 Marks)

(4)

(1) Climate change leading to increasing temperature has impacted the water cycle & changed the pattern & intensity of rainfall in various regions

(2) Increase in temperature of water has impacted aquatic biosystems ⇒ migration of fishes towards poles ⇒ affecting economic life of local fishing community

increased evaporation

(3) Climate change has increased rate of glacier & snow melting ⇒ Increased flow in rivers ⇒ Impacting long term sustainability

increased vagaries of drought & flood

(4) Climate change ⇒ Increase in global sea level ⇒ inundation of coastal regions ⇒ impacting huge population living along coasts.

(5) It has led to increased melting of Arctic & it has been ~~pre~~assessed that Arctic will disappear by 2050 ⇒ It will further increase climate change due to decreased albedo of earth.

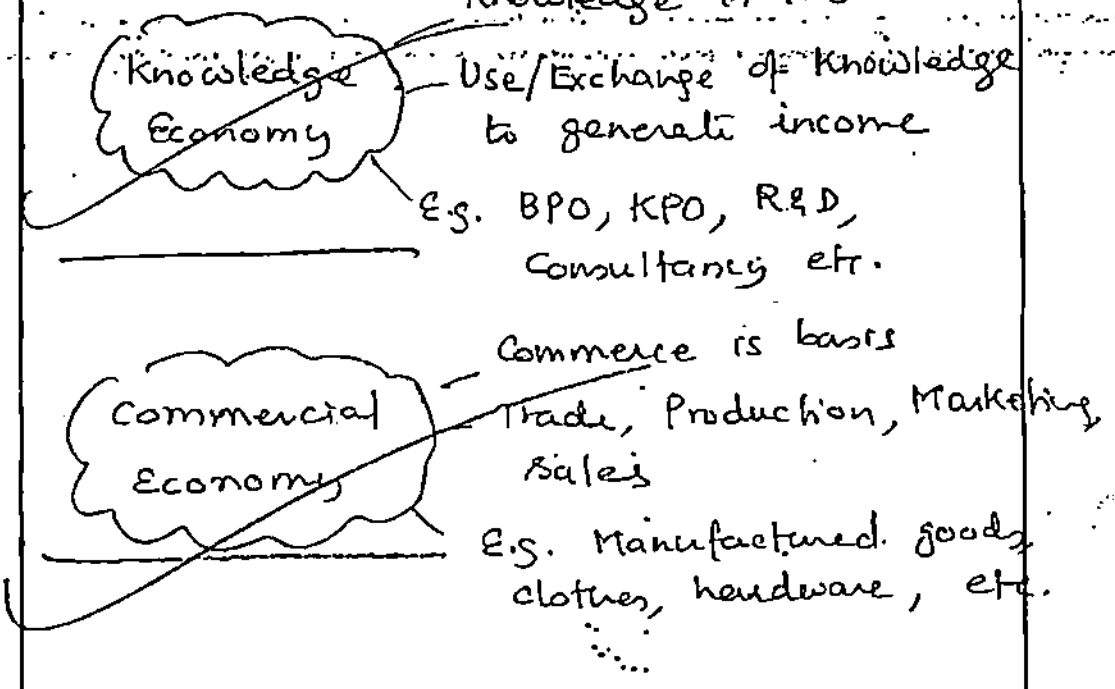
~~(6) water resources~~ →

(6) Impacts Agriculture, fisheries, other activities due to dwindling availability of water

(7) water resource provide various economic activities → change in their pattern will have long term impact on survival of human beings. refer hints.

Q14. An innovation ecosystem is a combination of two distinct economies, knowledge economy and the commercial economy. In this context illustrate the major challenges faced by India's innovation ecosystem and entrepreneurship. (12.5 Marks)

12.5



Innovation ecosystem needs to combine both where especialised knowledge can be utilised to improve production methods, techniques, marketing strategies etc. to improve commercial gains.

Major Challenges

(1) Unclear, confusing, slow, cumbersome Regulatory processes to setup an enterprise

(2) Corruption in Administration, lack of accountability, transparency, leading

to harrassment. e.g. 54% of startup companies in 2009-11 shifted from India to Singapore, USA etc

(3) Merger & Acquisition, Exit mechanism are also not streamlined.

(4) The ecosystem, support system does not help Innovation & entrepreneurship e.g. family atmosphere in middle & lower class focuses on employment

(5) Academic institutions do not provide required emphasis on Innovation rather they focus & reward Rote learning.

Yours work

Q15. India has recently committed to expand the share of non-fossil fuel energy to 40% by 2030. Discuss the implications of it for the economic and sustainable growth of India. (12.5 Marks)

(4)

In recently announced INDC Taiget to UNFCCC prior to cop-21 of Paris Goverinment of India announced to expand share of non-fossil fuel energy to 40% by 2030.

focus on targeted growth of solar, wind energy generation

Implications

(1) Economic Growth

(a) It will put financial burden on government

(b) Fossil fuel based technologies are well established while non-fossil fuel energy still needs to be developed ⇒ Huge cost on R&D, Technology development

(c) Energy is very crucial in todays economy ⇒ Most industrial processes are energy intensive ⇒ If high cost renewable energy is used ⇒ will impact economic growth.

(d) Increase cost of consumer goods, Increase in Inflation ⇒ More burden on poor people.

(2) Sustainable Growth:

(a) Less environmental Pollution.

(b) Better health of populace

(c) Sustainable energy ecosystem deriving from various sources viz coal, nuclear, hydro, solar, wind, geothermal etc.

(d) Big Hydro- generation power plant can have adverse impact on environment ⇒ deforestation, submergence, Reservoir induced earthquakes etc

(e) Huge cost on development on renewable & non-fossil based sources may not be socially sustainable.

In long term it is need of the hour to increase dependence on Renewable sources so as to fight Climate change & achieve sustainable development.

Q16. Define the "Polluters Pay Principle". Discuss the major difficulties in implementing Polluter Pays Principle in developing countries like India. (12.5 Marks)

(45)

"Polluters Pay Principle" is a principle where the person/group/corporate who has caused the pollution needs to pay for its clean-up

- It acts as a deterrent against pollution
- Additionally people are entitled for clean environment & if they have not polluted they should not been the harmful effects
- Thus it is economic recovery of pollutions being created.

Difficulties in Implementation

(1) No clear cut policy; e.g. ambiguity about identify of culprits In Bhopal gas still clean-up is not being done by culprits

(2) Scientific assessment is needed how much needs to be payed, how much clean up to be done. e.g. Unilver in TN mercury pollution case saying it will clean upto

large number of poor households

limit of 20 mg/kg while that is also outside permissible limit

(3) Lack of Regulatory mechanism, lackadaisal implementation ⇒ polluters go scot free. e.g. in Bhopal gas case.

(4) lack of Scientific capability to have objective guidelines & assessment.

Thus need is to have

(1) Clear cut Policy esp on Environmental Remediation

(2) Building Administrative Capability e.g. Involving Academic, Scientific, Research institutes

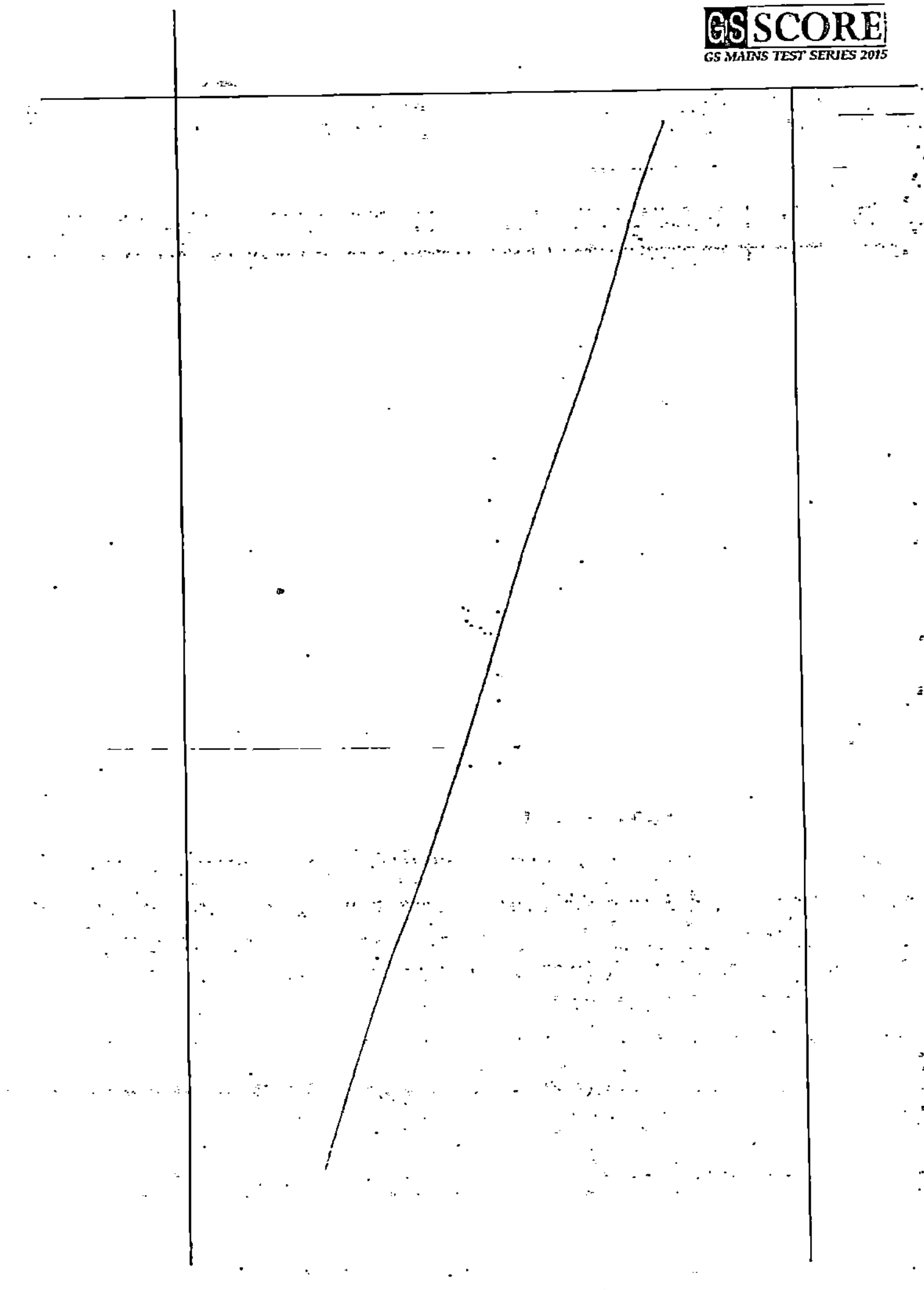
(3) Strict implementation of Law

(4) Peoples participation in such cases esp local community

(5) Accountability, Transparency

(6) Fast, speedy Judicial process prosecuting polluters.

Q17. Environmental sanitation is a major public health issue in India. Do you agree? Discuss various intervention strategies related to environmental sanitation in India and also highlight major challenges faced in achieving the desired outcomes. (12.5 Marks)



Q18. Define the term 'Biosimilars'. How do biosimilars differ from the original innovator medicines? What role biosimilars can play in the near future? (12.5 Marks)

(2)

Biosimilars : refers to compounds with similar structure, constituents & exhibiting similar properties & characteristics. Thus in effect they work in the same fashion as the original medicines.

Original innovator medicines have been developed over long period of time involving numerous experiments, research, cost. While bio-similars utilise techniques like reverse engineering to develop similar characteristics.

Incomplete

Q19. The conventional 'Gun and Guard' method of conservation is no more effective in dealing with the socio-ecological complexity and political dimensions of biodiversity conservation. Comment. (12.5 Marks)

4

Biodiversity conservation is protecting, conserving biological, ecological resources for current & future need & to maintain balance in ecology.

However in modern times it has become multi-dimensional & complex process :

(1) It has social dimension : local people & their biological resource & knowledge need to be conserved & benefits arising should be shared with them for their development

(2) Ecological dimension : Biodiversity & ecology are complex and have various inter-linkages. Importance of any species in its environment needs to be studies properly for a long time to ensure conservation of bio diversity

(3) Political dimension: Recent cases of patent conflicts on biological sources like Neem, Turmeric etc depicts the political dimension & need of global mechanism to solve these conflicts.

In such a scenario of ever increasing complexity in the field of biological diversity conservation single dimensional "Gun & Guard" i.e. Top-down strict implementation technique will not work. Rather it requires:

(1) Participative ⇒ Global, countries, local community, scientific community etc

(2) Bottom-Up ⇒ capitalising local Knowledge & blending it with scientific knowledge

(3) Benefit sharing with all stakeholders

(4) Evolving methods, processes for long term sustainability

Q20. E-waste export to the developing countries is governed by brute global economics in which market forces, if left unregulated, dictates that the toxic waste will always run "downhill" on an economic path of least resistance. Elaborate. (12.5 Marks)

(4.8)

E-waste is emerging as a major problem due to rising usage of electronic equipments.

E-waste has various heavy & rare metals which can have impact on health of the community. In todays Globalised world, Developed countries have been exporting e-waste to developing & less developed countries for disposal of ewaste. It has following angles:

(1) Developed world are following the principle of NIMBY (Not in my back yard) i.e. they do not want pollutions in their vicinity

(2) Leads to cost-effective, cheap disposal in developing countries
⇒ due to lack of strict & effective regulatory environment

(3) Causes health, environment impact on developing countries

Global economics of e-waste export by developed countries ??

This because of harmful effect & cheap process ⇒ developed countries want to export all their e-waste to developing countries. And this process is strictly driven by economic benefit causing huge social, health, environmental loss to developing countries.

Therefore it must be regulated in terms of

(1) Amount
(2) Quality of e-waste
(3) Cost
(4) Ensuring strict regulation in developing countries.

Thus developing countries need to protect themselves & their people.

refer hints