

SCIENCE & TECHNOLOGY – UPSC MAINS PYQS (BRAINSTORMING SHEETS - 40 YEARS PYQS COVERED)

MACRO TOPIC - RURAL DEVELOPMENT AND AGRICULTURE

#	Micro Topic	Year	Marks	Question
1.	Technology in Agriculture	2020	10	How is science interwoven deeply with our lives? What are the striking changes in agriculture triggered off by the science-based technologies?
2.	Diseases	1997	10	What is Madcow disease?
3.	Fertilizers	1992	10	Briefly explain the use of various chemical fertilizers in Indian agriculture.
4.	Biogas Trchnology	1982	15	What is biogas technology? What benefits are envisaged from its use? Describe the steps government of India is taking for its development discussing the salient features of the programme.
5.	S&T in Rural Development	1979	15	Comment critically on the impact that modern Science and Technology have made on the attitudes, life styles, social structures and economic wellbeing of the people in the rural areas in India.

MACRO TOPIC - ACHIEVEMENTS IN INDIA SCIENCE

#	Micro Topic	Year	Marks	Question
6	Vaccine	2022	15	What is the basic principle behind vaccine development? How do vaccines work? What approaches were adopted by the Indian vaccine manufacturers to produce COVID-19 vaccines?
7	Nobel Prize	2021	15	The Nobel Prize in Physics of 2014 was jointly awarded to Akasaki, Amano and Nakamura for the invention of Blue LEDs in the 1990s. How has this invention impacted the everyday life of human beings?
8	Bose - Einstein Statistics	2018	10	Discuss the work of 'Bose-Einstein Statistics' done by Prof. SatyendraNath Bose and show how it revolutionized the field of Physics.
9	Traditional Knowledge	2015	12.5	India's Traditional Knowledge Digital Library (TKDL) which has a database containing formatted information on more than 2 million medicinal formulations is proving a powerful weapon in the country's fight against erroneous patents. Discuss the pros and cons making this database publicly available under open-source licensing.
10	R&D in Universities	2014	12.5	"Scientific research in Indian universities is declining, because a career in science is not as attractive as are business professions, engineering or administration, and the universities are becoming consumer-oriented. Critically comment."
11	Hydroelectricity Project	2013	10	In the context of the challenges to be faced in the 21st century, it is generally felt that there is an urgent need to re orient science education and scientific research in the country. Identify the important areas that need reorientation and suggest steps you consider necessary for the purpose.
12	Hydroelectric Project	1991	10	The National Hydroelectric Power Corporation (NHPC) is expected to set up a number of hydroelectric projects in the Eighth plan. Summarise the salient features of the proposal.
13	R&D in IT and Health	2012	15	Discuss the globalization of R&D and its impact on India's development. Provide an illustration from at least one sector such as Information Technology or Health.
14	Scientific Research in Education	1985	10	In the context of the challenges to be faced in the 21st century, it is generally felt that there is an urgent need to re orient science education and scientific research in the country. Identify the important areas that need reorientation and suggest steps you consider necessary for the purpose.

MACRO TOPIC - SPACE AND MISSILE TECHNOLOGIES

#	Micro Topic	Year	Marks	Question
15	Space and Universe	2024	15	What are asteroids? How real is the threat of them causing the extinction of life? What strategies have been developed to prevent such a catastrophe?
16	Moon Missions	2023	15	What is the main task of India's third moon mission which could not be achieved in its earlier mission? List the countries that have achieved this task. Introduce the subsystems in the spacecraft launched and explain the role of the Virtual Launch Control Centre' at the Vikram Sarabhai Space Centre which contributed to the successful launch from Sriharikota.
17	Telescope	2022	15	"Launched on 25th December, 2021, James Webb Space Telescope has been much news since then. What are its unique features which make it superior to its predecessor Space Telescopes? What are the key goals of this mission? What potential benefits does it hold for the human race?"
18	Air Defence Technology	2021	10	How is the S-400 air defence system technically superior to any other system presently available in the world?
19	Space Station	2019	10	What is India's plan to have its own space station and how will it benefit our space programme?
20	Satellite	2018	10	Why is Indian Regional Navigational Satellite System (IRNSS) needed? How does it help in navigation?
21	Space Missions	2016	12.5	"India has achieved remarkable successes in unmanned space missions including the Chandrayaan and Mars Orbiter Mission, but has not ventured into manned space mission, both in terms of technology and logistics? Explain critically."
22	Satellite and GPS	2015	12.5	"What do you understand by 'Standard Positioning Systems' and 'Protection Positioning Systems' in the GPS era? Discuss the advantages India perceives from its ambitious IRNSS programme employing just seven satellites."
23	Space Missions	2012	15	"The safe landing of the "Curiosity" Rover under NASA's space programme has sparked many possibilities. What are those and how could humankind benefit from them?"
24	Satellite	2008	10	What do you know about Indian Regional National Satellite Systems? Describe its important features.
25	Missile Technology	2007	10	Discuss the missile technology initiatives undertaken by India.
26	Geostationary Orbit	2000	15	What is the significance of the geostationary orbit? What would happen if it becomes too crowded?
27	Remote Sensing	1998	15	What is remote sensing? What are its uses especially in the Indian context?
28	Missile Technology	1997	10	Why is Agni Project important for India?
29	Space Missions	1996	15	Describe how India's space programme has helped in its socio-economic development.
30	Satellite Launch Vehicle	1995	10	What is PSLV? Describe its significance for India's space programme.
31	Remote Sensing	1993	10	What is remote sensing? Describe the status of remote sensing in India.
32	Indian defence scientists	1993	10	Give an account of the achievements of Indian defence scientists in technology development.
33	Cryogenic Engines	1992	10	Discuss briefly the importance of the cryogenic engine for India's space programme.
34	Missile Technology	1992	10	What are the salient features of India's missile development programme?
35	ISRO	1991	10	Trace the progress of India's Space Research Programmes? What are its significant achievements?

36	Air Defence Technology	1989	10	What is meant by a stealth aircraft? Mention two stealth technological techniques used in such an aircraft.
37	Remote Sensing	1986	10	"What is remote sensing technique? Name the various regional remote sensing centers in India. What specific purposes are served by remote sensing operations?"
38	Space Missions	1983	10	"What are the advantages to the nation in sending man into space? It is sometimes argued that the problem of tackling poverty will get side-lined if we indulge in such luxurious experiments. What are your views in this regard?"
39	Space Research	1981	15	"What are the significant achievements of Indian scientists in the context of Space Research? How will space technology be useful for weather prediction, telecommunications and identification of natural resources?"
40	Air Defence Technology	1980	10	Name the main combat aircraft which are in active service in Indian Air Force. Which of them is obsolete or obsolescent? What have been the recent acquisitions of combat aircraft for use in our Air Force? What options are open to Indian Air Force to match the F – 16 Aircraft, which is being acquired by?

MACRO TOPIC - IT & COMPUTERS

#	Micro Topic	Year	Marks	Question
41	Semiconductor	2025	15	India aims to become a semiconductor manufacturing hub. What are the challenges faced by the semiconductor industry in India? Mention the salient features of the India Semiconductor Mission
42	IT in Toll Collection	2024	10	What is the technology being employed for electronic toll collection on highways? What are its advantages and limitations? What are the proposed changes that will make this process seamless? Would this transition carry any potential hazards?
43	Artificial Intelligence	2023	10	Introduce the concept of Artificial Intelligence (AI). How does AI help clinical diagnosis? Do you perceive any threat to privacy of the individual in the use of AI in healthcare?
44	Digital India	2015	13	"How can the 'Digital India' programme help farmers to improve farm productivity and income? What steps has the Government taken in this regards?"
45	Cloud Hosting	2015	12.5	Discuss the advantage and security implications of cloud hosting of servers vis-a-vis in-house machine-based hosting for government businesses.
46	Digital Signature	2013	10	What is a digital signature? What does its authentication mean? Give various salient built-in features of a digital signature.
47	3D Printing	2013	10	How does the 3D printing technology work? List out the advantages and disadvantages of the technology.
48	Information Technology and Health	2005	10	Use of Information technology in health management in India.
49	Digital Convergence	2005	10	What is digital convergence? Examine its implications for modern society.
50	Information Technology	2000	15	"India is rapidly emerging as an Information Technology (IT) Superpower. Discuss some aspects of the growth of this Sector in the Indian economy. What role can public policy play in further enhancing growth prospects in this Sector?"
51	Super Computers	1998	10	Describe the development of Super-computers in India.
52	Optical Fibres	1998	10	What are optical fibres? What are their advantages?
53.	Super Computers	1993	15	What is a supercomputer? Give an account of super-computer development in India.

54	Information Technology	1993	10	What is a CD-ROM? Describe its main advantages as a vehicle for information dissemination.
55	Artificial Intelligence	1991	15	What is artificial intelligence? What is its current scenario and what are its prospects?
56	Super Conductors	1990	10	What is the application of superconductors in computers?
57	Fiber Optics	1987	15	"It is believed that the use of fiber optics will revolutionize the telecommunication technology. What progress has been made in India in this field?"

MACRO TOPIC - ROBOTICS

#	Micro Topic	Year	Marks	Question
58.	Robots	2015	12.5	"What are the areas of prohibitive labour that can be sustainably managed by robots? Discuss the initiatives that can propel research in premier research institutes for substantive and gainful innovation."

MACRO TOPIC - NANO-TECHNOLOGY

#	Micro Topic	Year	Marks	Question
59	Nano Tech in Agriculture	2025	15	How does nanotechnology offer significant advancements in the field of agriculture? How can this technology help to uplift the socio-economic status of farmers?
60	Nanotech in Health	2020	10	What do you understand by nanotechnology and how is it helping in the health sector?
61	Nanotech and NanoScience	2006	15	Explain how Nanoscience and Nanotechnology have revolutionized modern technology.

MACRO TOPIC - BIO-TECHNOLOGY AND RELATED ISSUES

#	Micro Topic	Year	Marks	Question
62	Biotech and Energy Security	2025	10	How can India achieve energy independence through clean technology by 2047? How can biotechnology play a crucial role in this endeavour?
63	Micro-Organisms and Fuel	2023	10	Discuss several ways in which microorganisms can help in meeting the current fuel shortage.
64	Health Challenges	2022	10	The increase in life expectancy in the country has led to newer health challenges in the community. What are those challenges and what steps need to be taken to meet them?
65	R&D in Biotech	2021	15	"What are the research and developmental achievements in applied biotechnology? How will these achievements help to uplift the poorer sections of society?"
66	Biotech in Farmer's Welfare	2019	15	How can biotechnology help to improve the living standards of farmers?
67	Biotechn and Bio-Pharma	2018	15	Why is there so much activity in the field of biotechnology in our country? How has this activity benefitted the field of bio-pharma?
68	Stem Cells	2017	12.5	Stem cell therapy is gaining popularity in India to treat a wide variety of medical conditions including leukaemia, Thalassemia, damaged cornea and several burns. Describe briefly what stem cell therapy is and what advantages it has over other treatments?
69	AntiBiotics Resistant	2014	12.5	Can overuse and free availability of antibiotics without Doctor's prescription, be contributors to the emergence of drug-resistant diseases in India? What are the available mechanisms for monitoring and control? Critically discuss the various issues involved.

70	Fixed Drug Combinations	2013	12.5	What do you understand by Fixed Dose drug Combinations (FDCs)? Discuss their merits and demerits.
71	Drug Resistant	2012	15	"What do you understand by the term "Multi-Drug Resistant Tuberculosis" (MDR-TB)? What measures would you advocate for its containment and what are the implications of its spread in the community?"
72	Trans Fats	2012	15	"Many food items contain "trans fats". What do you understand by this term? Which Indian food items contain trans fats? What are the implications of trans fats on human health?"
73	Human Genome	2007	10	Explain the objectives and the current achievements of human genome project.
74	Biotech in Pollution treatment	2006	15	Justify with necessary logic "Biological clean-up methods can be cheaper than the conventional physical and chemical pollution treatments".
75	Biotechnology	2002	15	"Biotechnology boom may pave a golden path for India". Discuss.
76	GM Crops	2000	10	How are transgenic plants different from hybrid plants and what is their relevance in modern agriculture? Elaborate.
77	Human Genome	1999	10	What is the Human Genome Project? Discuss briefly its importance.
78	Genetic Engineering	1998	15	What is genetic engineering? Why is it getting increasingly important these days?
79	Enzymes	1998	10	What are enzymes? What is their importance?
80	Polio Diseases	1997	10	What is Polio? Name its few features and how it can be prevented.
81	Transgenic	1996	10	What are transgenic organisms? What are they used for?
82	AIDS Diseases	1995	15	What is AIDS? Describe its salient features.
83	Karnal Technology	1995	10	What do you understand by 'Karnal Technology' What is it used for?
84	Genetic Abnormalities Detection	1995	10	What is 'amniocentesis' What has made it a controversial technique?
85	Iodine Deficiency	1994	15	What are the diseases caused by Iodine Deficiency? What steps are beings taken to tackle the problem in India?
86	DNA Fingerprinting	1994	10	What is DNA fingerprinting? Which research institution in India is working in this area?
87	Genetic Conservation	1993	15	What is genetic conservation? Bring out the salient features of genetic conservation activity in India.
88	Biotechnology in Medicine	1993	10	Describe how biotechnology is finding use in medicine. Give a few current examples.
89	Bio Fertilizers	1992	10	What are bio fertilizers? What advantages do they have over chemical fertilizers?
90	Biotechnology	1991	15	Give a brief account of major achievements in the realm of biotechnology in India.
91	Leprosy Disease	1989	10	It has been estimated that there are more than four million leprosy patients in India. What steps are being taken by the Government of India for their treatment and rehabilitation?
92	Ultrasound	1989	10	What is ultrasound? State two of its uses in modern medical practice.
93	Genetic Diseases	1985	10	"What are genetic diseases give some examples? What are the prospects of treatment of patients suffering from such diseases? Can these patients be cured?"
94	Microbial Technology	1985	10	"Microorganisms have been harnessed by man for some time for the production of useful materials. Point out the important developments in this area. What is the current status microbial technology in our country?"
95	Genetic Engineering	1981	10	"What is meant by 'Genetic Engineering' What are the dangers associated with it? Do you recommend we should go ahead in developing this technology?"
96	Malaria Diseases	1980	10	Why has there been a resurgence of Malaria in India? What steps should be taken to prevent its spread and to eradicate it eventually?

MACRO TOPIC - IPR AND ITS RELATED ISSUES

#	Micro Topic	Year	Marks	Question
97	IPR	2024	10	What is the present world scenario of intellectual property rights with respect to life materials? Although, India is second in the world to file patents, still only a few have been commercialized. Explain the reasons behind this less commercialization.
98	IPR	2014	12.5	In a globalized world, Intellectual Property Rights assume significance and are a source of litigation. Broadly distinguish between the terms— Copyrights, Patents and Trade Secrets.
99	IPR	2010	10	Did the TRIPS agreement helped in resolving trade conflicts arising out of variations in different nations IPR's regimes? Also list the steps taken by India to conform to TRIPS.
100	IPR	2006	15	Explain the implications of the implementation of Intellectual Property Clauses in our patent law regime after joining the WTO.
101	IPR	1996	15	What are Intellectual Property Rights? Why are Indian scientists concerned about the new patent regimes?
102	Patent	2019	15	How is the Government of India protecting traditional knowledge of medicine from patenting by pharmaceutical companies?
103	Innovation	2012	15	What do you understand by the term "Innovation"? Discuss the need for launching a national innovation policy in India.
104	Innovation	1994	10	What is innovation? What kind of economic compulsions in a country like India, you think, could really stimulate innovations?

MACRO TOPIC - NUCLEAR TECHNOLOGIES & RELATED ISSUES

#	Micro Topic	Year	Marks	Question
105	Nuclear Energy and ITER	2025	10	The fusion energy programme in India has steadily evolved over the past few decades. Mention India's contributions to the international fusion energy project – International Thermonuclear Experimental Reactor (ITER). What will be the implications of the success of this project for the future of global energy?
106	Nuclear Energy Programme	2018	15	"With growing energy needs should India keep on expanding its nuclear energy programme? Discuss the facts and fears associated with nuclear energy."
107	Nuclear Energy Programme	1994	10	Describe briefly the different phases of India's nuclear energy programme.
108	Fast Breeder Reactor	2016	12.5	"Give an account of the growth and development of nuclear science and technology in India. What is the advantage of fast breeder reactor programme in India?"
109	Economy and Defence	1997	15	How has India's Nuclear Programme contributed to the economic and defence requirements of the country?
110	Nuclear Medicine	1996	10	What is nuclear medicine? Describe briefly its different uses.
111	Nuclear Research	1992	10	Mention some of the new programmes that have been undertaken in recent years in respect of nuclear research in India.
112	Fast Breeder Reactor	1992	10	What is a fast breeder reactor? Discuss briefly its role in India's nuclear energy programme.
113	Non Conventional Energy	1989	10	"What are the non-conventional sources of energy relevant in the Indian Context? Comment on the status of the technologies available for their utilization."

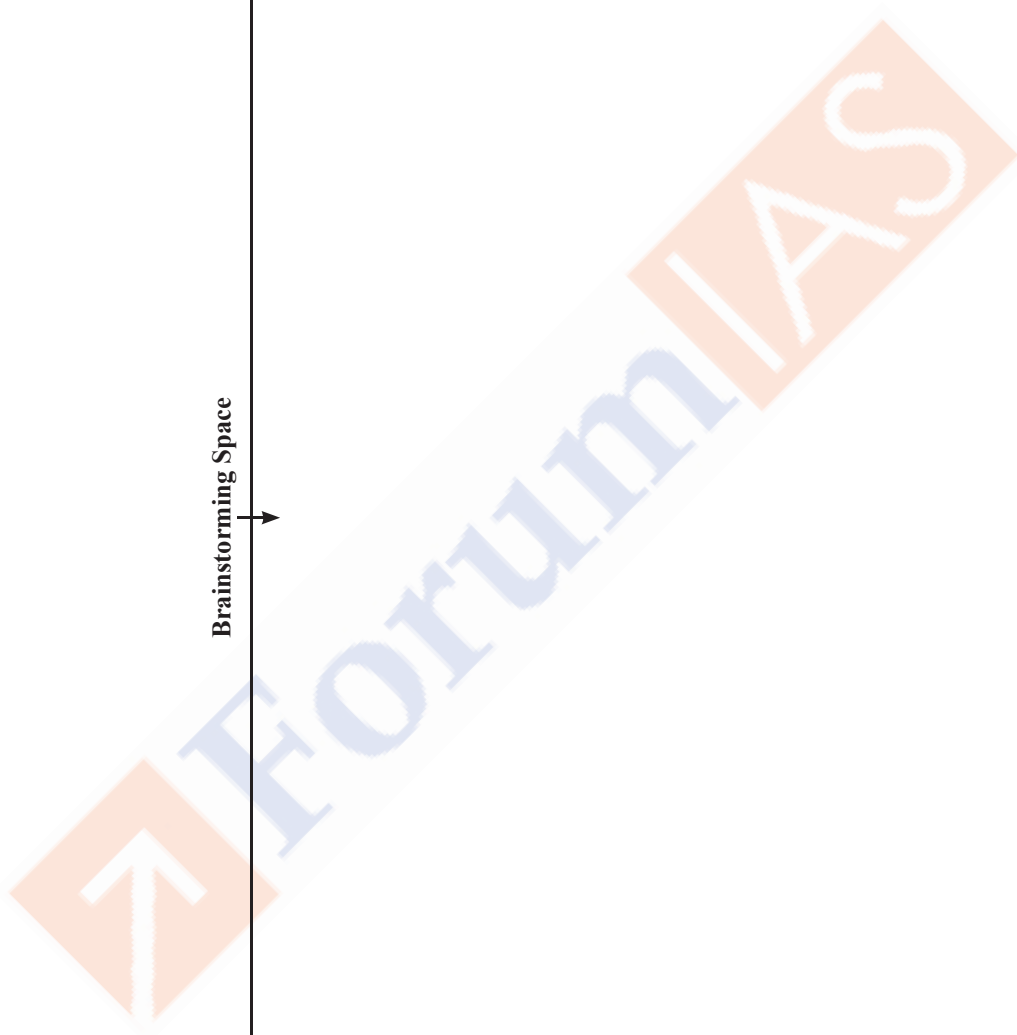
114	Nuclear Power	1984	10	"The current tech of nuclear power generation is based upon the fission process, what are the other methods possible for the generation of nuclear power with reference to the Indian condition?"
-----	---------------	------	----	---

MACRO TOPIC - RENEWABLE & ALTERNATIVE ENERGY SOURCES

#	Micro Topic	Year	Marks	Question
115	Green Grid Initiative	2021	10	Explain the purpose of the Green Grid Initiative launched at the World Leaders Summit of the COP26 UN Climate Change Conference in Glasgow in November 2021. When was this idea first floated in the International Solar Alliance (ISA)?
116	Solar Energy	2020	15	Describe the benefits of deriving electric energy from sunlight in contrast to the conventional energy generation. What are the initiatives offered by our Government for this purpose?
117	Renewable Energy	2012	10	Given the accelerated pace development and demand for energy, would you consider renewable energy as a viable option for India's future?
118	Alternative Fuels	2007	10	What are the alternative fuels available for the transport sector? Discuss their characteristics, advantages and disadvantages in their utilization.
119	Alternative Energy	2006	10	"Bring out the prospects of development of alternative energy sources of India."
120	Hydrogen Fuel	2005	10	Why is hydrogen being acclaimed as the fuel of the future?
121	Alternative Energy Sources	2004	15	Discuss in detail "Alternative Energy Sources".
122	Solar Energy	1991	15	Discuss the potential of solar energy utilization in India.
123	Integrated Rural Energy	1991	10	What do you understand by the Integrated Rural Energy System? Also mention at least three new sources of Energy.

Q.1) How is science interwoven deeply with our lives? What are the striking changes in agriculture triggered off by the science-based technologies? (10 Marks, 150 Words) [2020]

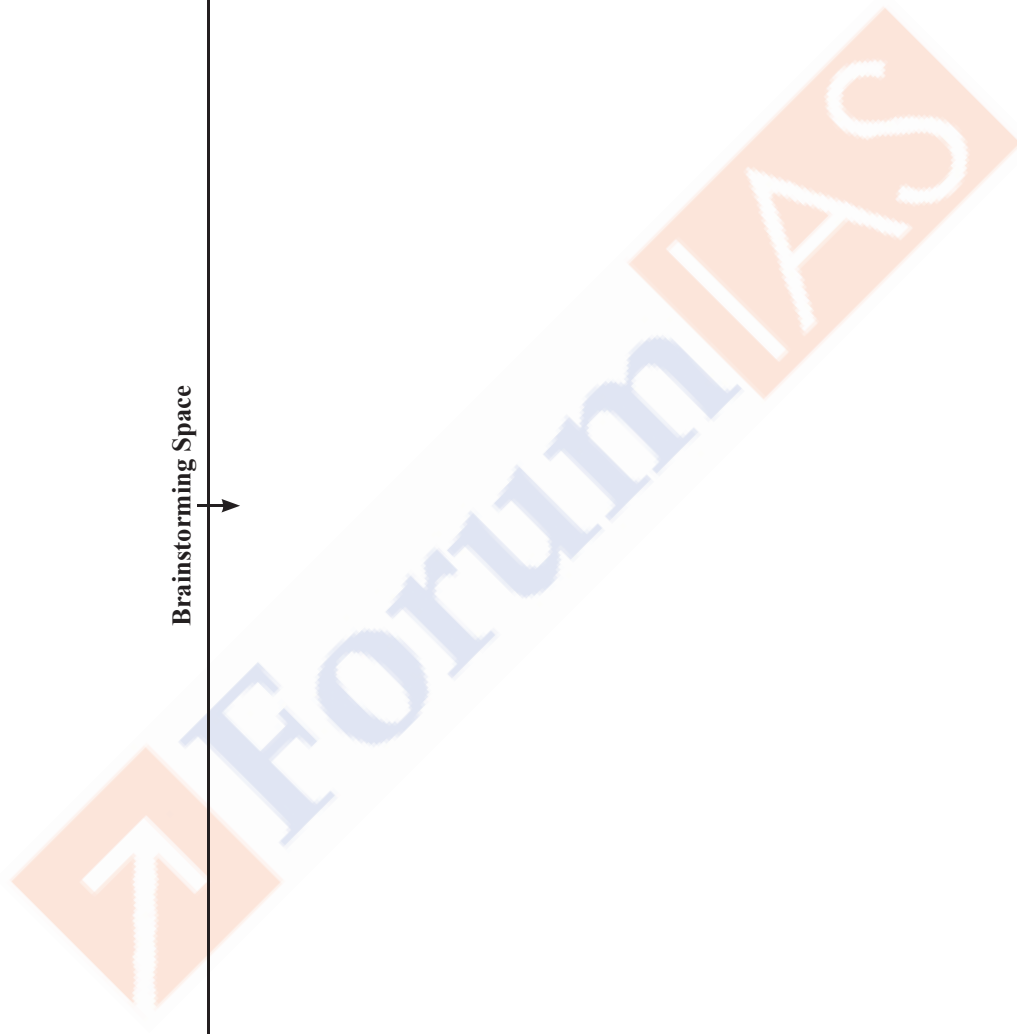
Brainstorming Space



Q.2) What is Madcow disease?

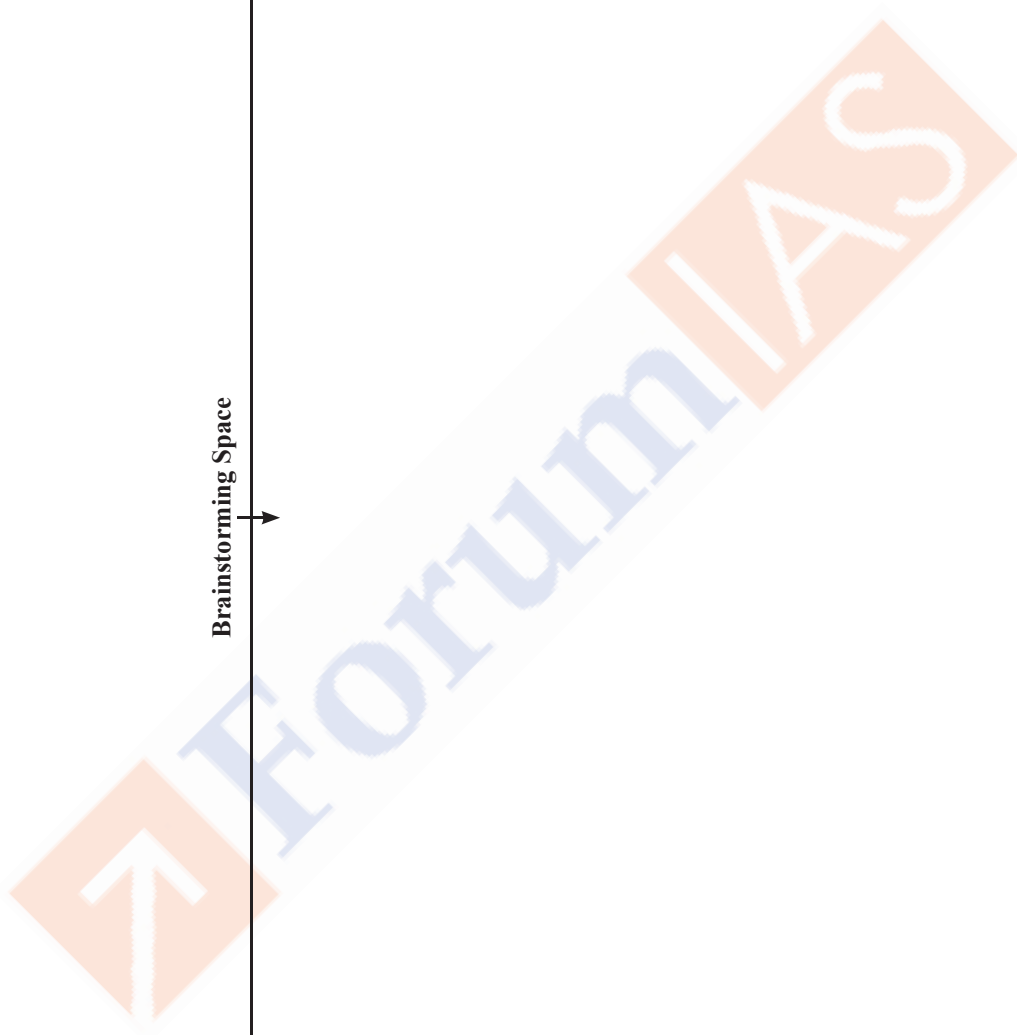
(10 Marks, 150 Words) [1997]

Brainstorming Space



Q.3) Briefly explain the use of various chemical fertilizers in Indian agriculture. (10 Marks, 150 Words) [1992]

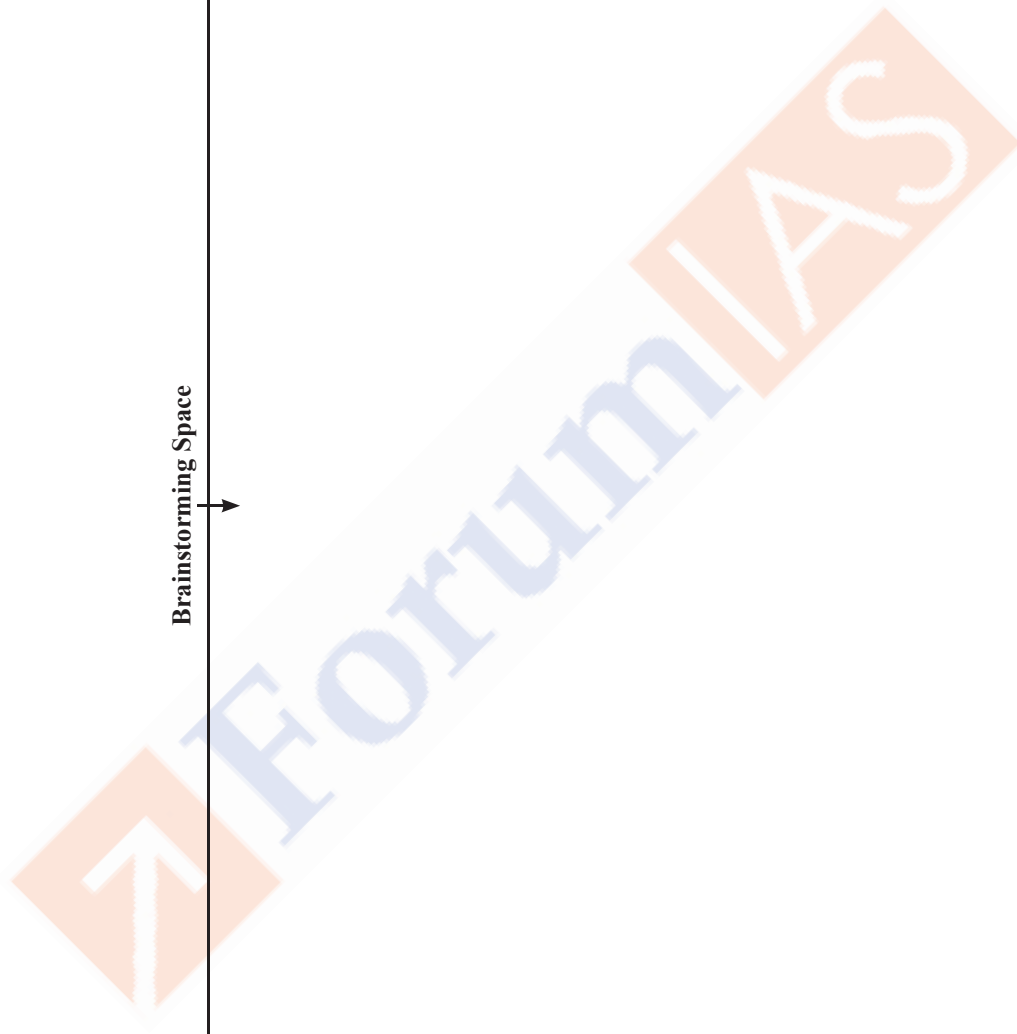
Brainstorming Space



Q.4) What is biogas technology? What benefits are envisaged from its use? Describe the steps government of India is taking for its development discussing the salient features of the programme.

(15 Marks, 250 Words) [1982]

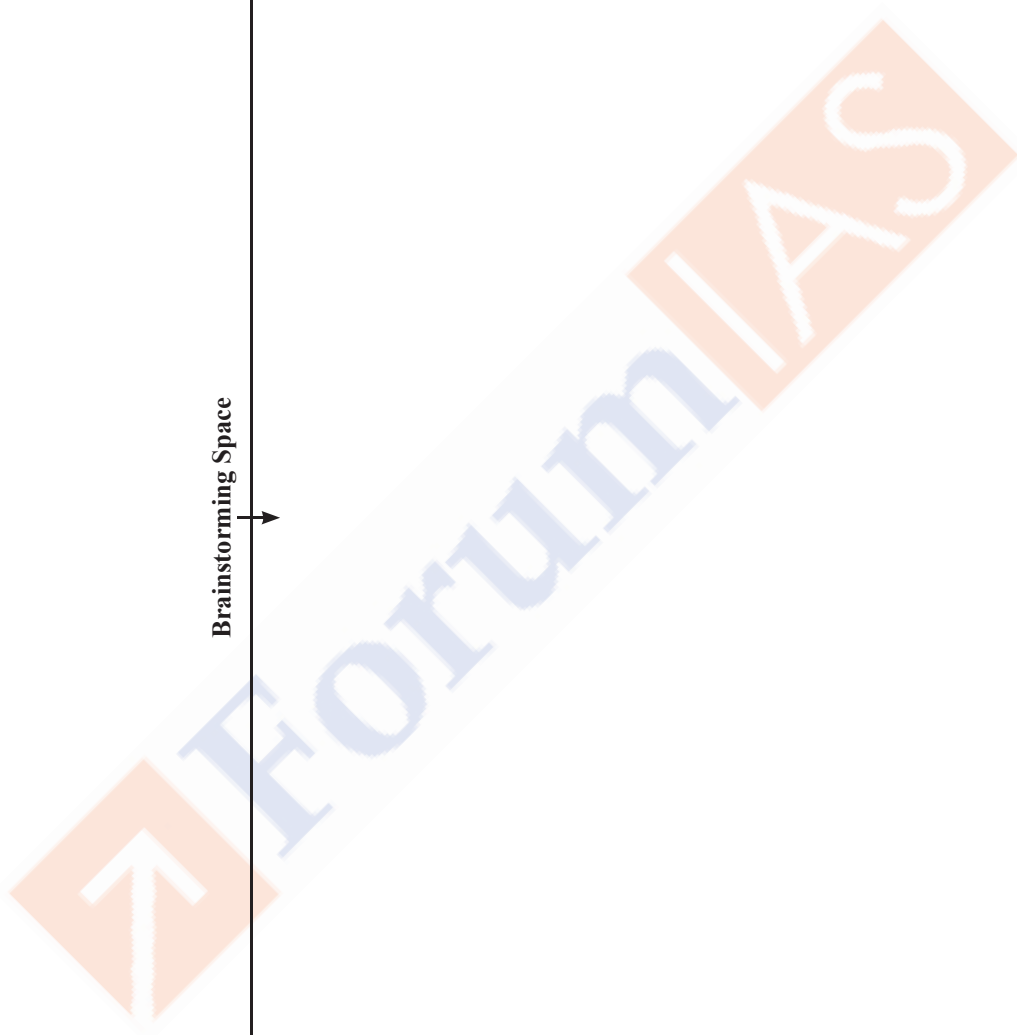
Brainstorming Space



Q.5) Comment critically on the impact that modern Science and Technology have made on the attitudes, life styles, social structures and economic wellbeing of the people in the rural areas in India.

(15 Marks, 250 Words) [1979]

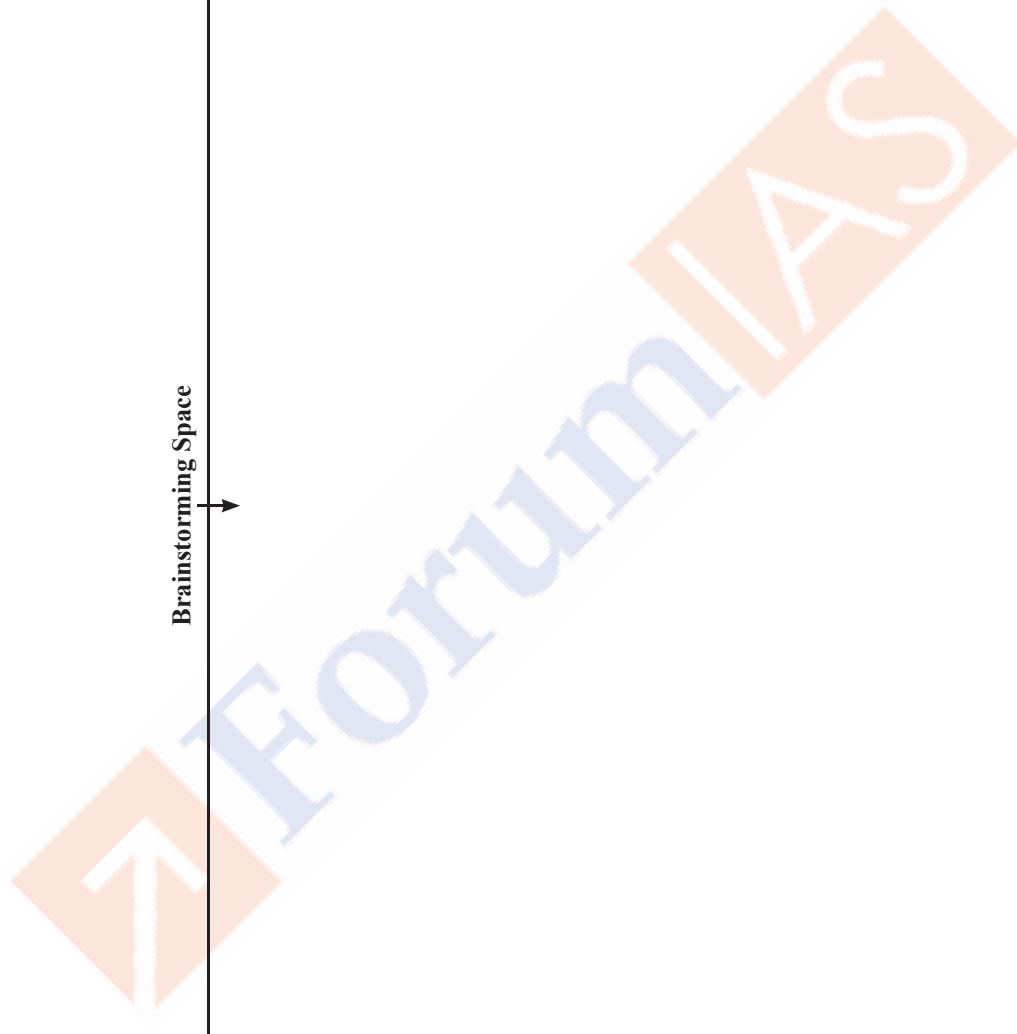
Brainstorming Space



Q.6) What is the basic principle behind vaccine development? How do vaccines work? What approaches were adopted by the Indian vaccine manufacturers to produce COVID-19 vaccines?

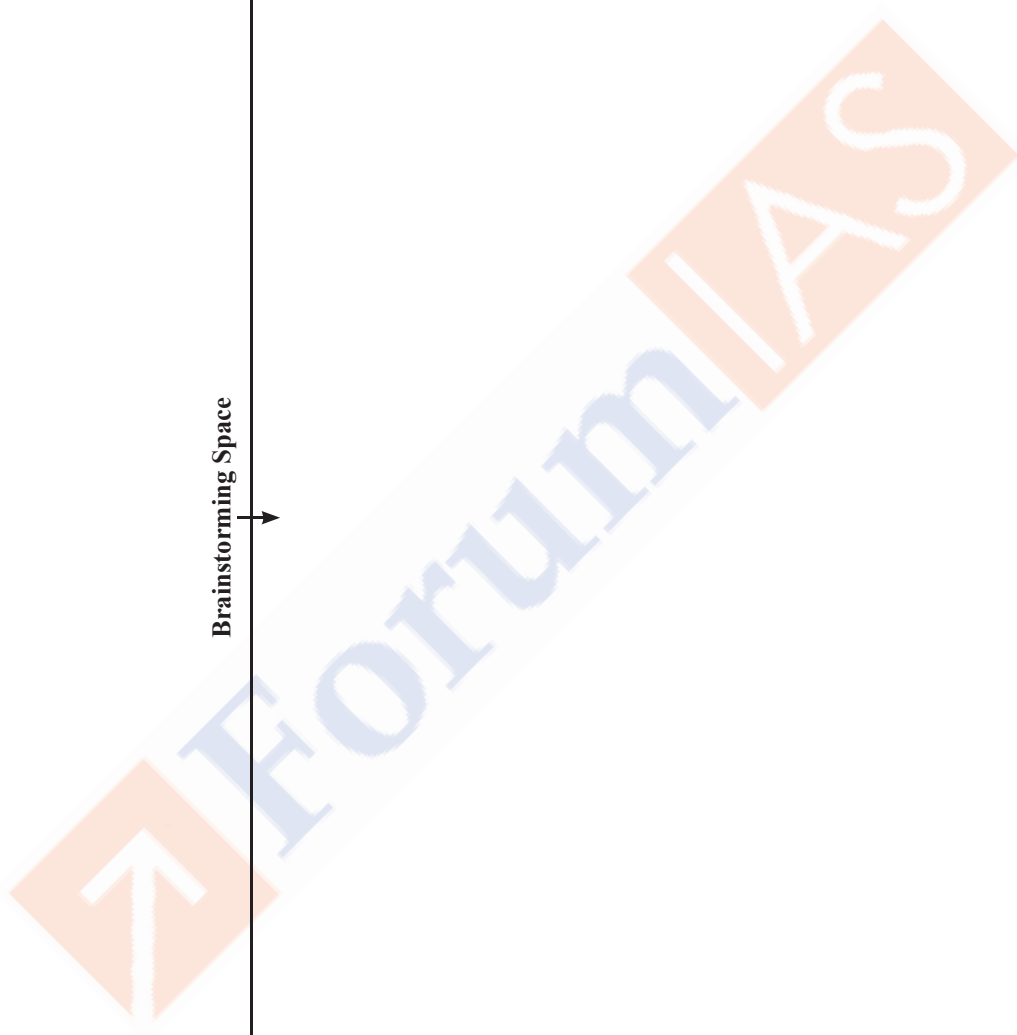
(15 Marks, 250 Words) [2022]

Brainstorming Space



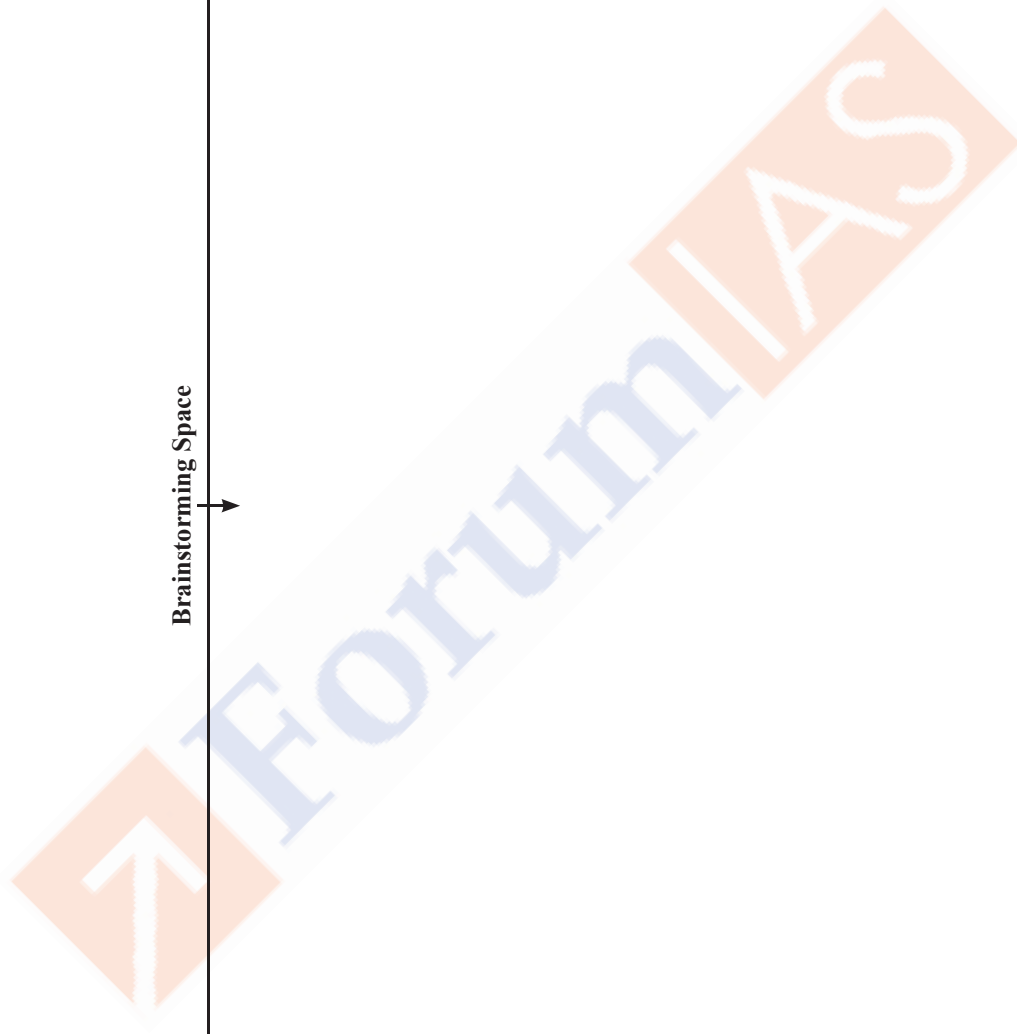
Q.7) The Nobel Prize in Physics of 2014 was jointly awarded to Akasaki, Amano and Nakamura for the invention of Blue LEDs in the 1990s. How has this invention impacted the everyday life of human beings?
(15 Marks, 250 Words) [2021]

Brainstorming Space



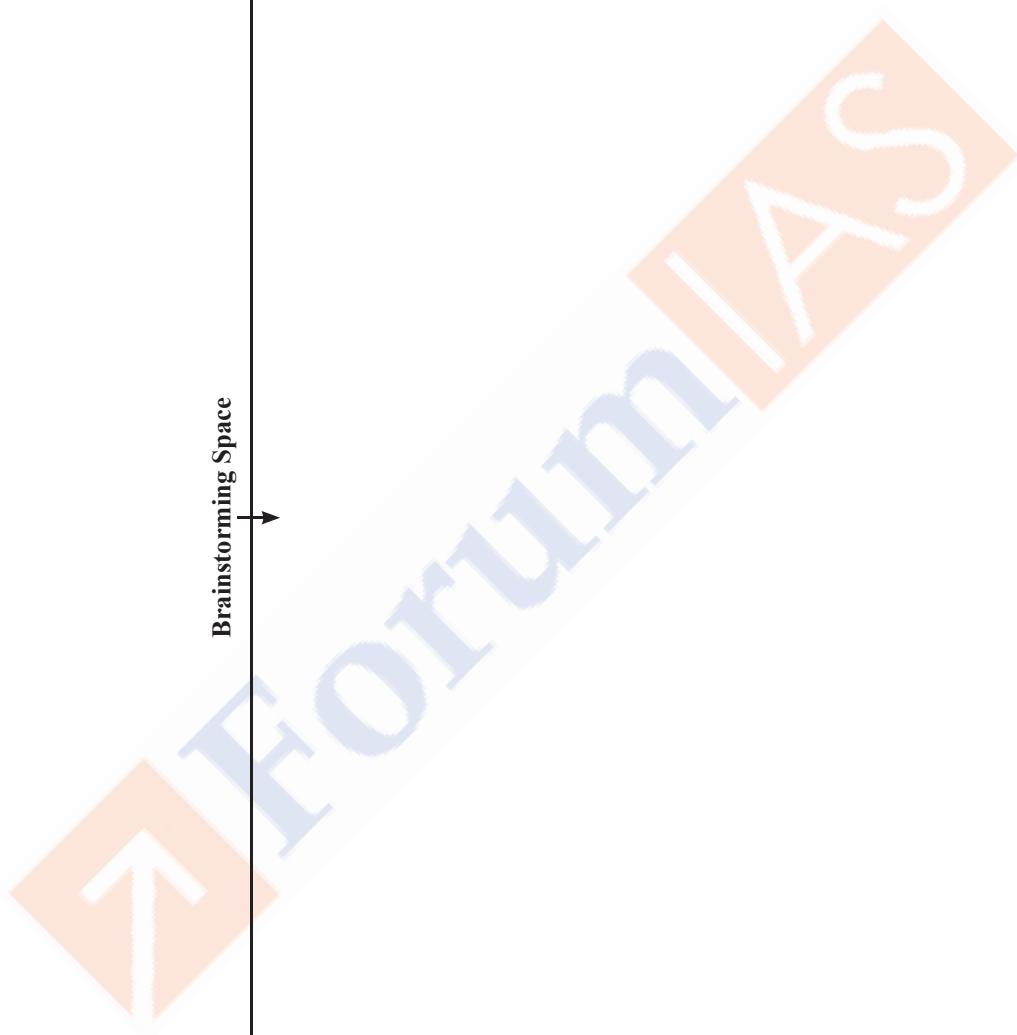
Q.8) Discuss the work of 'Bose-Einstein Statistics' done by Prof. SatyendraNath Bose and show how it revolutionized the field of Physics. (10 Marks, 150 Words) [2018]

Brainstorming Space



Q.9) "India's Traditional Knowledge Digital Library (TKDL) which has a database containing formatted information on more than 2 million medicinal formulations is proving a powerful weapon in the country's fight against erroneous patents. Discuss the pros and cons making this database publicly available under open-source licensing. (12.5 Marks, 200 Words) [2015]

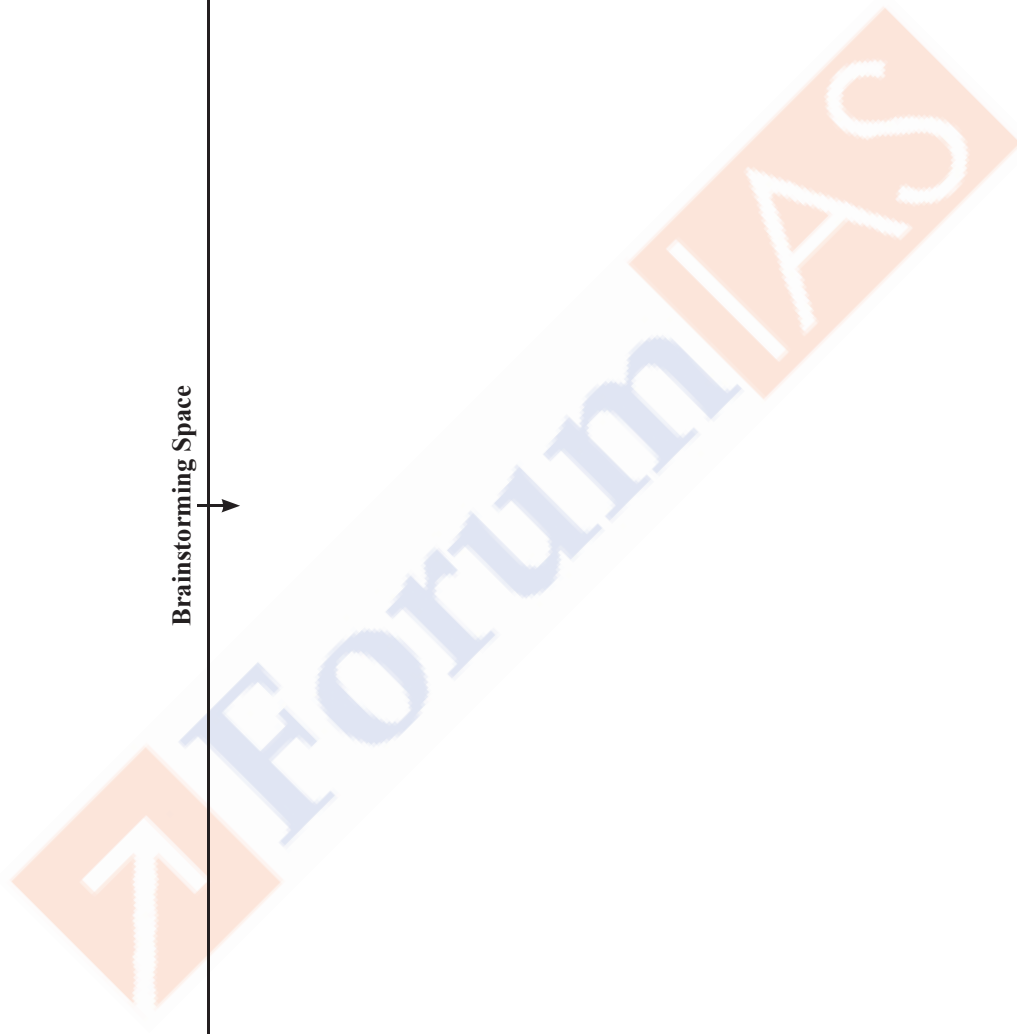
Brainstorming Space



Q.10) "Scientific research in Indian universities is declining, because a career in science is not as attractive as are business professions, engineering or administration, and the universities are becoming consumer-oriented. Critically comment."

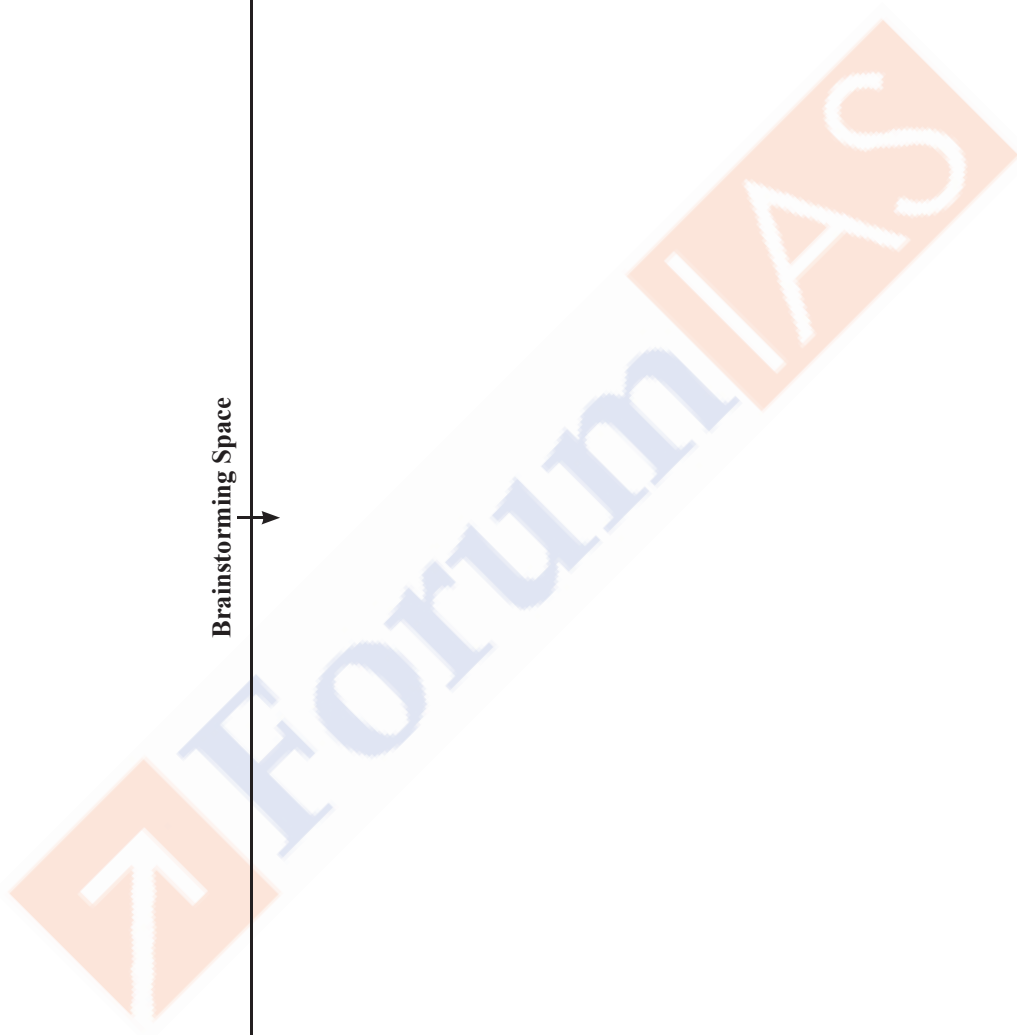
(12.5 Marks, 200 Words) [2014]

Brainstorming Space



Q.11) In the context of the challenges to be faced in the 21st century, it is generally felt that there is an urgent need to reorient science education and scientific research in the country. Identify the important areas that need reorientation and suggest steps you consider necessary for the purpose. (10 Marks, 150 Words) [1985]

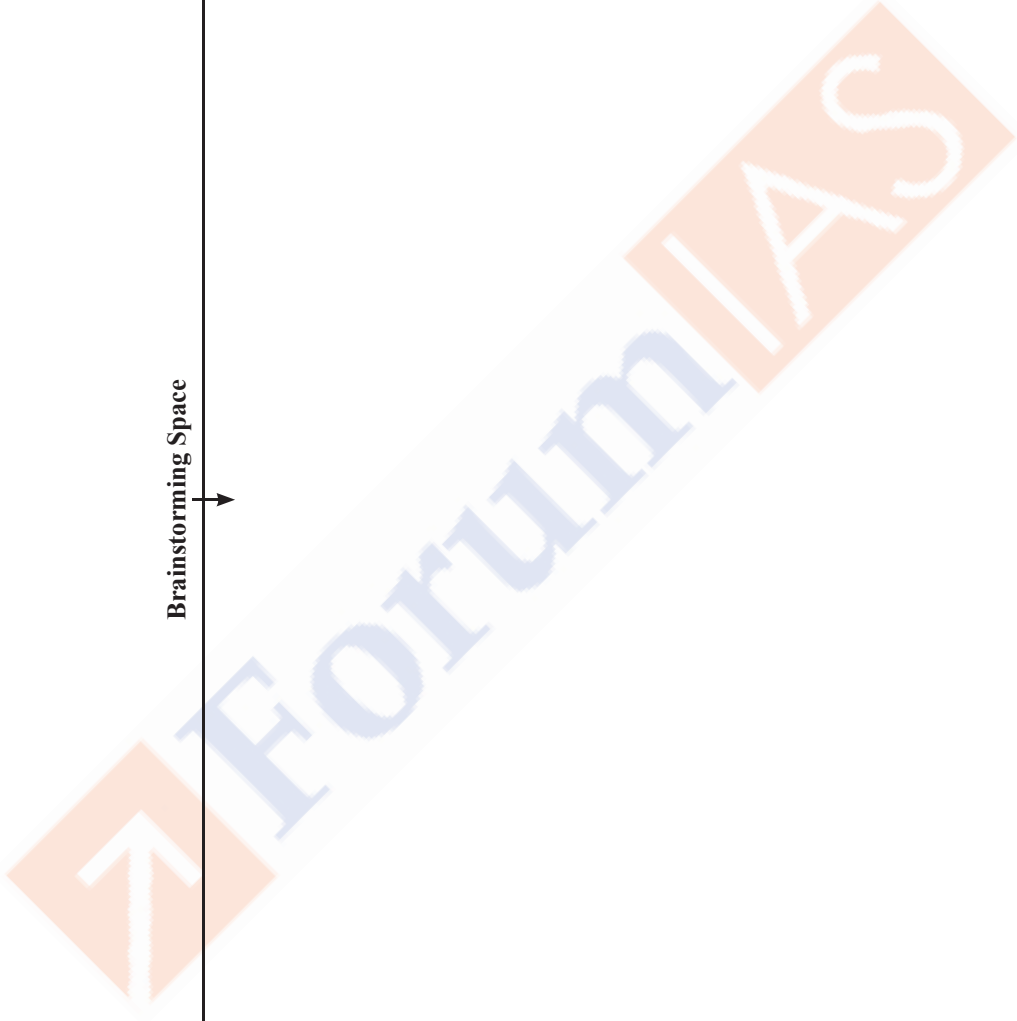
Brainstorming Space



Q.12) What do you understand by Run-of river hydroelectricity project?
How is it different from any other hydroelectricity project?

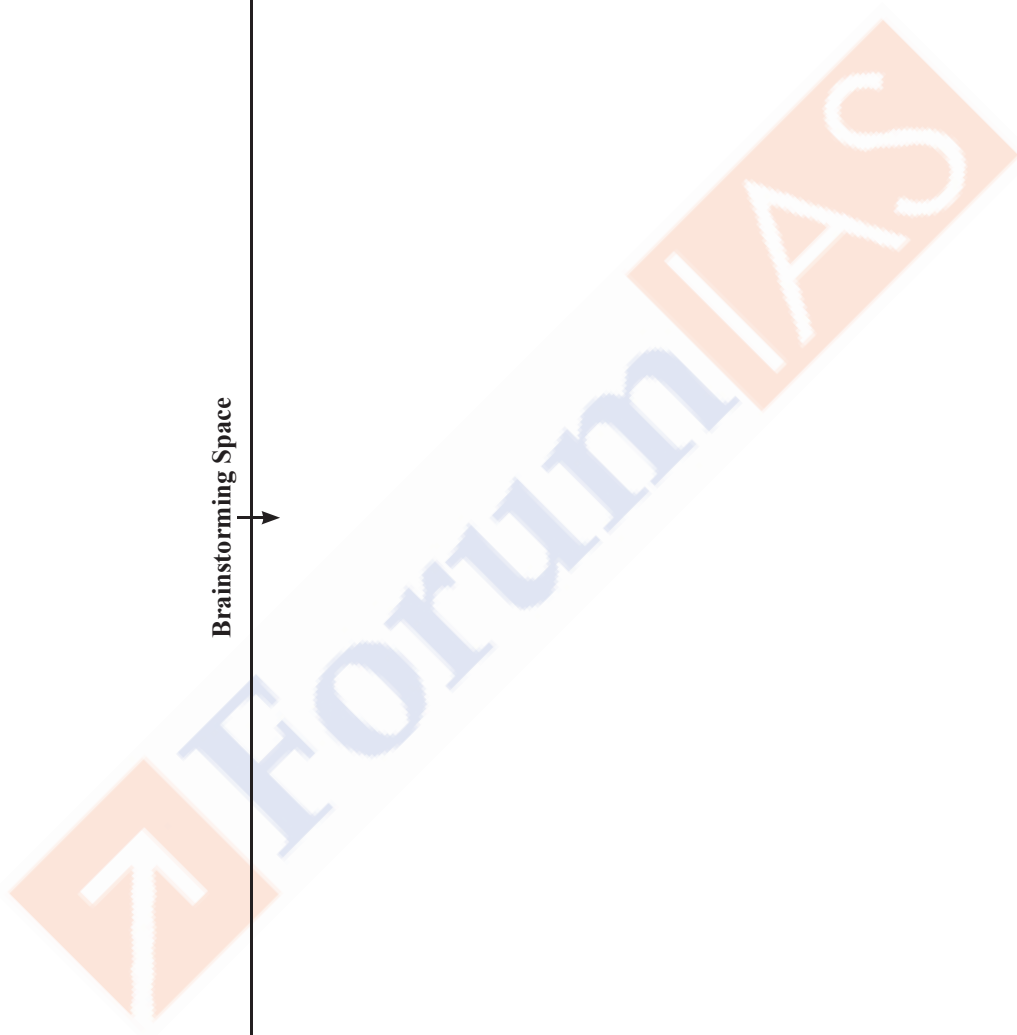
(10 Marks, 150 Words) [2013]

Brainstorming Space



Q.13) Discuss the globalization of R&D and its impact on India's development. Provide an illustration from at least one sector such as Information Technology or Health. (15 Marks, 250 Words) [2012]

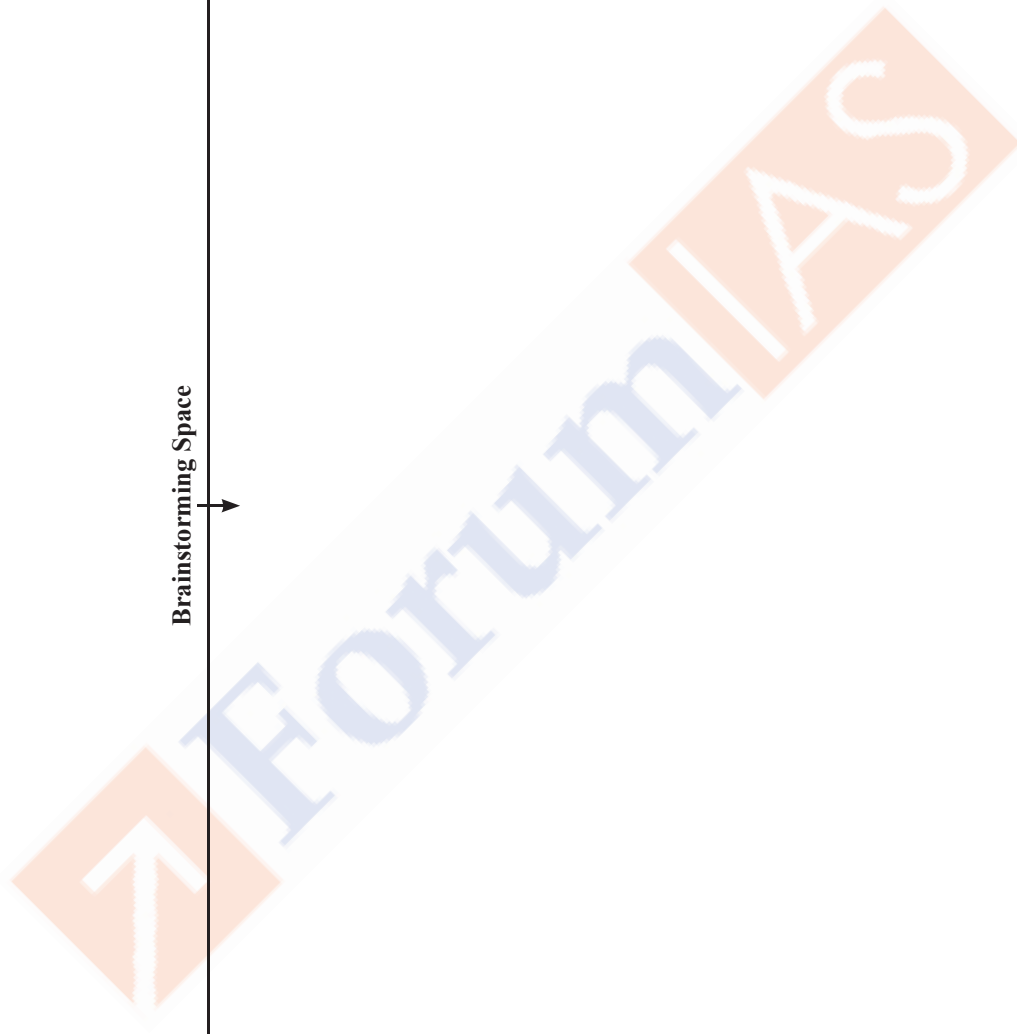
Brainstorming Space



Q.14) The National Hydroelectric Power Corporation (NHPC) is expected to set up a number of hydroelectric projects in the Eighth plan. Summarise the salient features of the proposal.

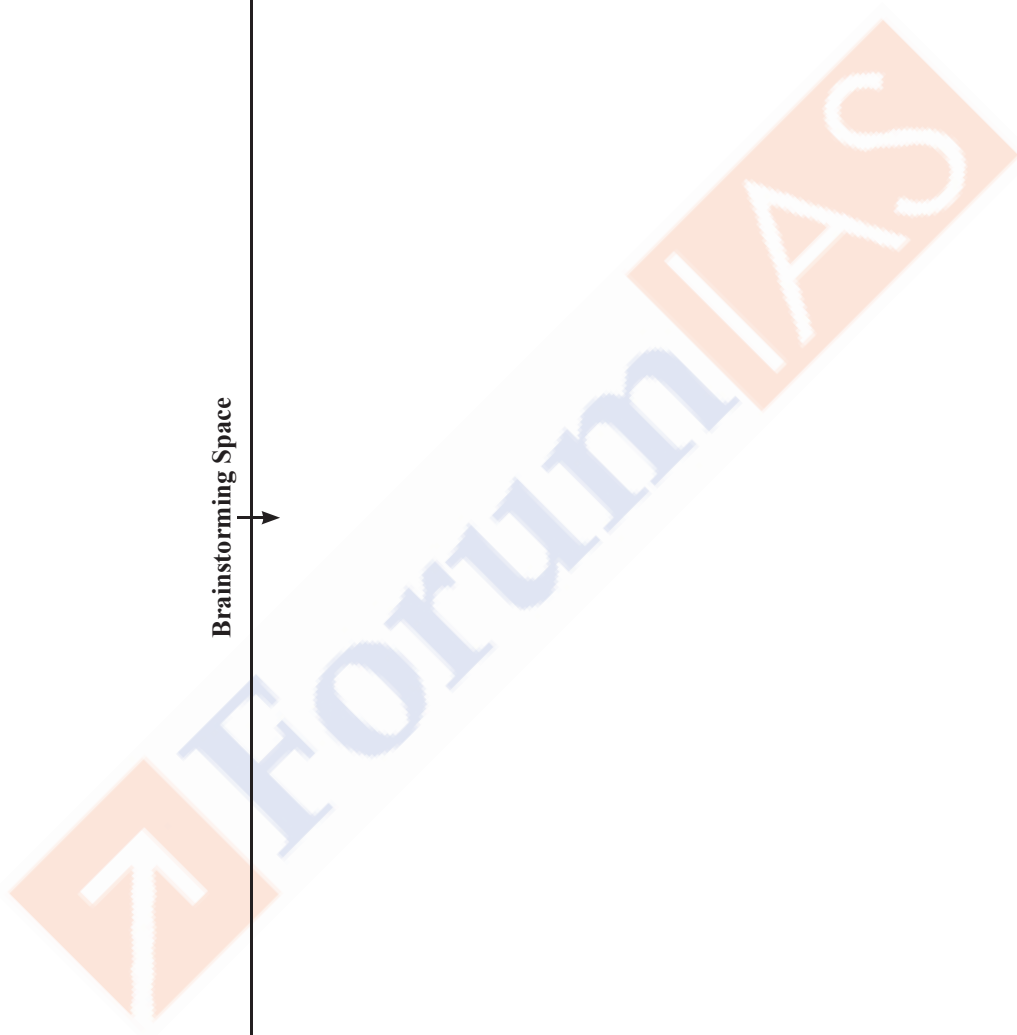
(10 Marks, 150 Words) [1991]

Brainstorming Space



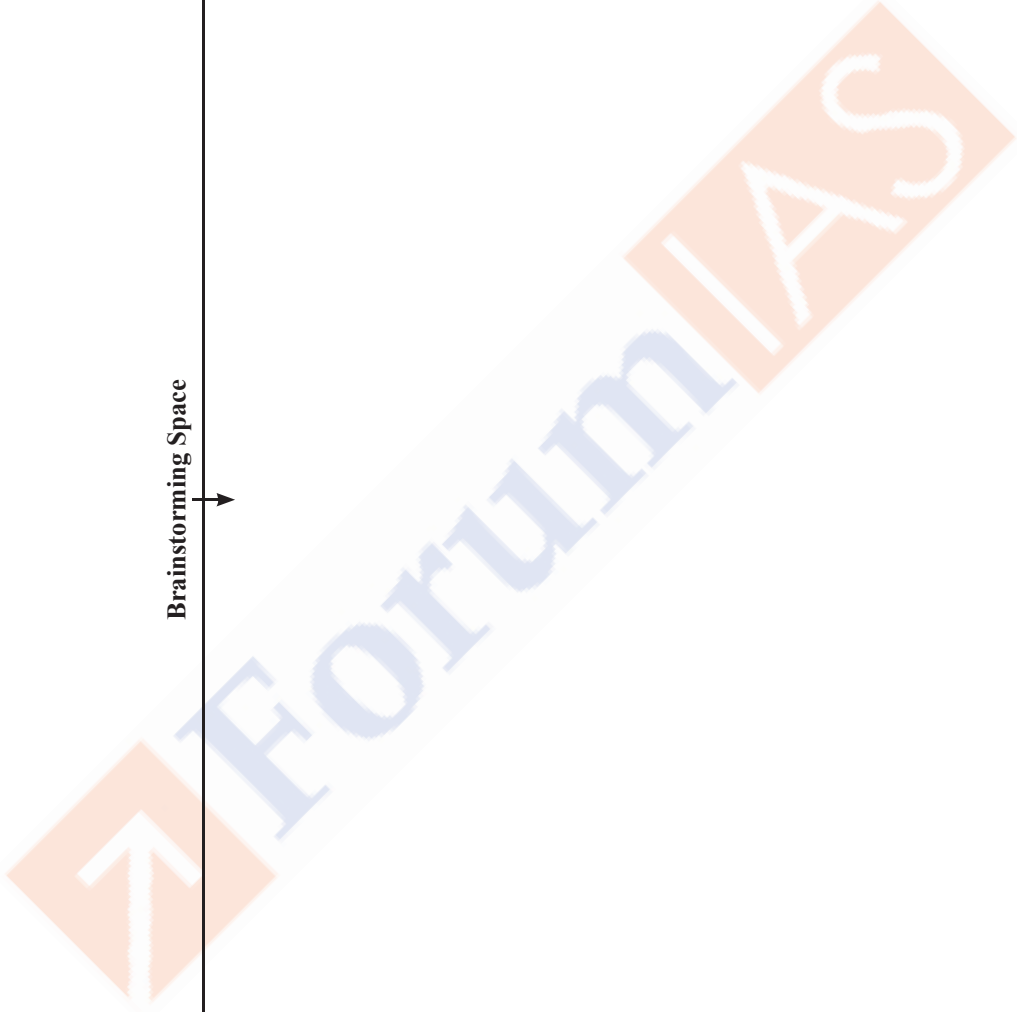
Q.15) What are asteroids? How real is the threat of them causing the extinction of life? What strategies have been developed to prevent such a catastrophe? (15 Marks, 250 Words) [2024]

Brainstorming Space



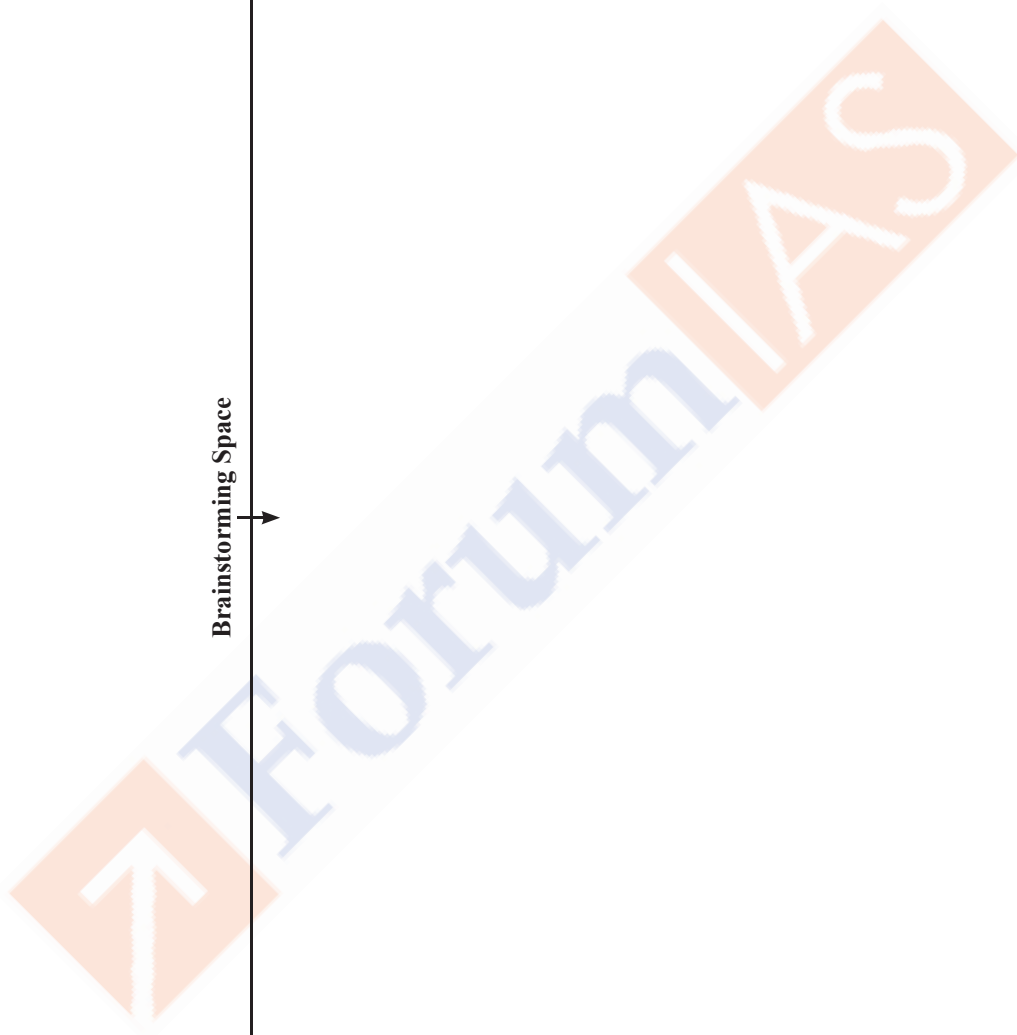
Q.16) What is the main task of India's third moon mission which could not be achieved in its earlier mission? List the countries that have achieved this task. Introduce the subsystems in the spacecraft launched and explain the role of the Virtual Launch Control Centre' at the Vikram Sarabhai Space Centre which contributed to the successful launch from Sriharikota. (15 Marks, 250 Words) [2023]

Brainstorming Space



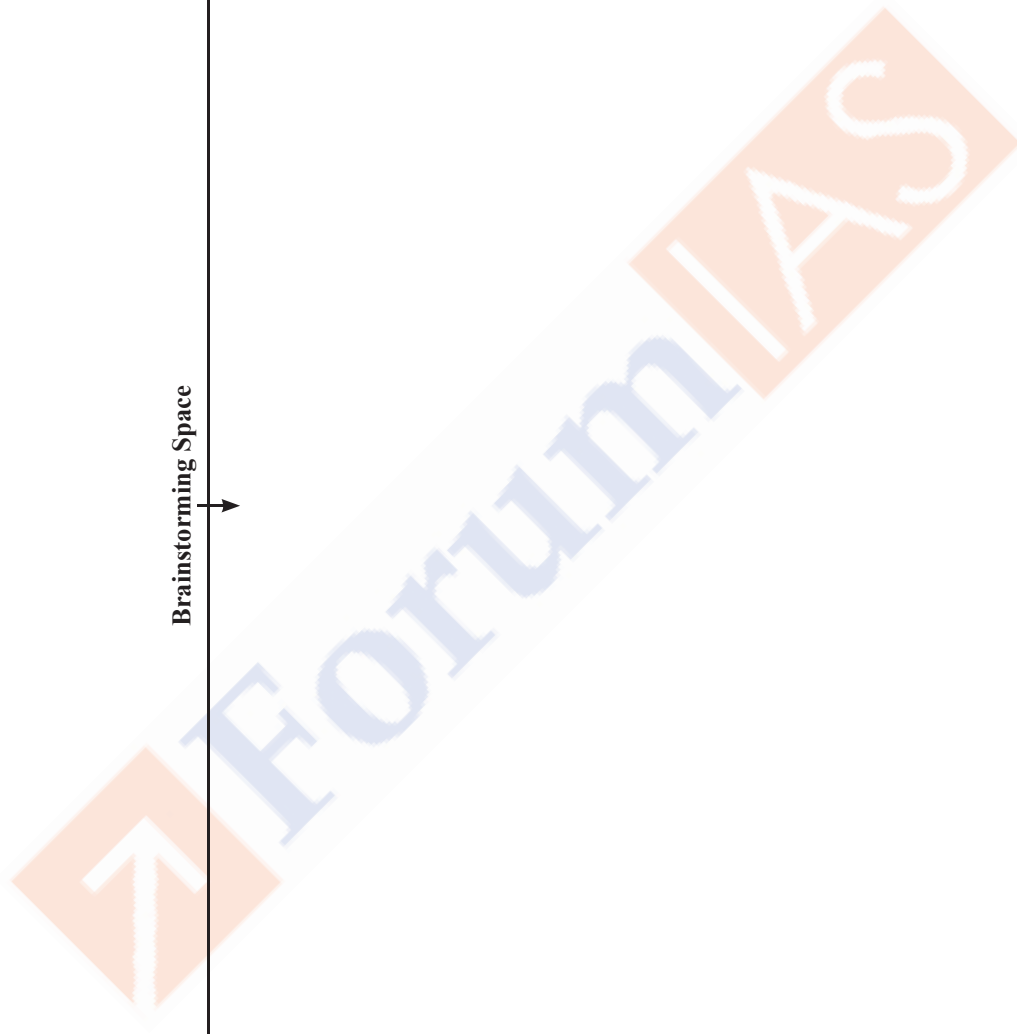
Q.17) "Launched on 25th December, 2021, James Webb Space Telescope has been much news since then. What are its unique features which make it superior to its predecessor Space Telescopes? What are the key goals of this mission? What potential benefits does it hold for the human race"? (15 Marks, 250 Words) [2022]

Brainstorming Space



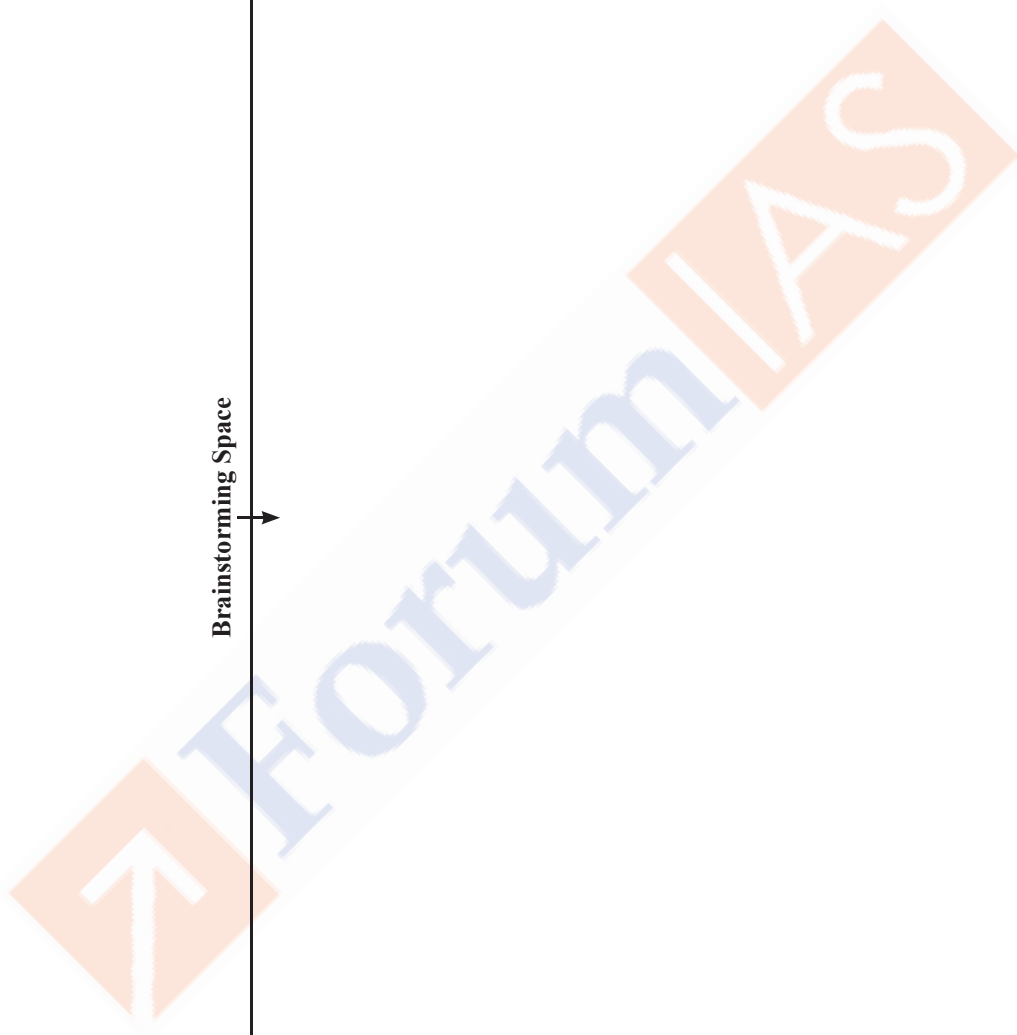
Q.18) How is the S-400 air defence system technically superior to any other system presently available in the world? (10 Marks, 150 Words) [2021]

Brainstorming Space



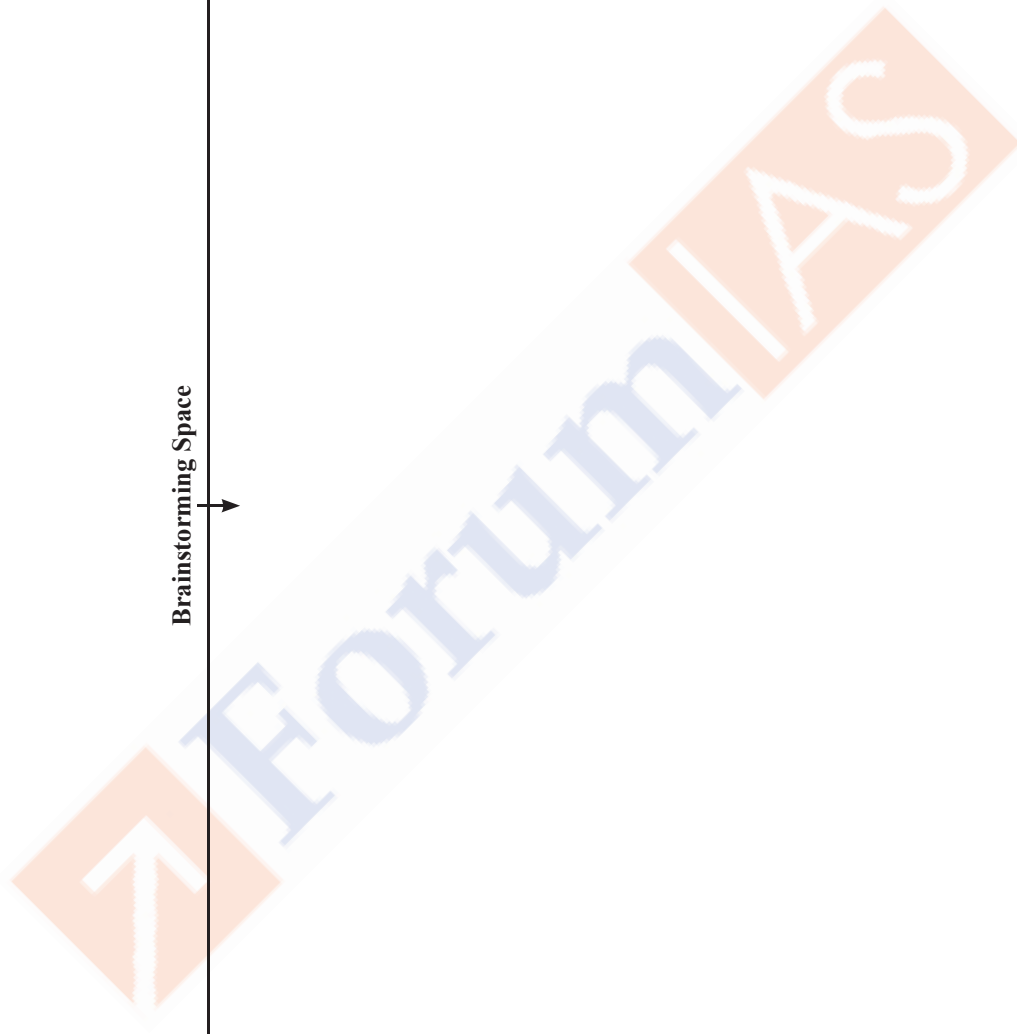
Q.19) What is India's plan to have its own space station and how will it benefit our space programme? (10 Marks, 150 Words) [2019]

Brainstorming Space



Q.20) Why is Indian Regional Navigational Satellite System (IRNSS) needed?
How does it help in navigation? (10 Marks, 150 Words) [2018]

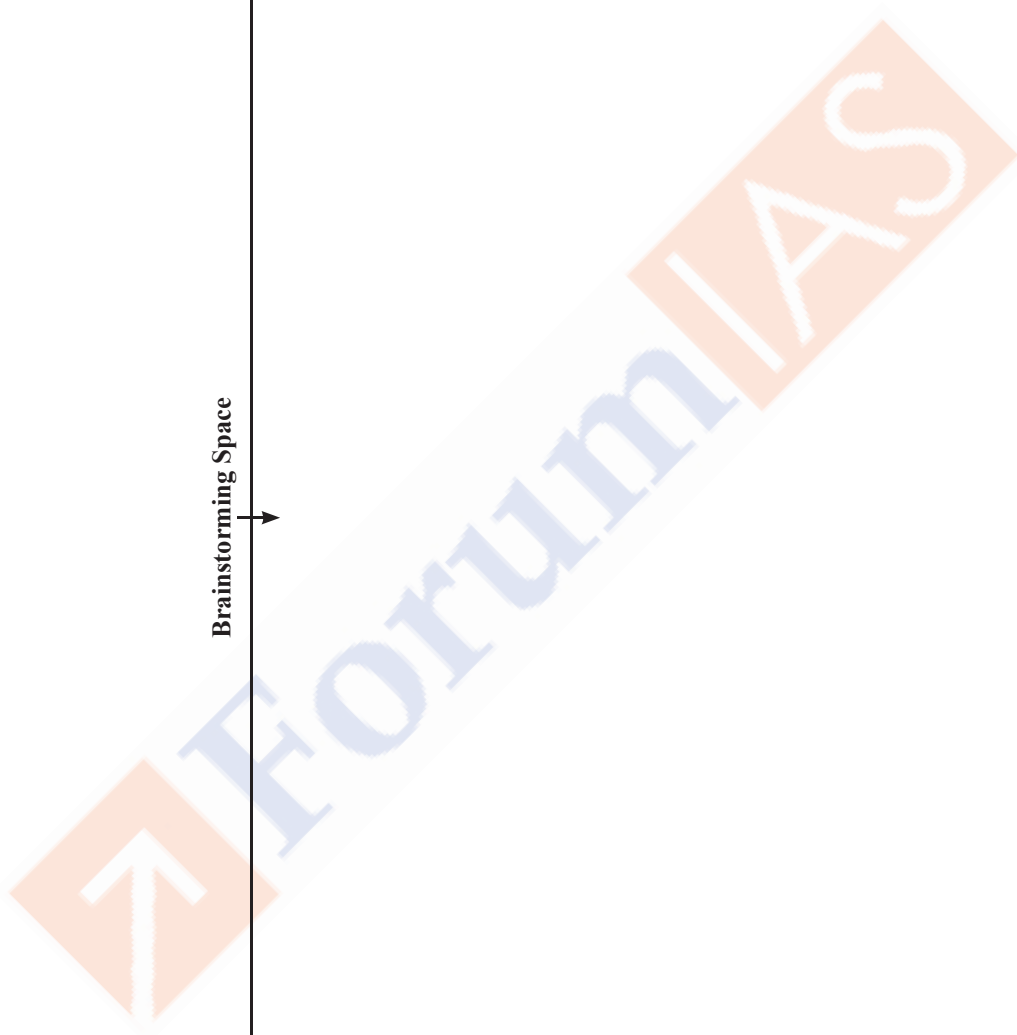
Brainstorming Space



Q.21) "India has achieved remarkable successes in unmanned space missions including the Chandrayaan and Mars Orbiter Mission, but has not ventured into manned space mission, both in terms of technology and logistics? Explain critically.

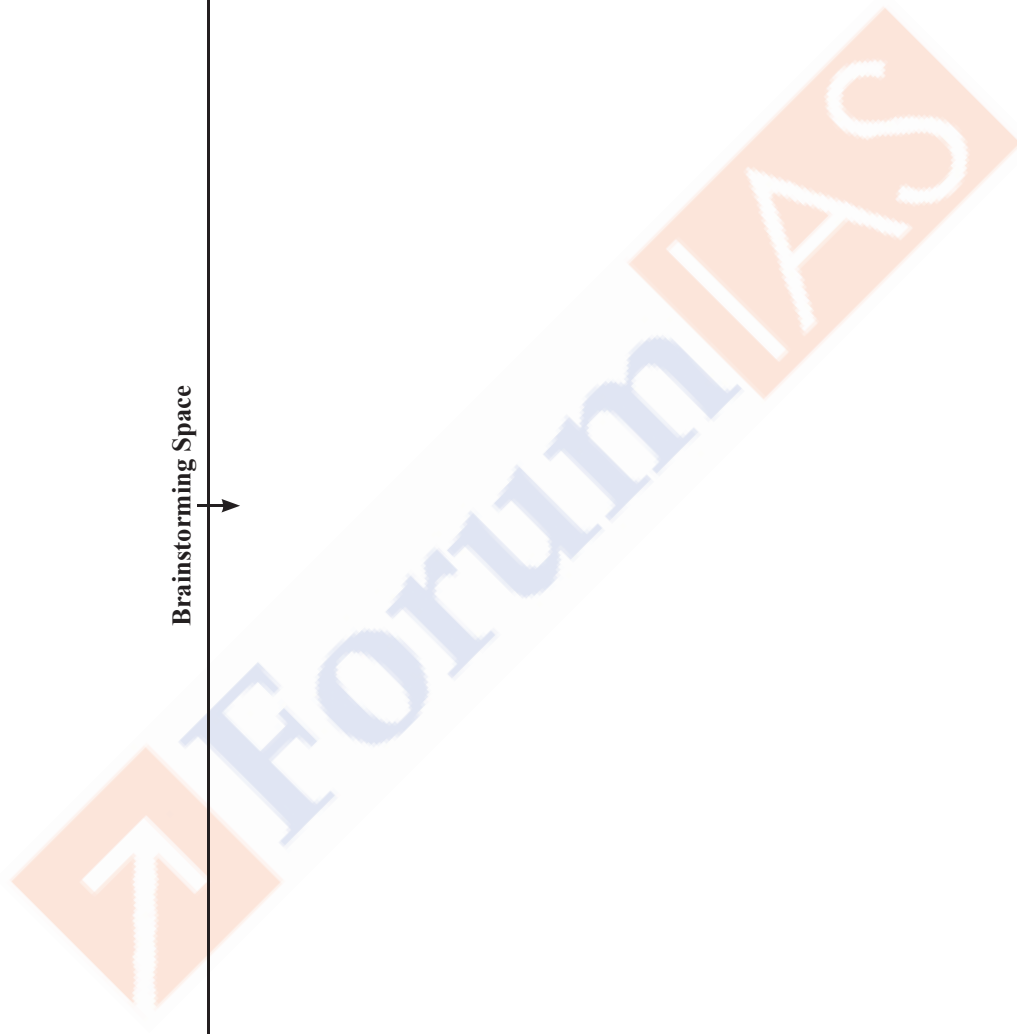
(12.5 Marks, 200 Words) [2016]"

Brainstorming Space



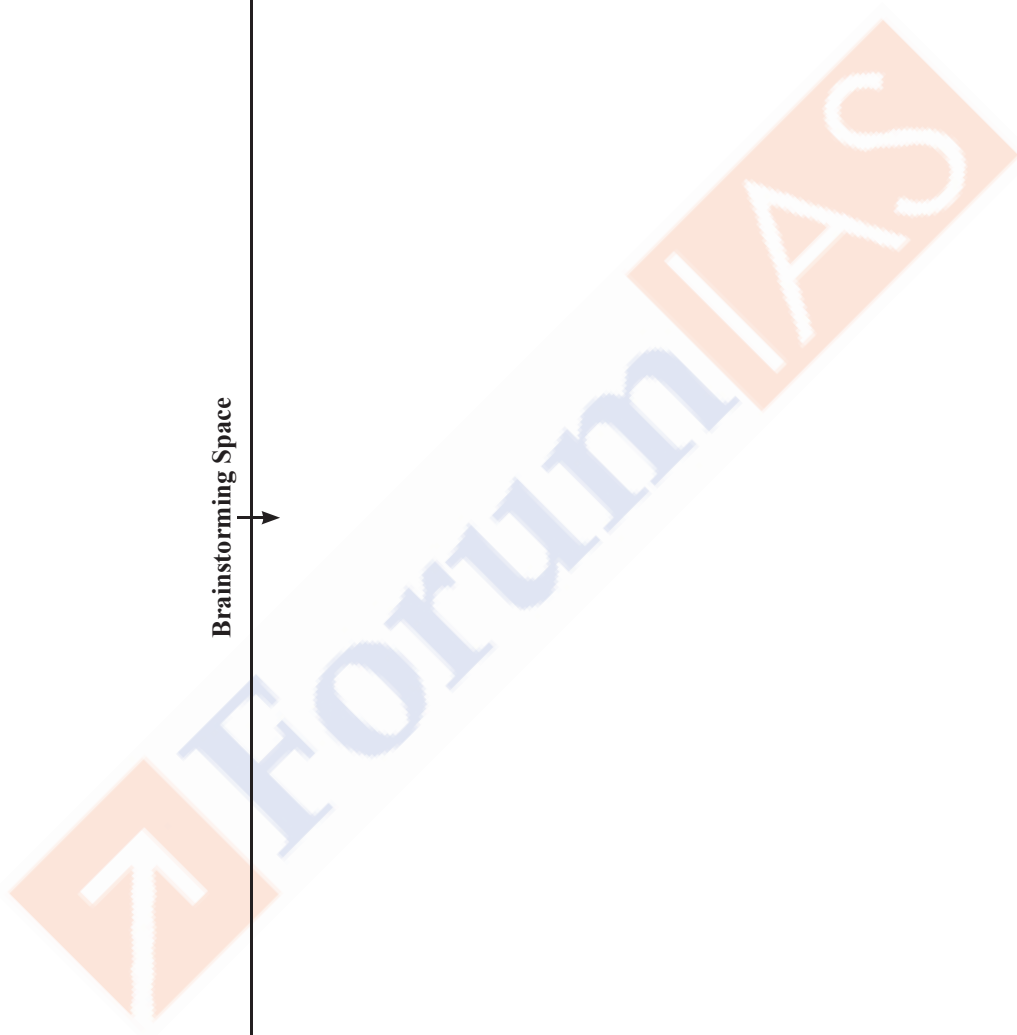
Q.22) "What do you understand by 'Standard Positioning Systems' and 'Protection Positioning Systems' in the GPS era? Discuss the advantages India perceives from its ambitious IRNSS programme employing just seven satellites. (12.5 Marks, 200 Words) [2015]"

Brainstorming Space



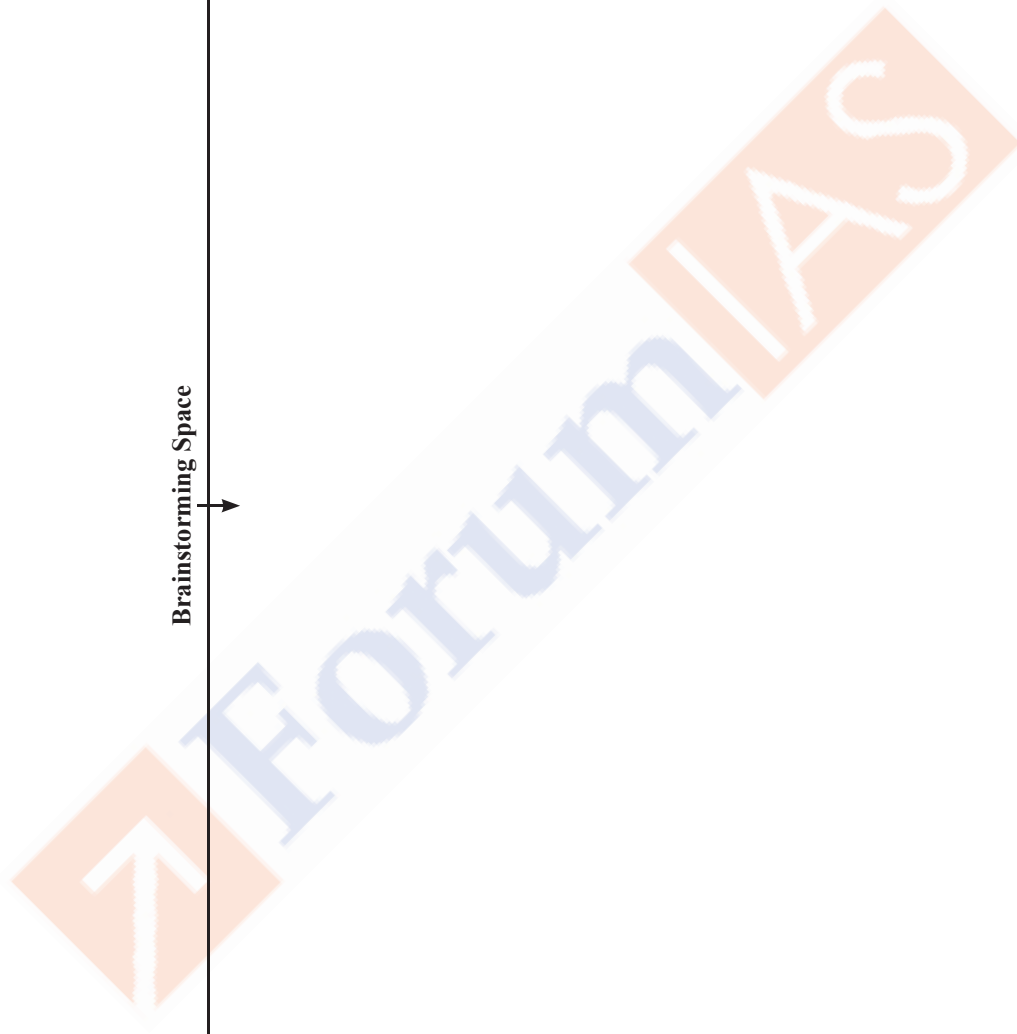
Q.23) The safe landing of the “Curiosity” Rover under NASA’s space programme has sparked many possibilities. What are those and how could humankind benefit from them? (15 Marks, 250 Words) [2012]

Brainstorming Space



Q.24) What do you know about Indian Regional National Satellite Systems? Describe its important features. (10 Marks, 150 Words) [2008]

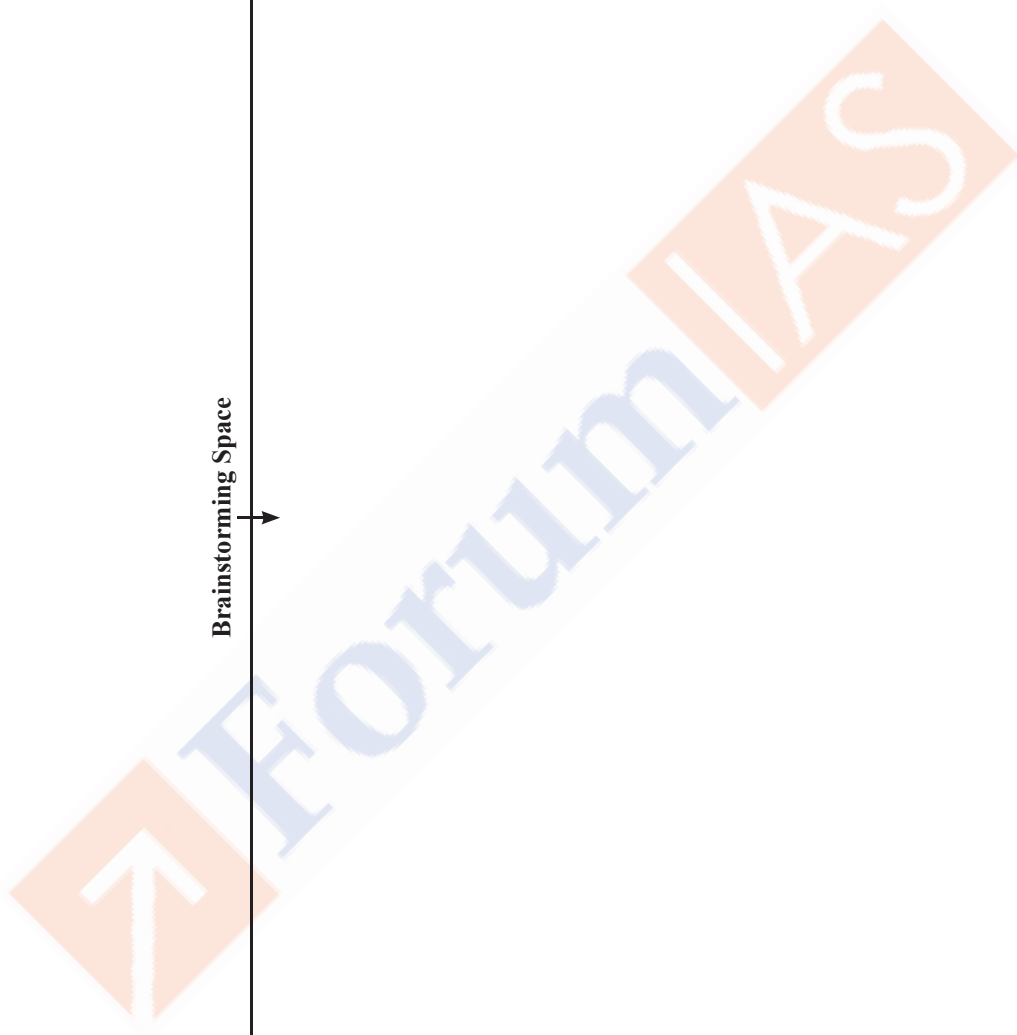
Brainstorming Space



Q.25) Discuss the missile technology initiatives undertaken by India.

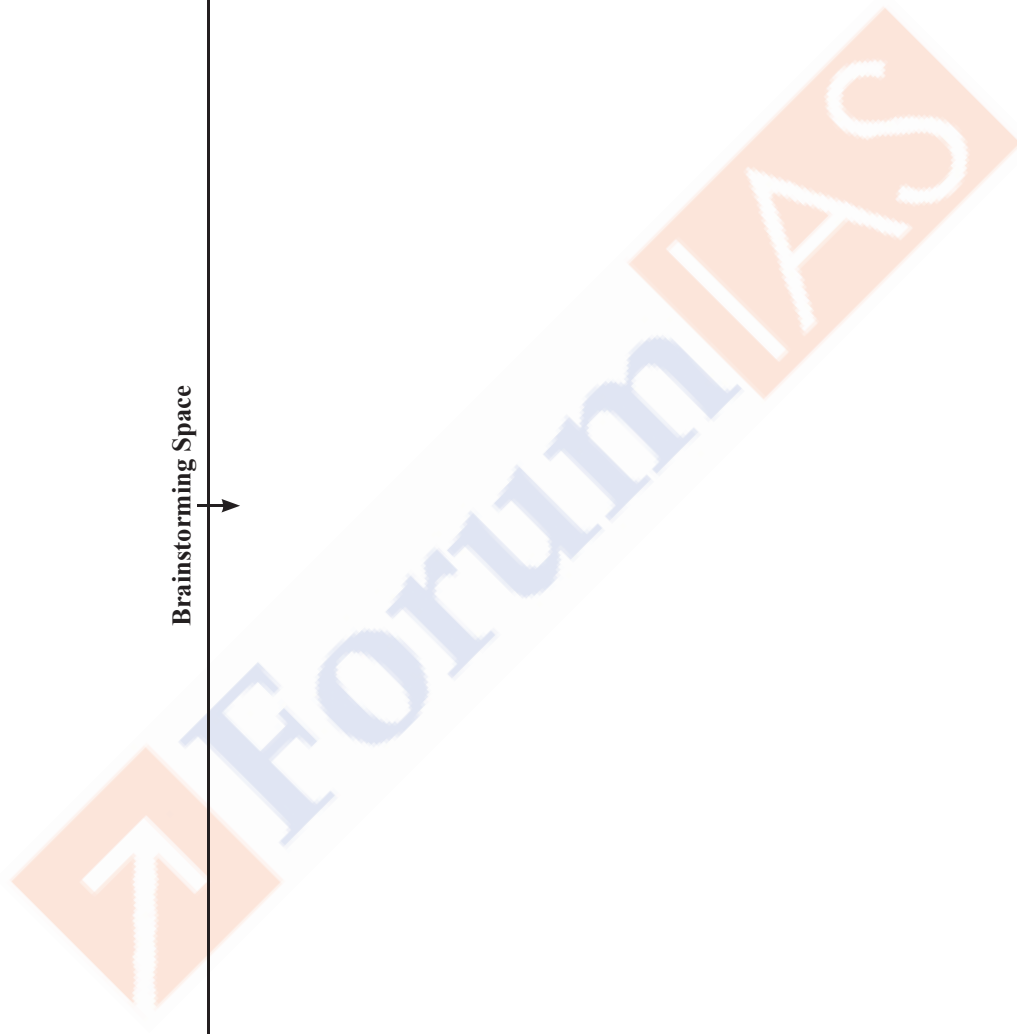
(10 Marks, 150 Words) [2007]

Brainstorming Space



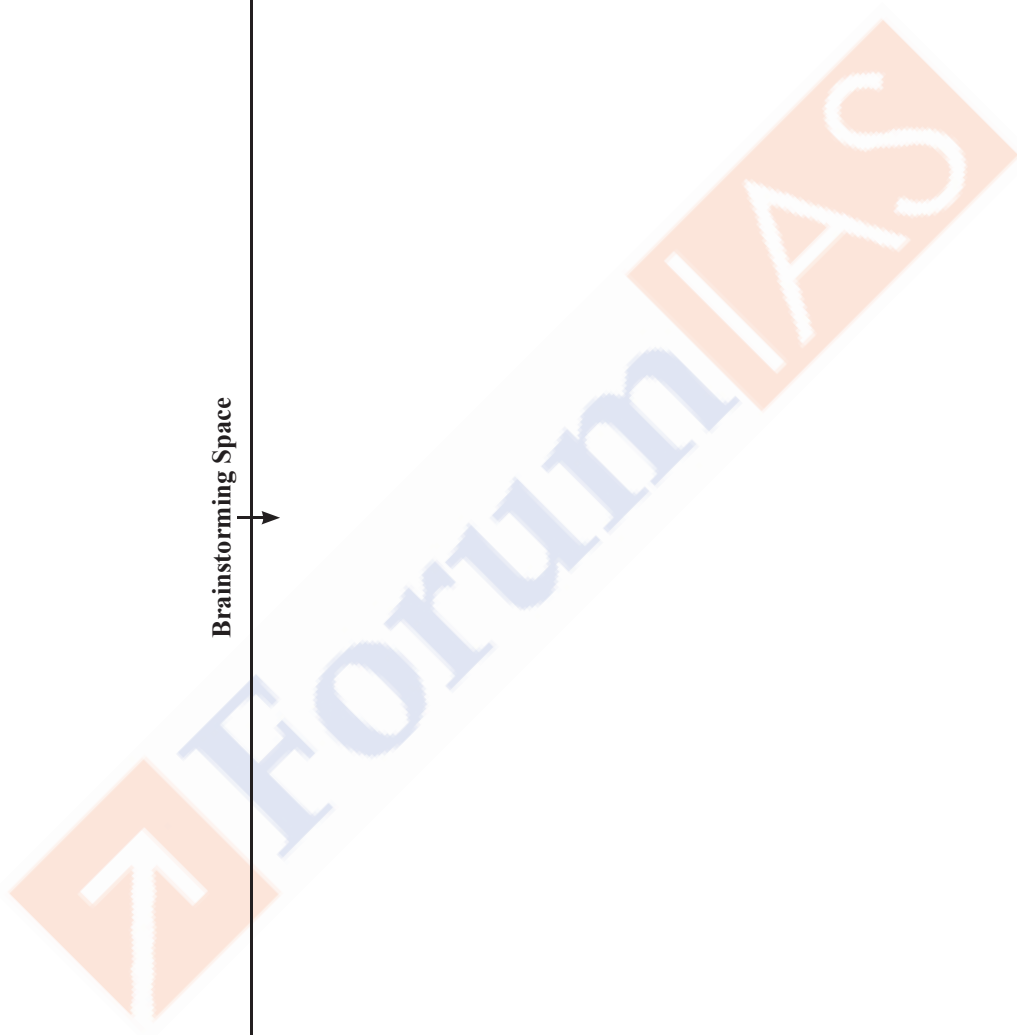
Q.26) What is the significance of the geostationary orbit? What would happen if it becomes too crowded? (15 Marks, 250 Words) [2000]

Brainstorming Space



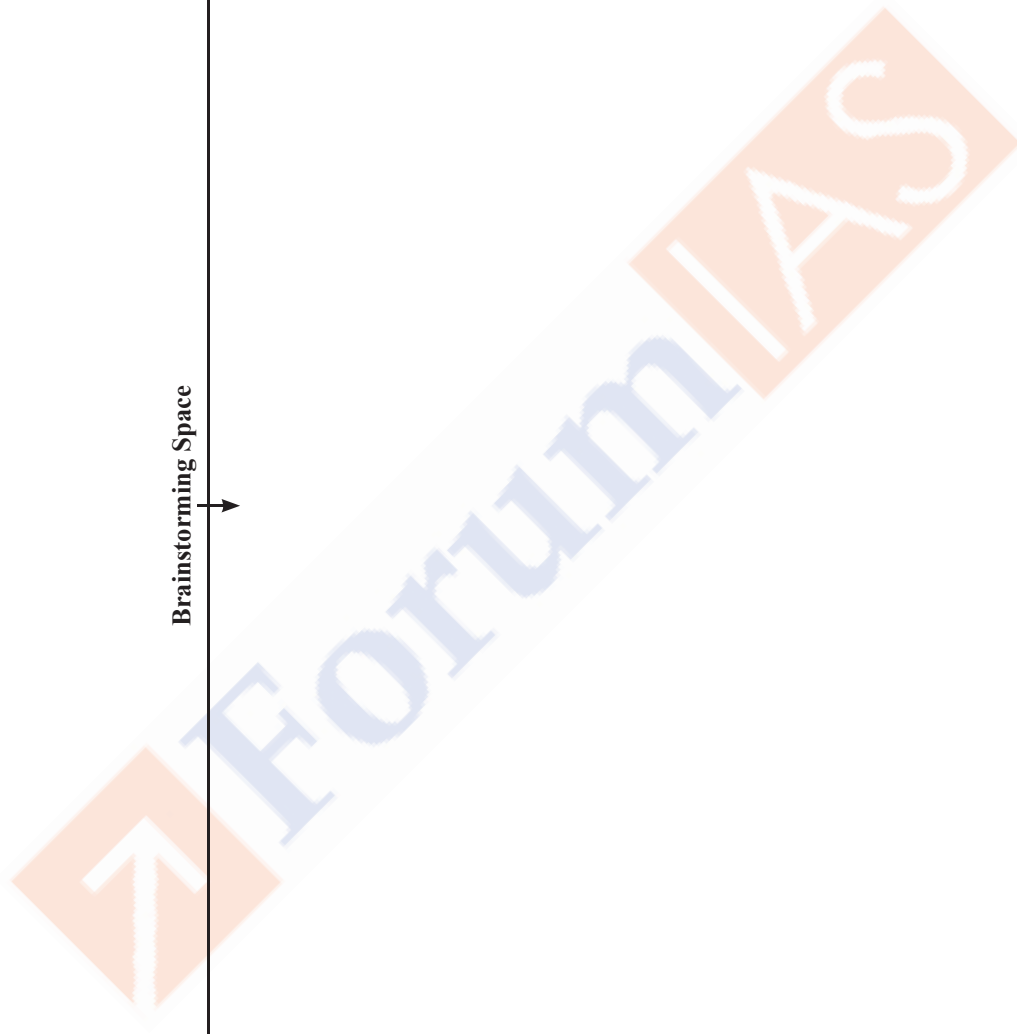
Q.27) What is remote sensing? What are its uses especially in the Indian context? (15 Marks, 250 Words) [1998]

Brainstorming Space



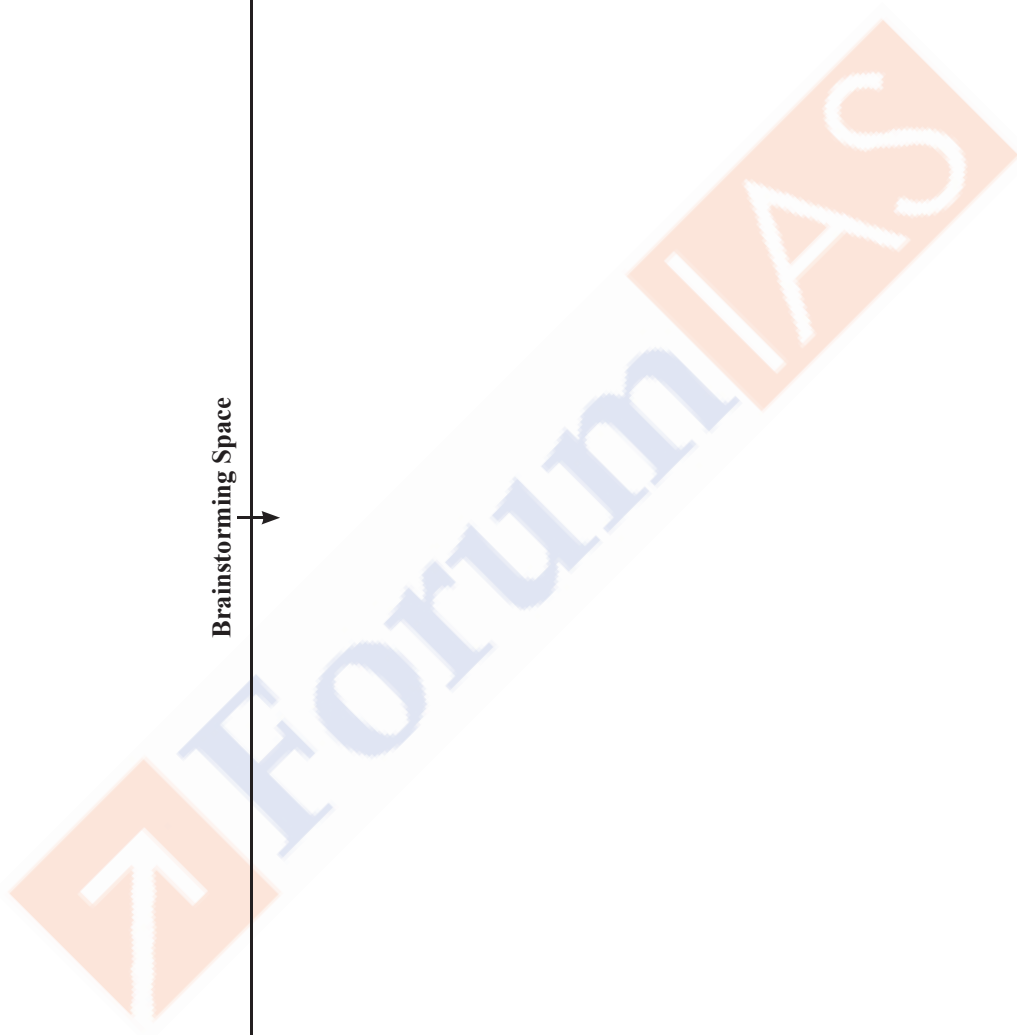
Q.28) Why is Agni Project important for India? (10 Marks, 150 Words) [1997]

Brainstorming Space



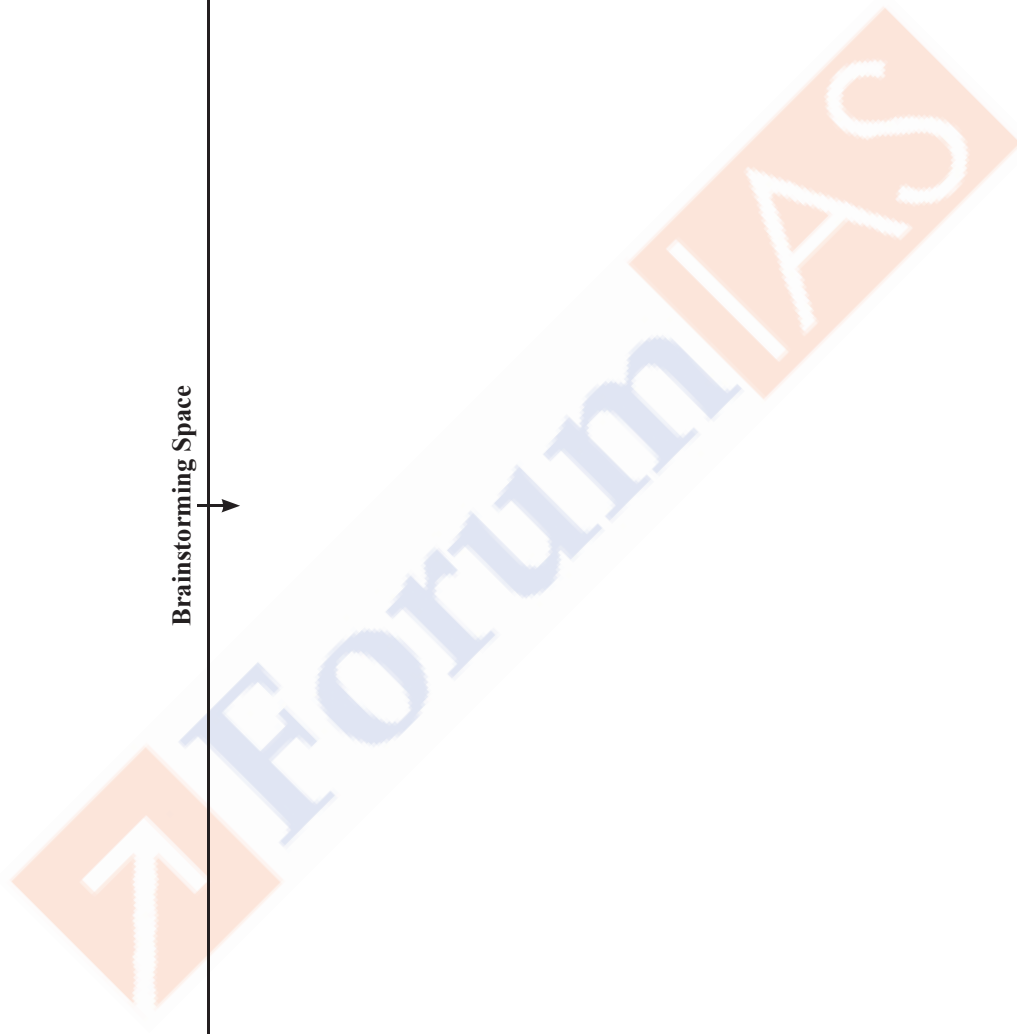
Q.29) Describe how India's space programme has helped in its socio-economic development. (15 Marks, 250 Words) [1996]

Brainstorming Space



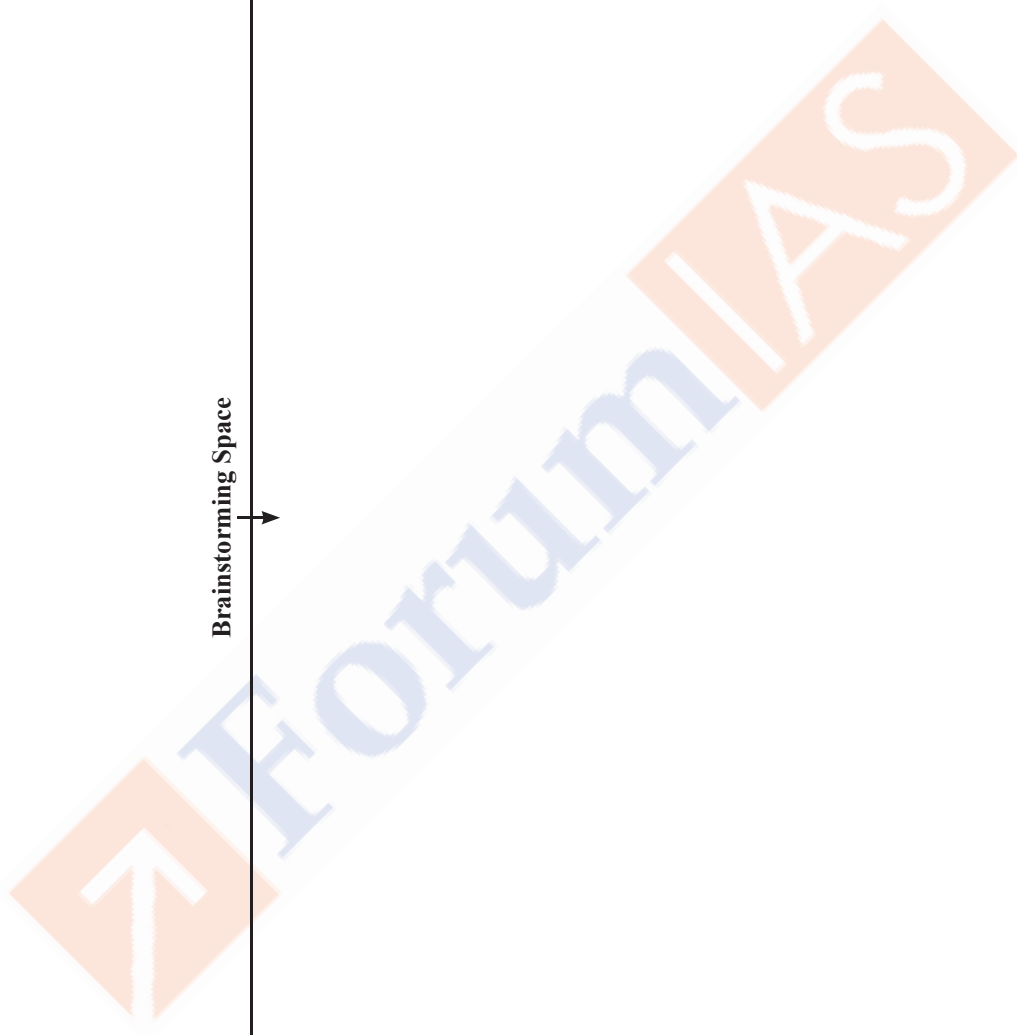
Q.30) What is PSLV? Describe its significance for India's space programme.
(10 Marks, 150 Words) [1995]

Brainstorming Space



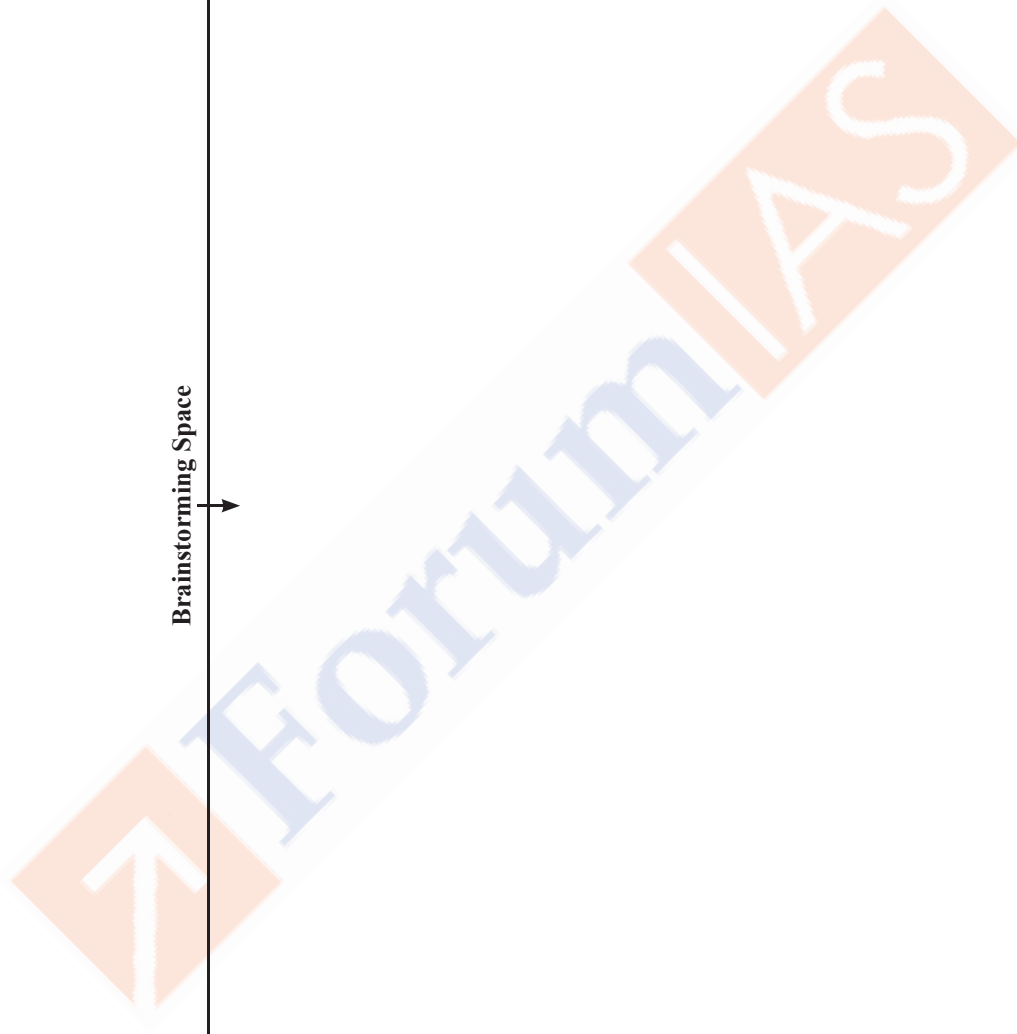
Q.31) What is remote sensing? Describe the status of remote sensing in India. (10 Marks, 150 Words) [1993]

Brainstorming Space



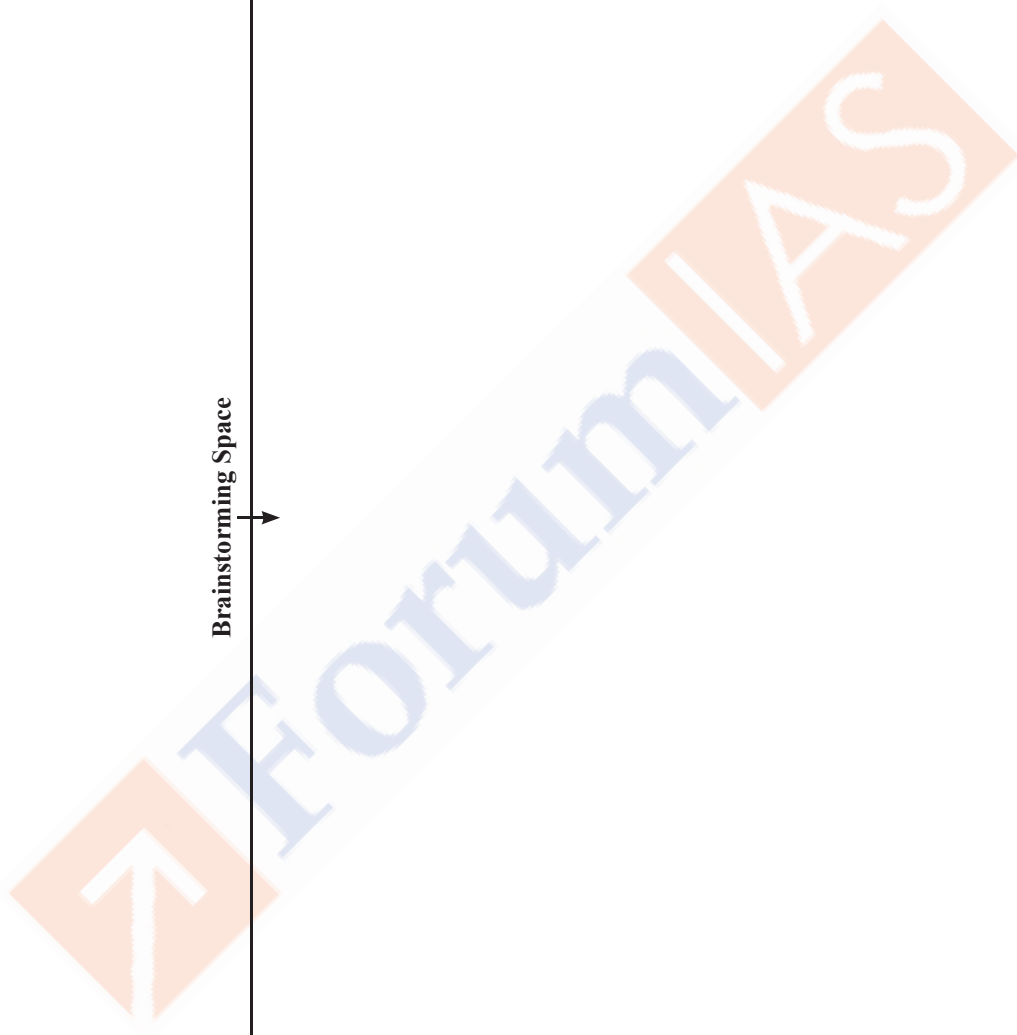
Q.32) Give an account of the achievements of Indian defence scientists in technology development. (10 Marks, 150 Words) [1993]

Brainstorming Space



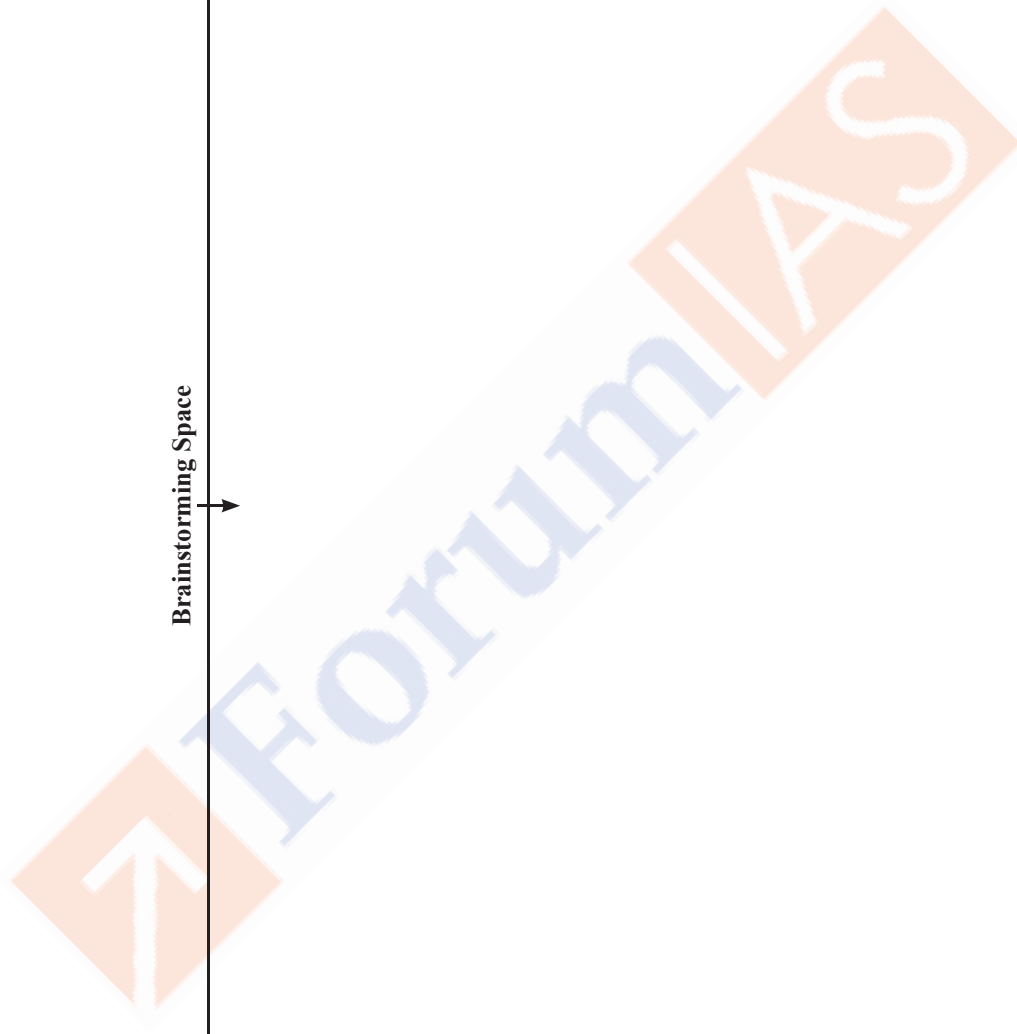
Q.33) Discuss briefly the importance of the cryogenic engine for India's space programme. (10 Marks, 150 Words) [1992]

Brainstorming Space



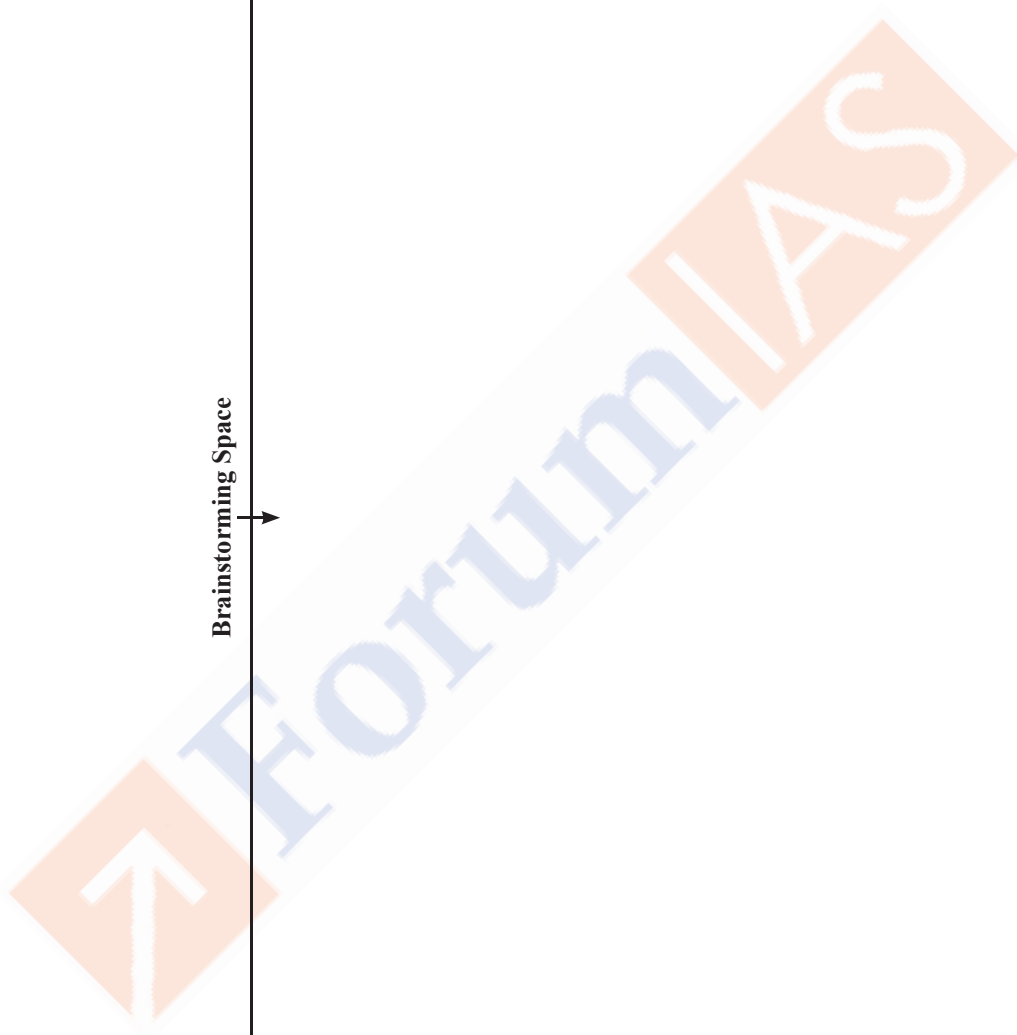
Q.34) What are the salient features of India's missile development programme?
(10 Marks, 150 Words) [1992]

Brainstorming Space



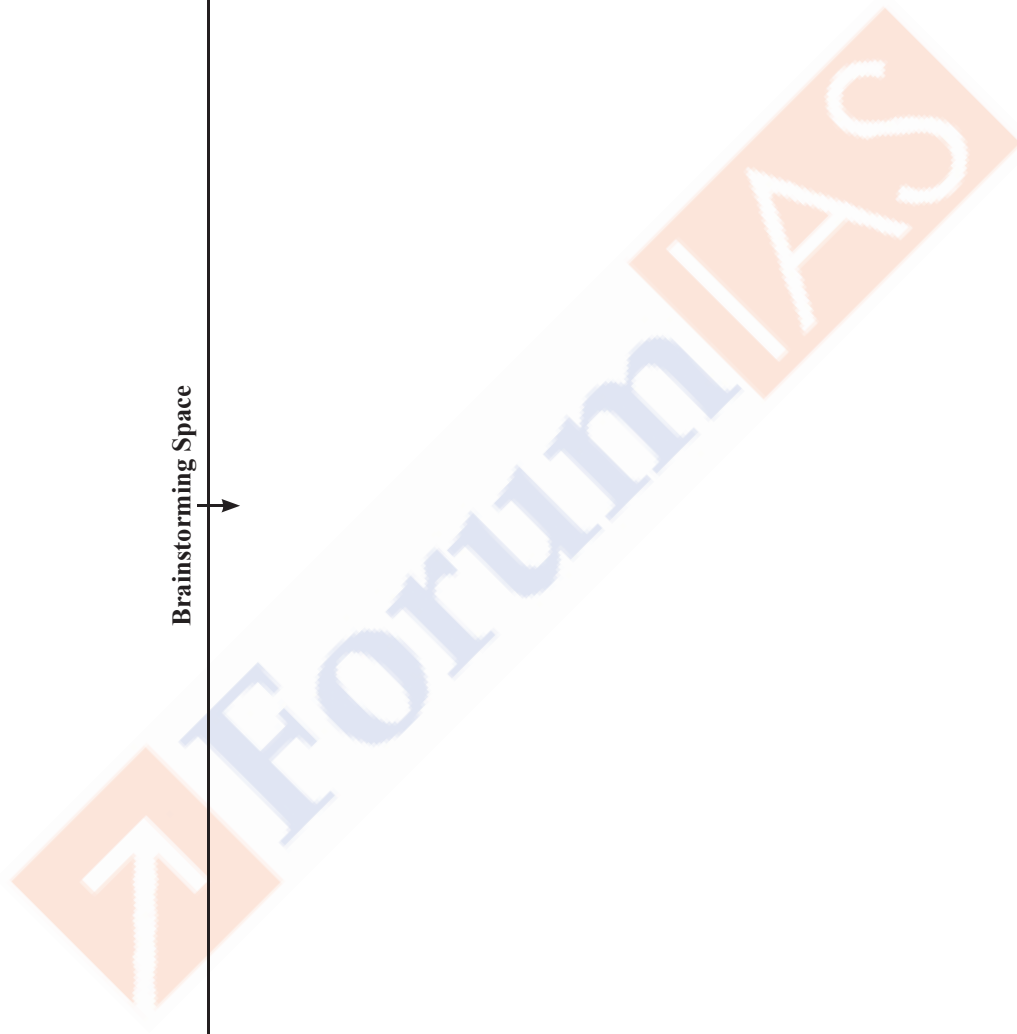
Q.35) Trace the progress of India's Space Research Programmes? What are its significant achievements? (10 Marks, 150 Words) [1991]

Brainstorming Space



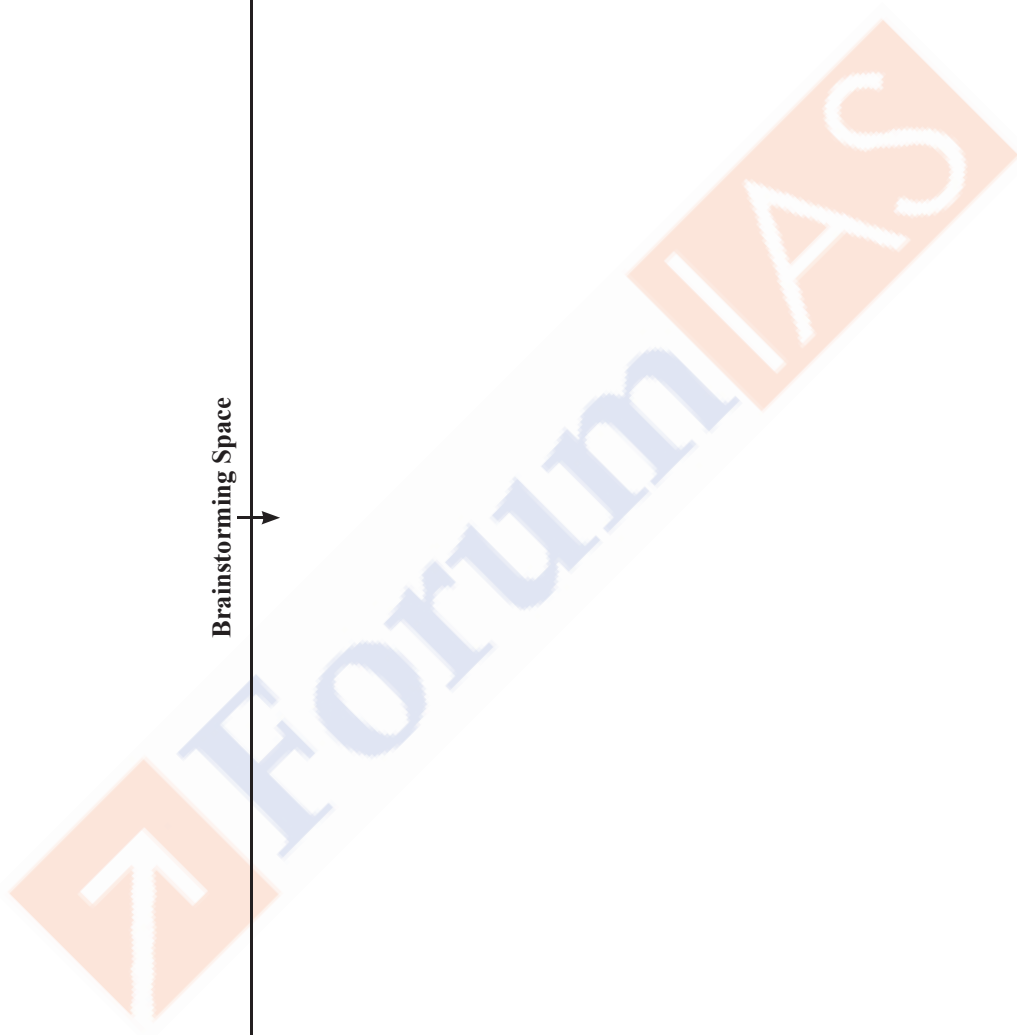
Q.36) What is meant by a stealth aircraft? Mention two stealth technological techniques used in such an aircraft. (10 Marks, 150 Words) [1989]

Brainstorming Space



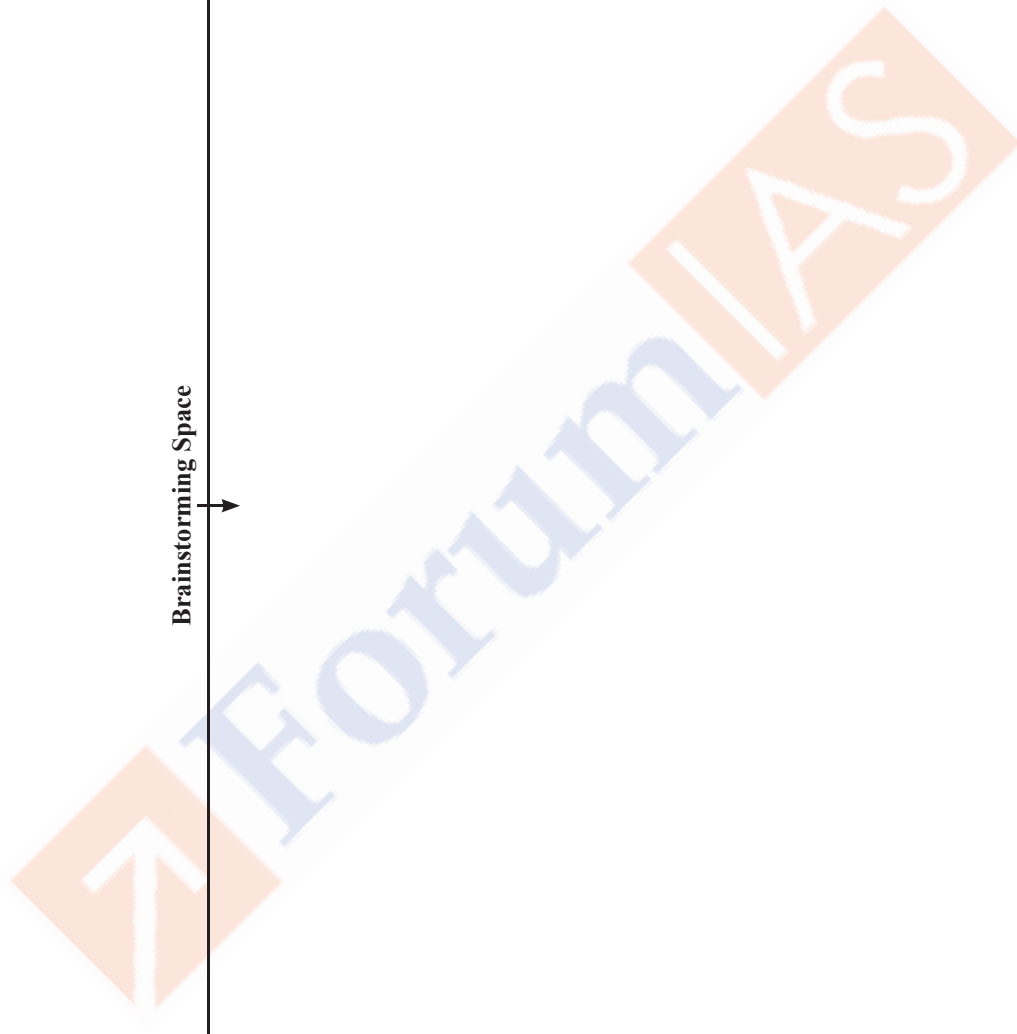
Q.37) What is remote sensing technique? Name the various regional remote sensing centers in India. What specific purposes are served by remote sensing operations? (10 Marks, 150 Words) [1986]

Brainstorming Space



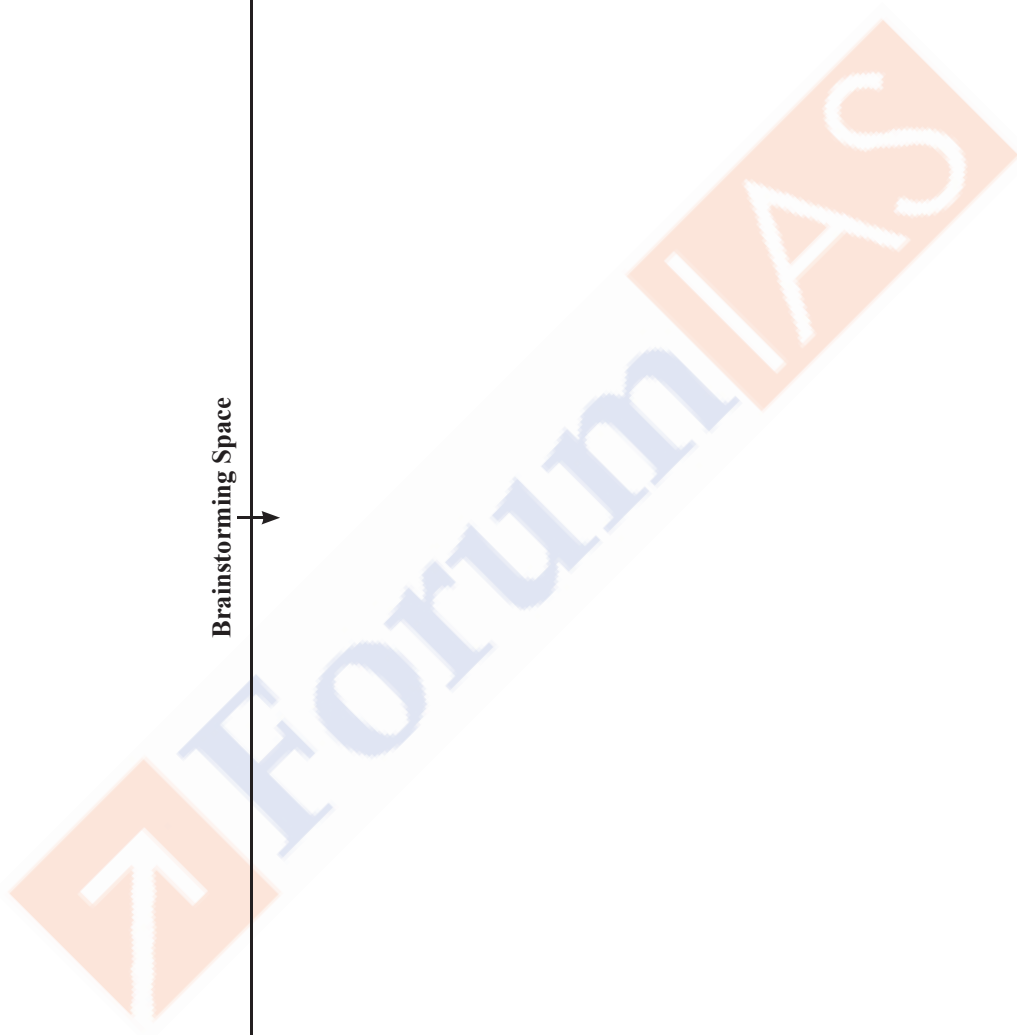
Q.38) What are the advantages to the nation in sending on man into space? It is sometimes argued that the problem of tackling poverty will get side-lined if we indulge in such luxurious experiments. What are your views in this regard? (10 Marks, 150 Words) [1983]

Brainstorming Space



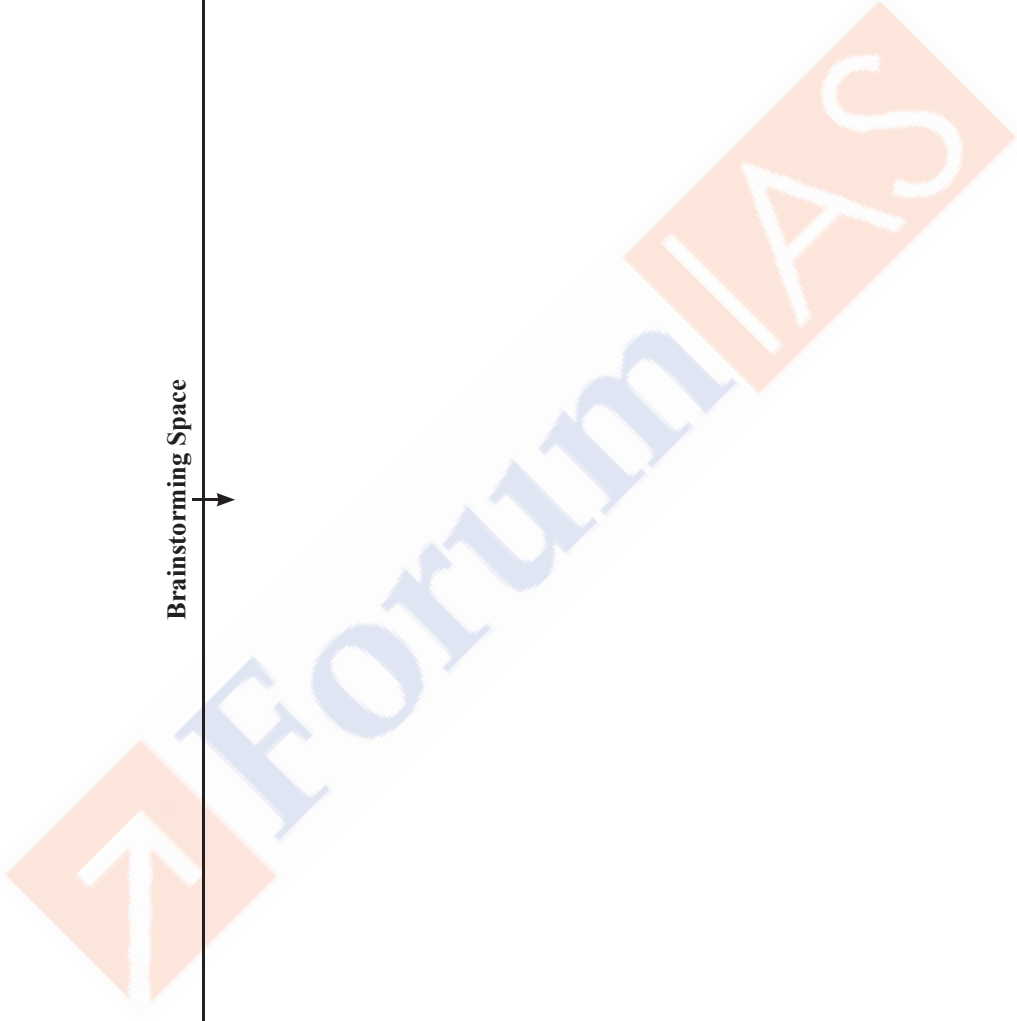
Q.39) What are the significant achievements of Indian scientists in the context of Space Research? How will space technology be useful for weather prediction, telecommunications and identification of natural resources?
(15 Marks, 250 Words) [1981]

Brainstorming Space



Q.40) Name the main combat aircraft which are in active service in Indian Air Force. Which of them is obsolete or obsolescent? What have been the recent acquisitions of combat aircraft for use in our Air Force? What options are open to Indian Air Force to match the F – 16 Aircraft, which is being acquired by? (10 Marks, 150 Words) [1980]

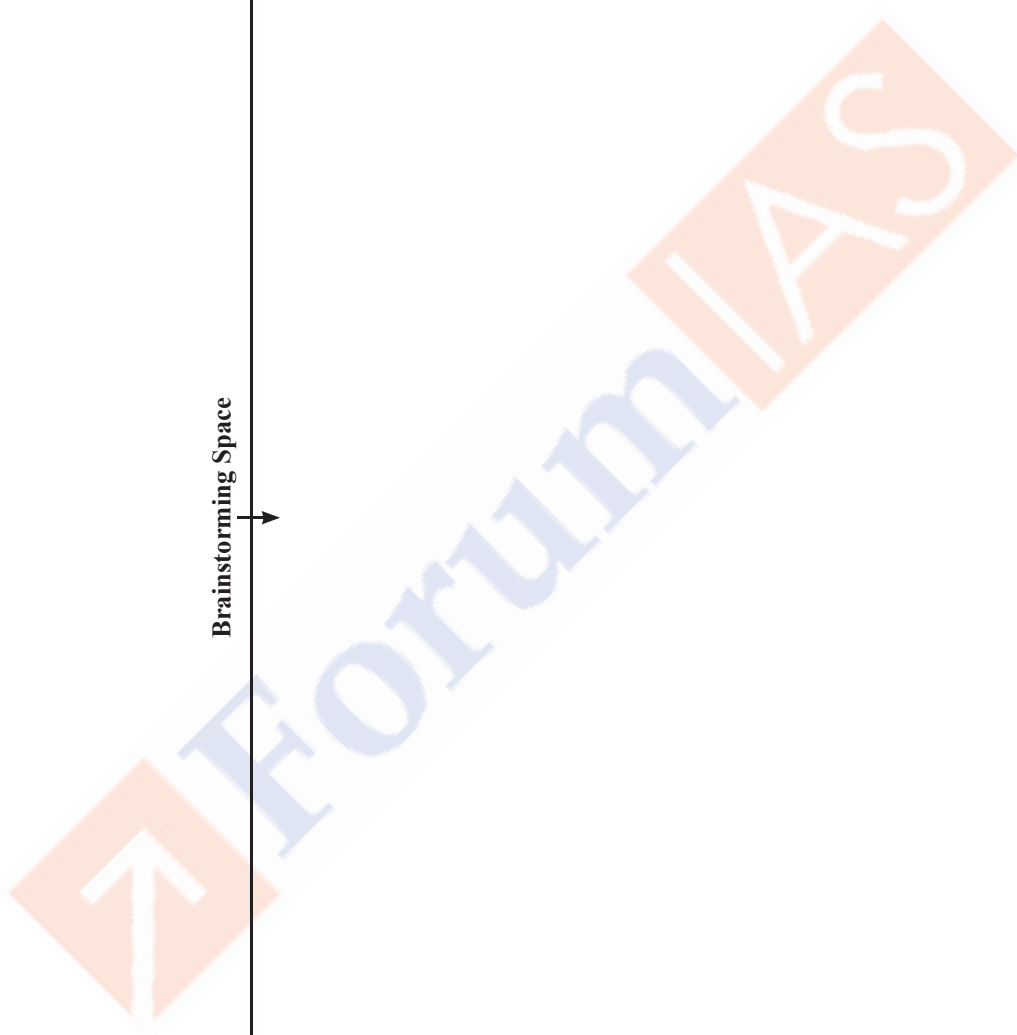
Brainstorming Space



Q.41) India aims to become a semiconductor manufacturing hub. What are the challenges faced by the semiconductor industry in India? Mention the salient features of the India Semiconductor Mission

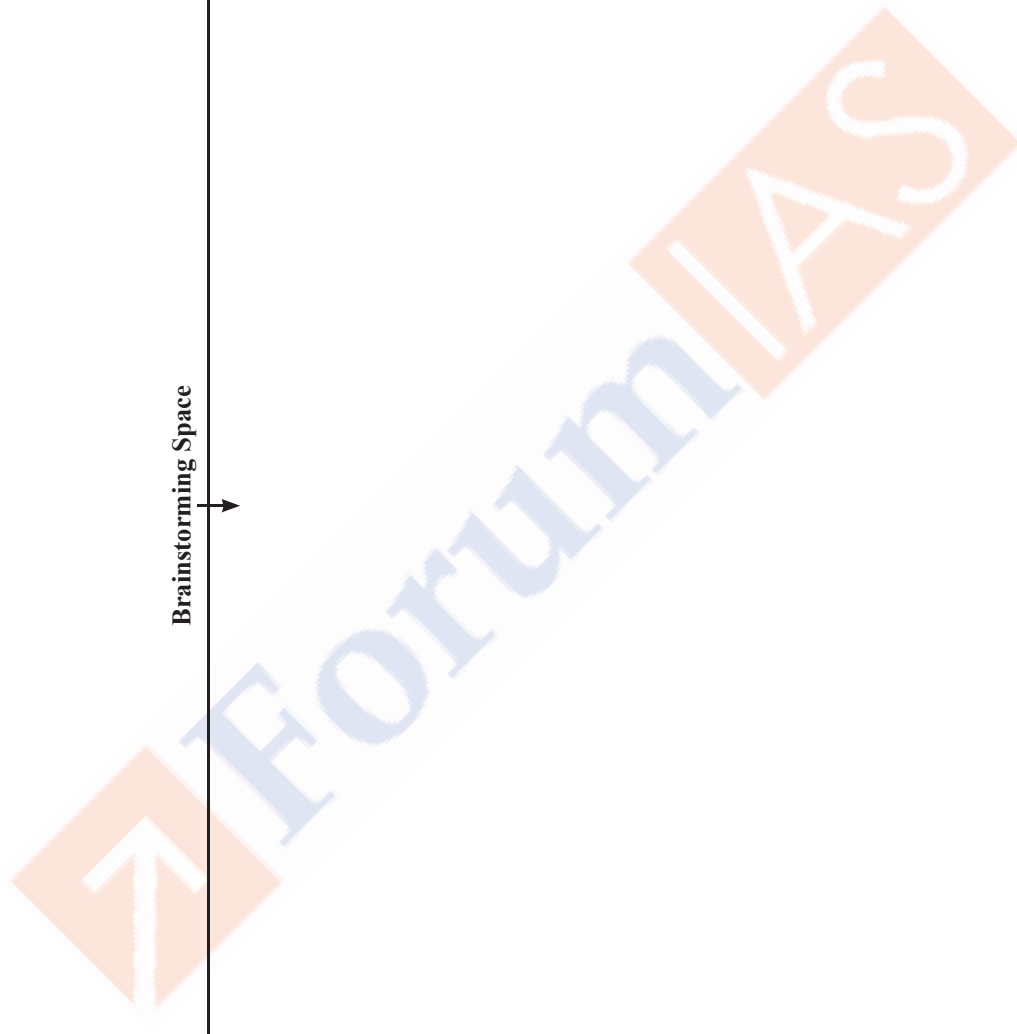
(15 Marks, 250 Words) [2025]

Brainstorming Space



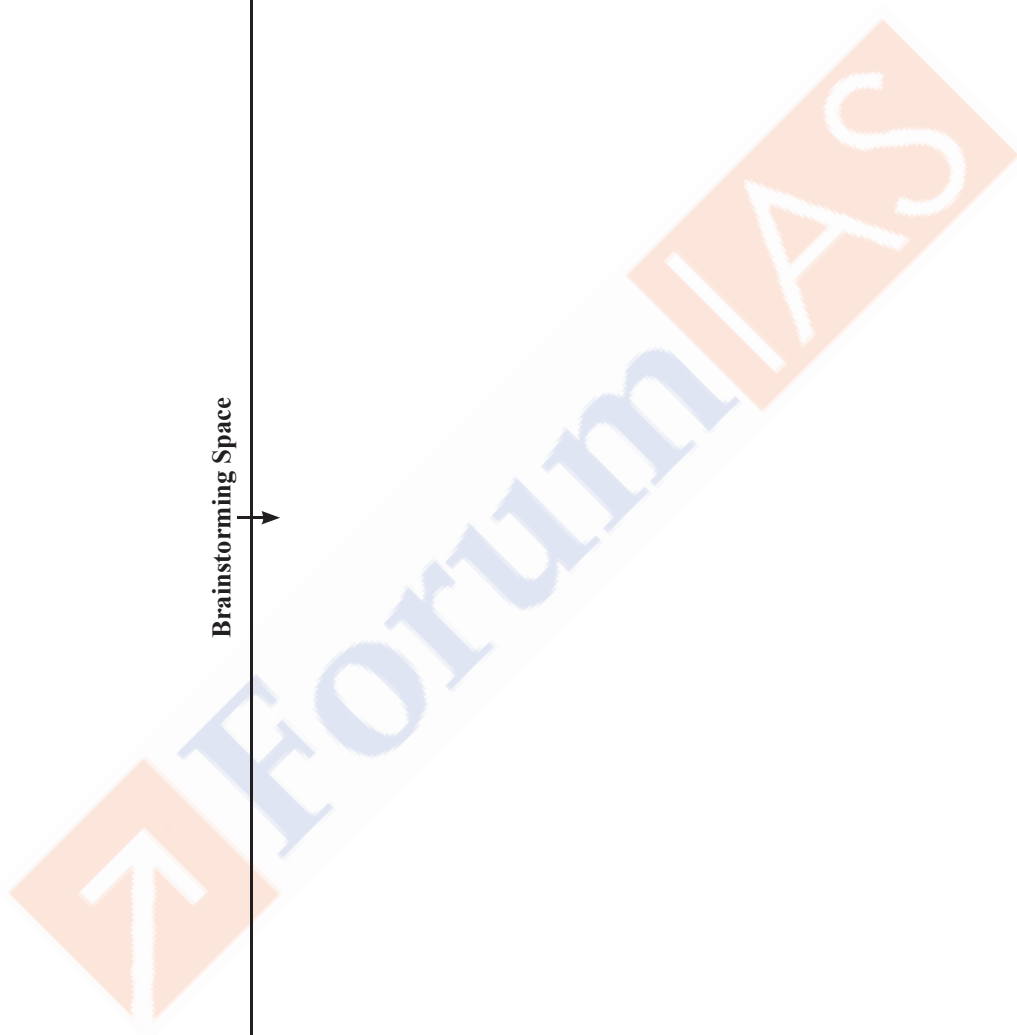
Q.42) What is the technology being employed for electronic toll collection on highways? What are its advantages and limitations? What are the proposed changes that will make this process seamless? Would this transition carry any potential hazards? (10 Marks, 150 Words) [2024]

Brainstorming Space



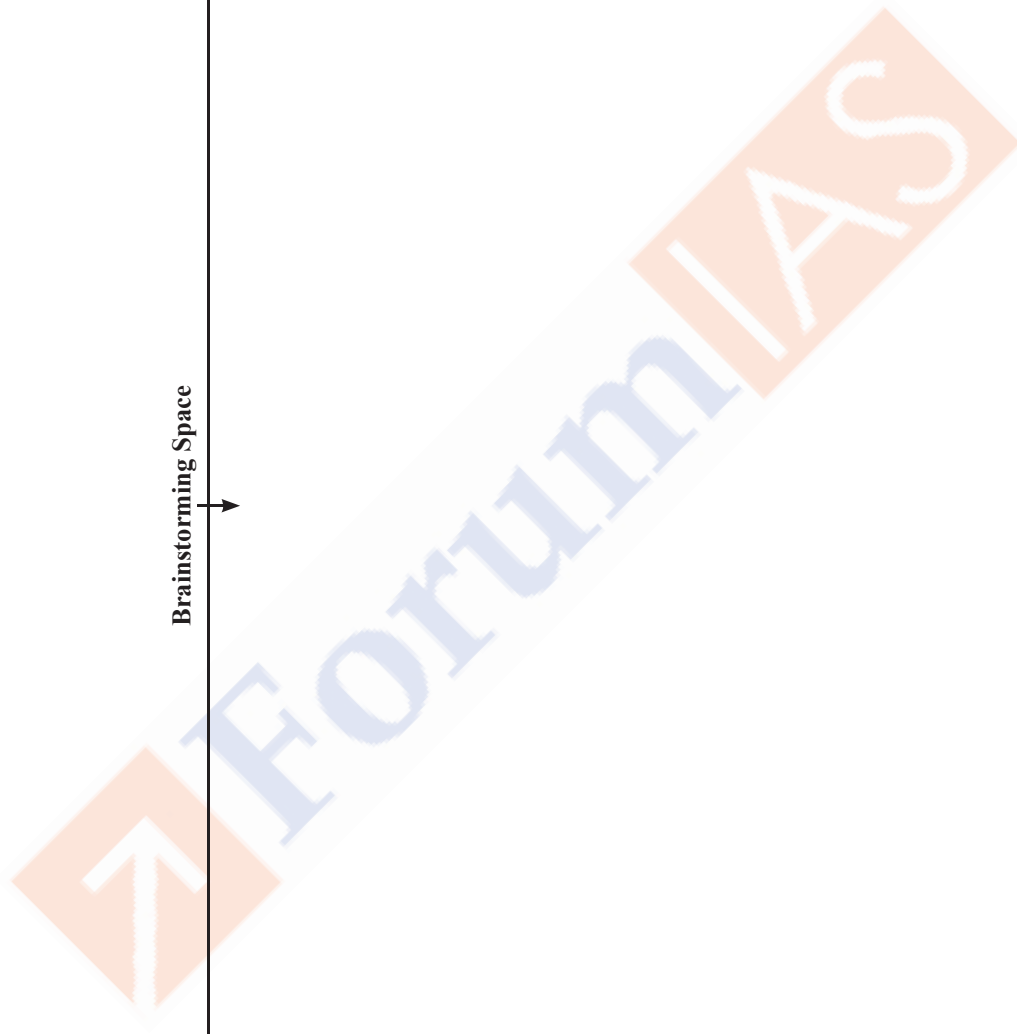
Q.43) Introduce the concept of Artificial Intelligence (AI). How does AI help clinical diagnosis? Do you perceive any threat to privacy of the individual in the use of AI in healthcare? (10 Marks, 150 Words) [2023]

Brainstorming Space



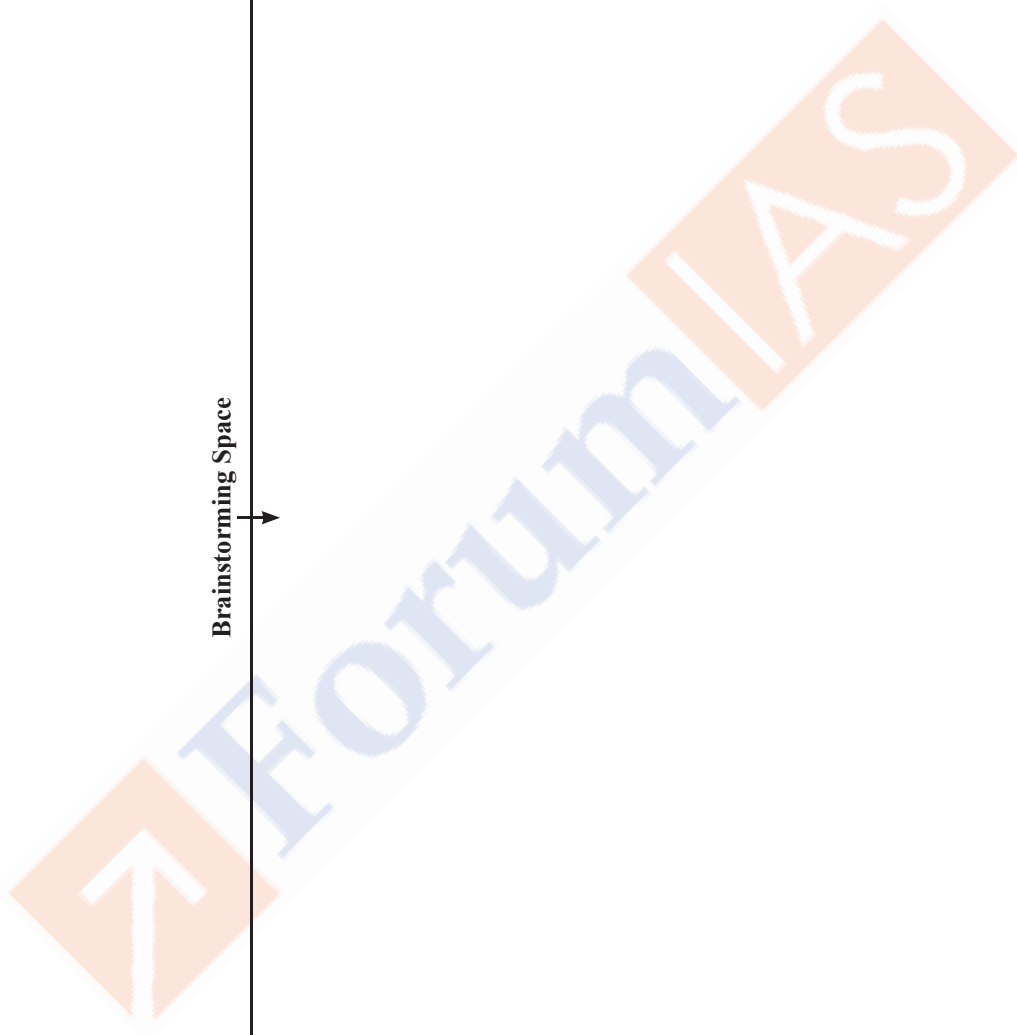
Q.44) "How can the 'Digital India' programme help farmers to improve farm productivity and income? What steps has the Government taken in this regards?"
(12.5 Marks, 200 Words) [2015]

Brainstorming Space



Q.45) "Discuss the advantage and security implications of cloud hosting of servers vis-a-vis in-house machine-based hosting for government businesses".
(12.5 Marks, 200 Words) [2015]

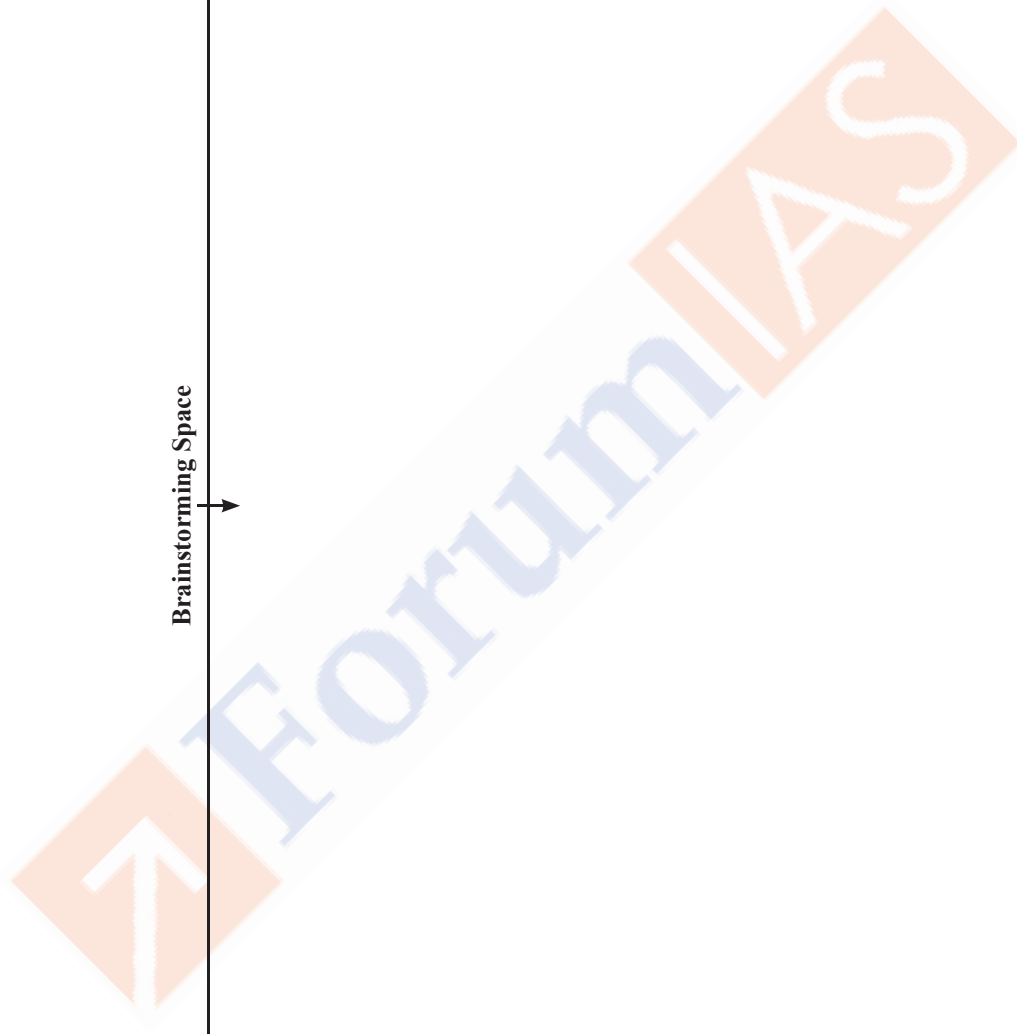
Brainstorming Space



Q.46) What is a digital signature? What does its authentication mean? Give various salient built-in features of a digital signature.

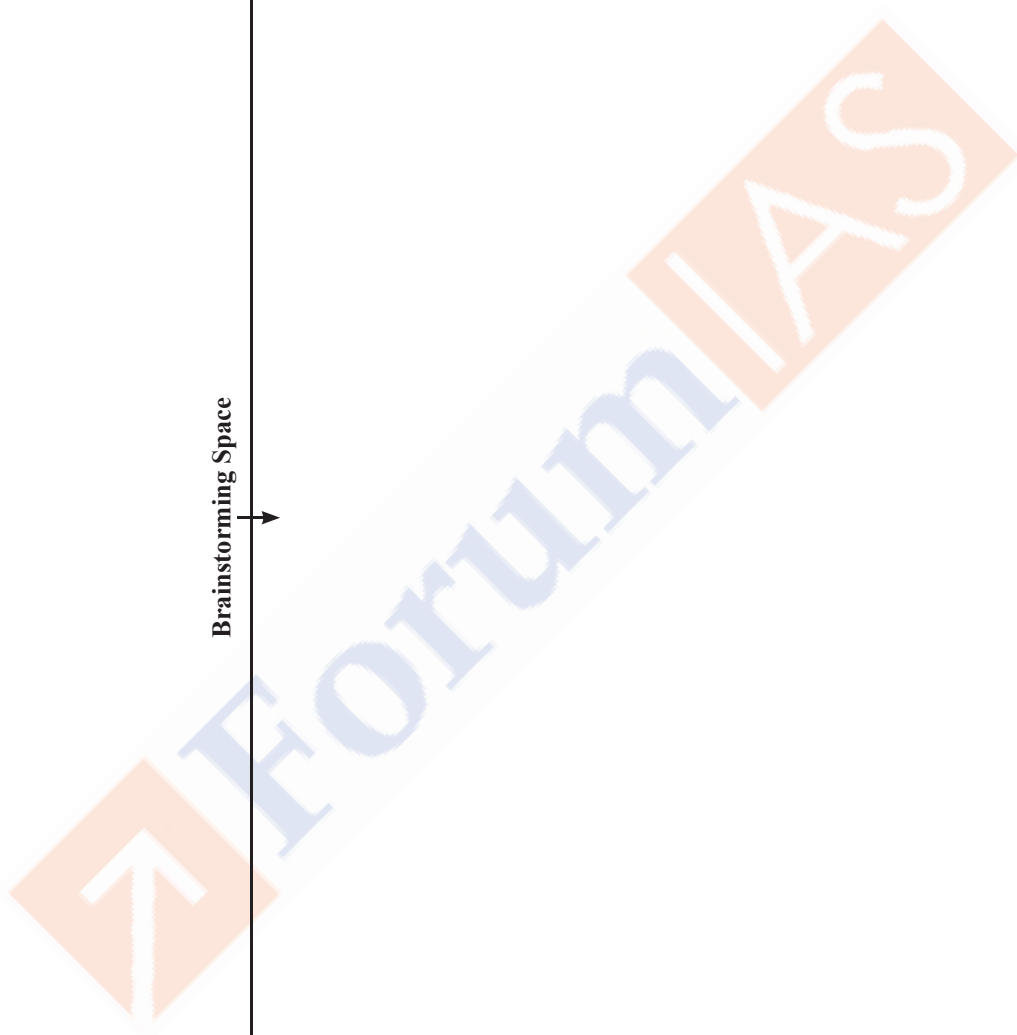
(10 Marks, 150 Words) [2013]

Brainstorming Space



Q.47) How does the 3D printing technology work? List out the advantages and disadvantages of the technology. (10 Marks, 150 Words) [2013]

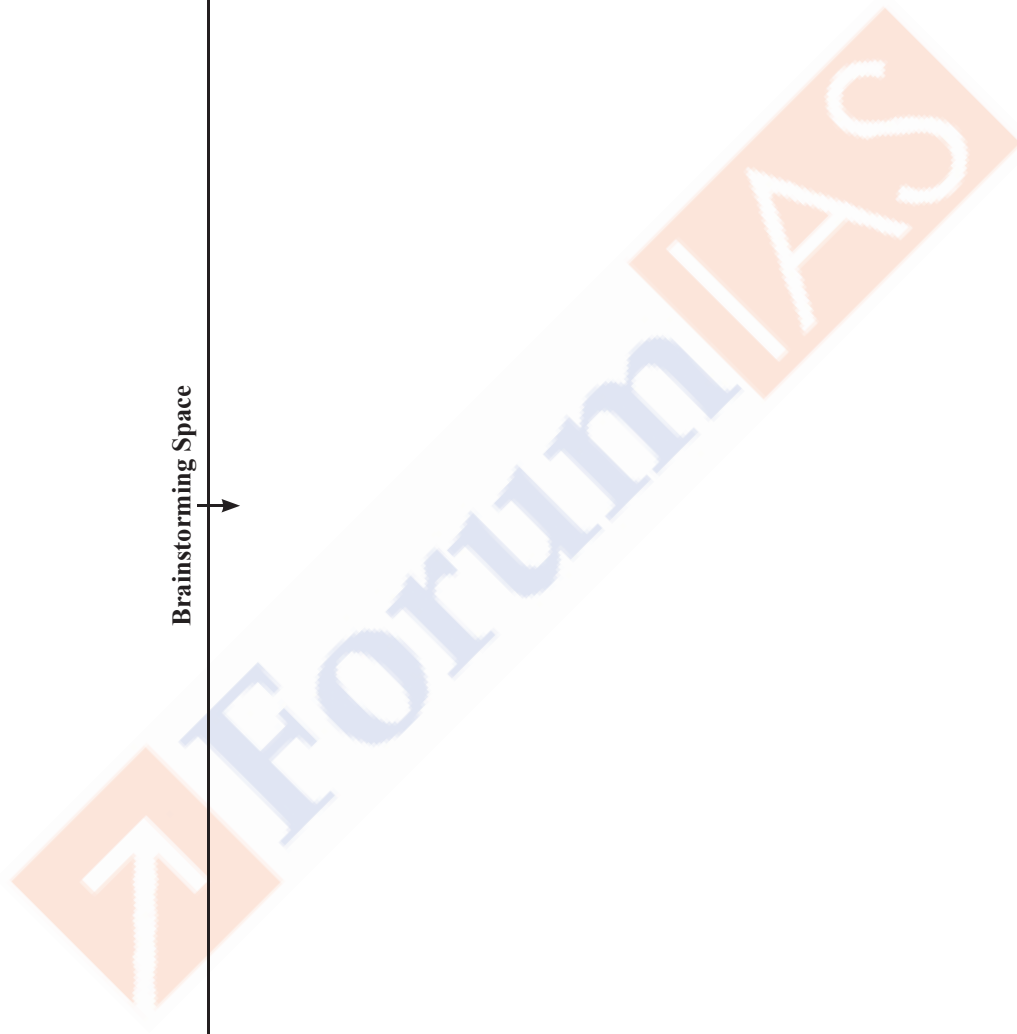
Brainstorming Space



Q.48) Use of Information technology in health management in India.

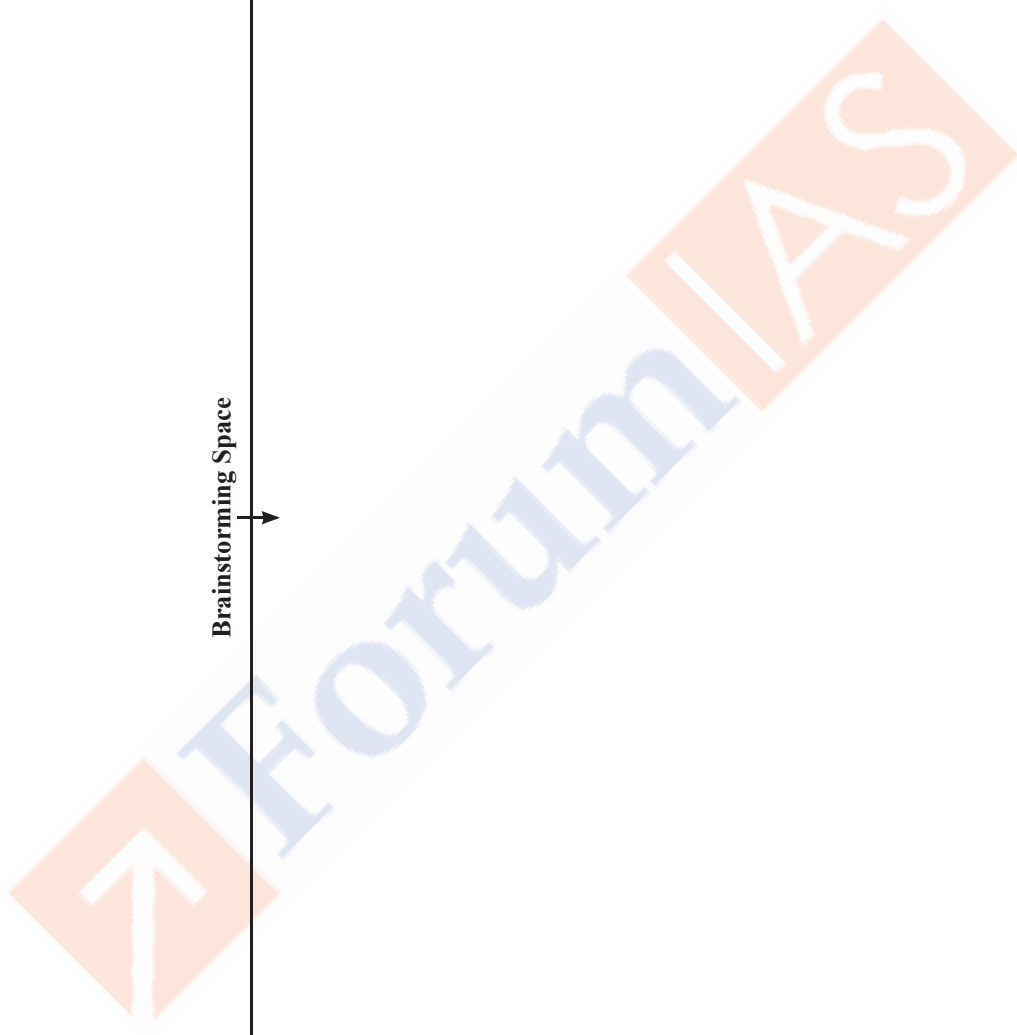
(10 Marks, 150 Words) [2005]

Brainstorming Space



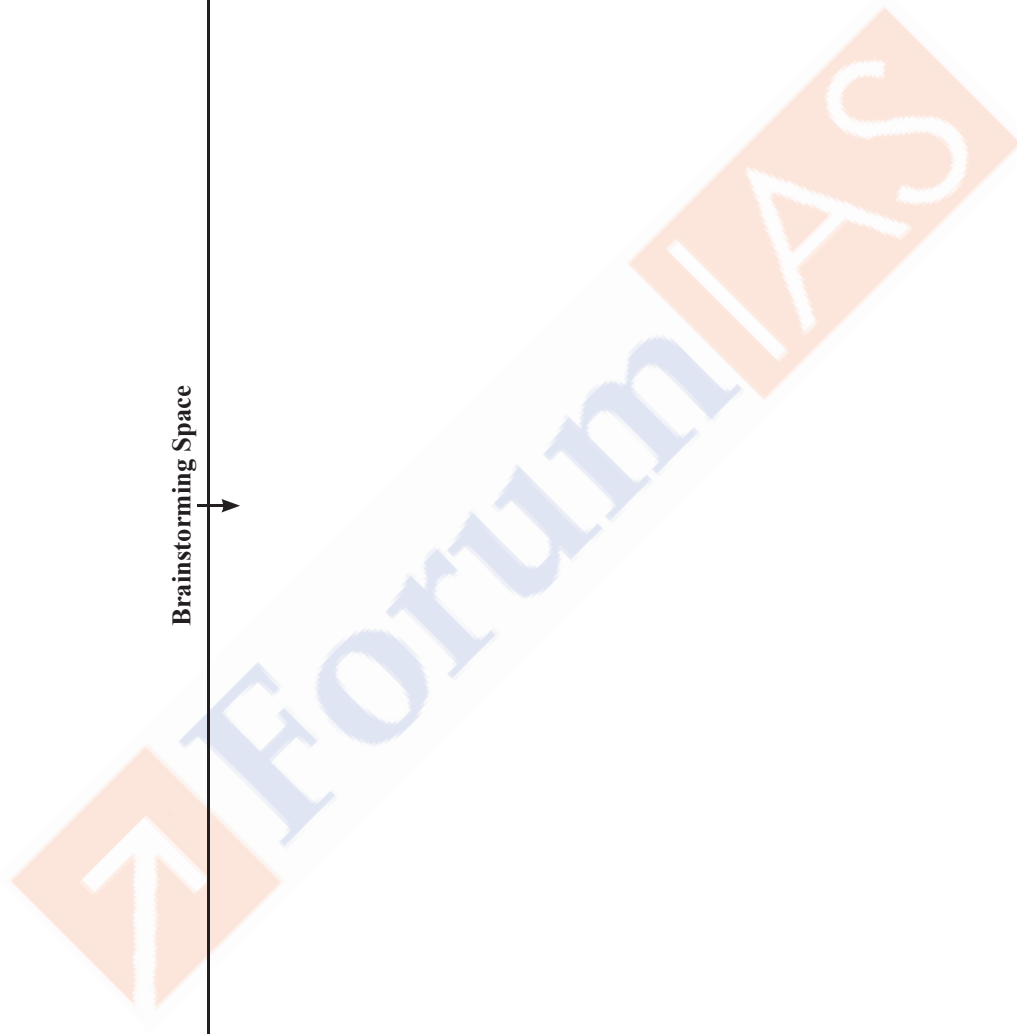
Q.49) What is digital convergence? Examine its implications for modern society. (10 Marks, 150 Words) [2005]

Brainstorming Space



Q.50) India is rapidly emerging as an Information Technology (IT) Superpower. Discuss some aspects of the growth of this Sector in the Indian economy. What role can public policy play in further enhancing growth prospects in this Sector? (15 Marks, 250 Words) [2000]

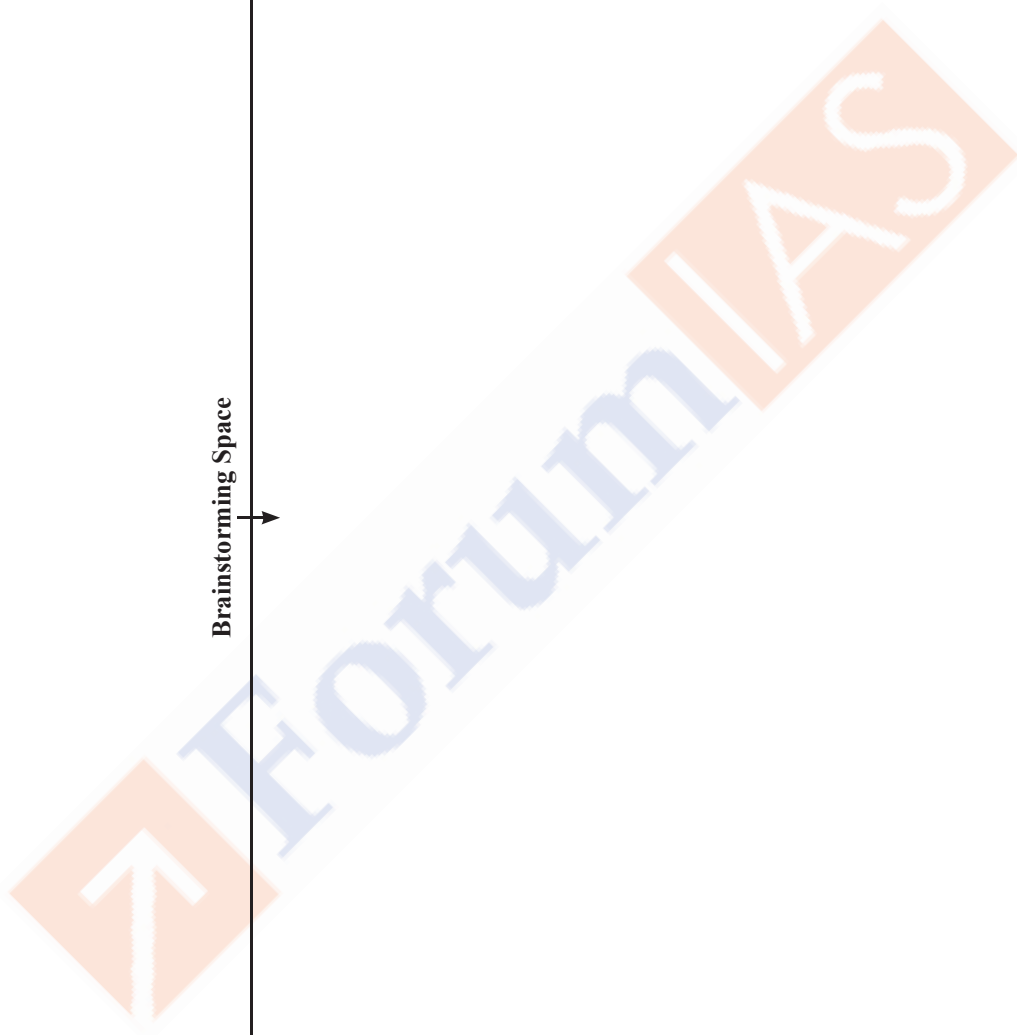
Brainstorming Space



Q.51) Describe the development of Super-computers in India.

(10 Marks, 150 Words) [1998]

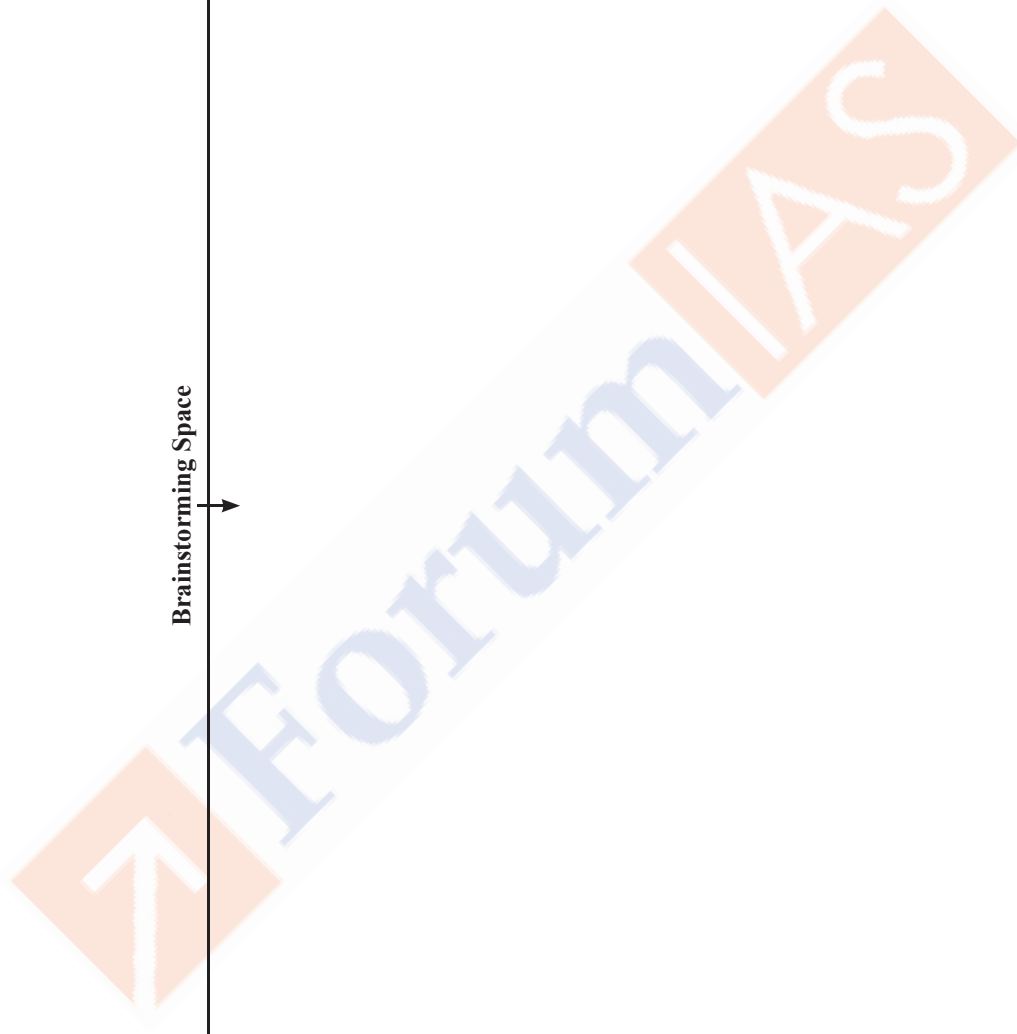
Brainstorming Space



Q.52) What are optical fibres? What are their advantages?

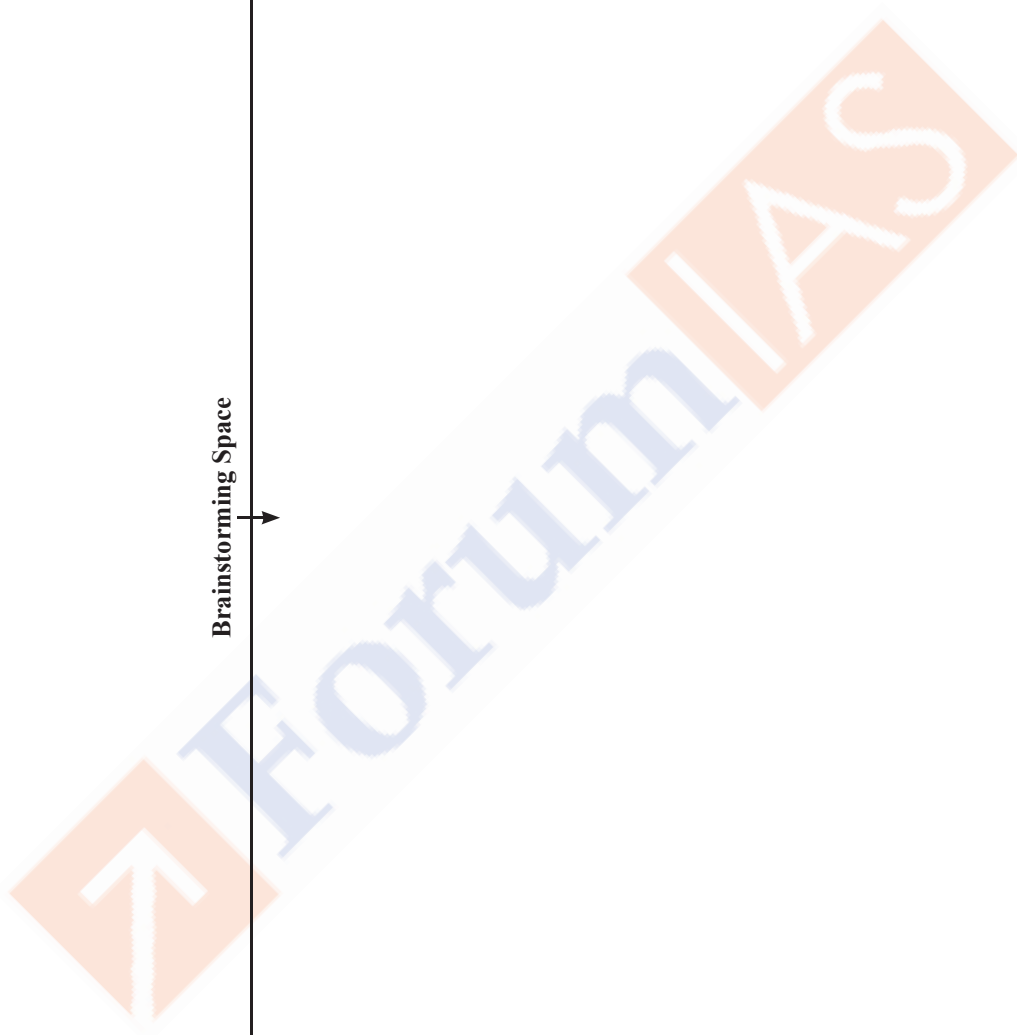
(10 Marks, 150 Words) [1998]

Brainstorming Space



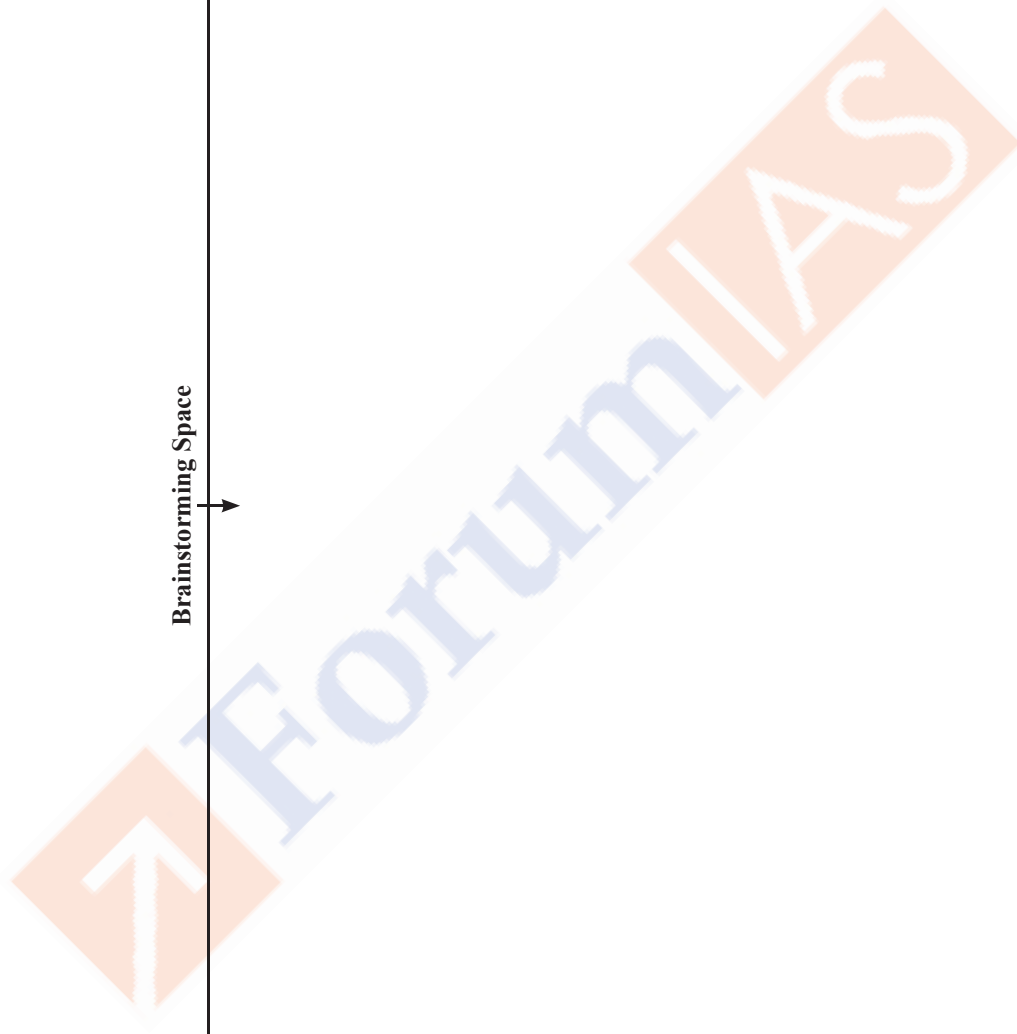
Q.53) What is a supercomputer? Give an account of super-computer development in India. (10 Marks, 150 Words) [1993]

Brainstorming Space



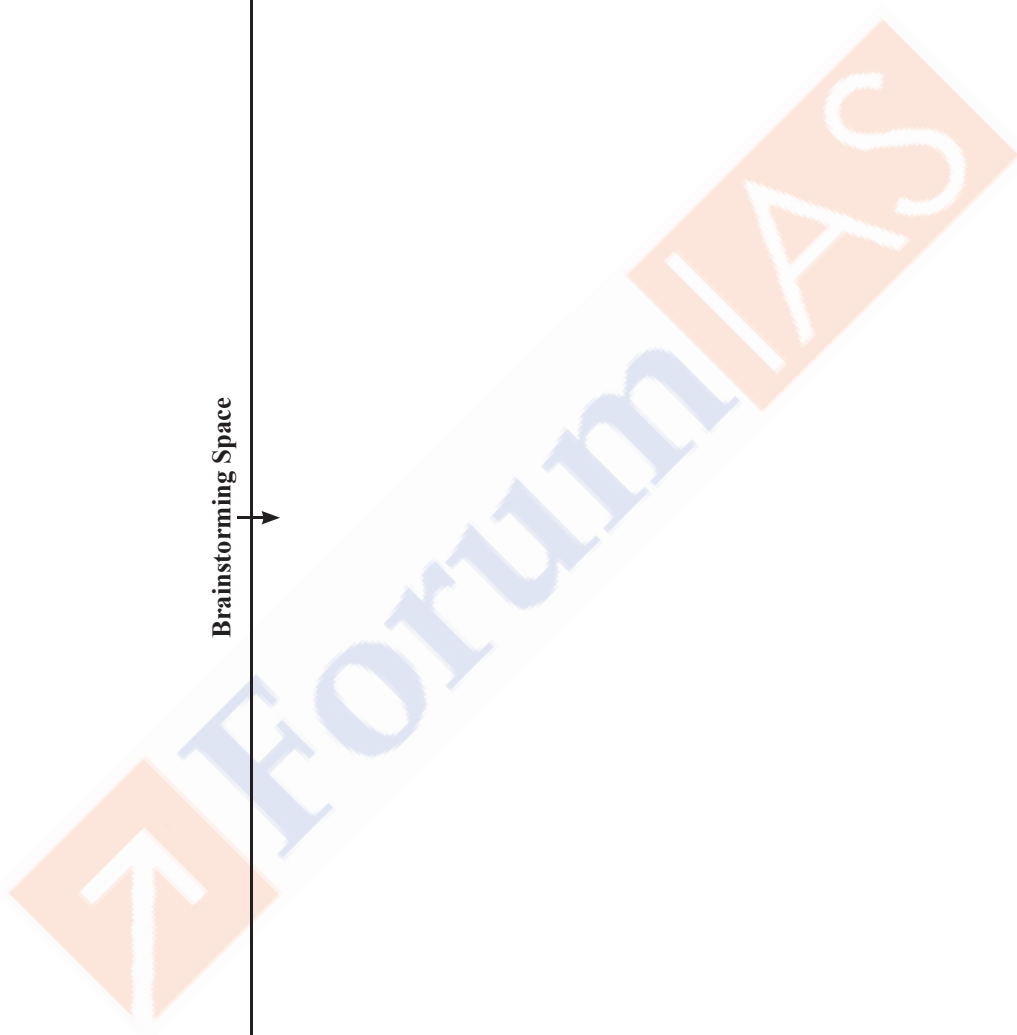
Q.54) What is a CD-ROM? Describe its main advantages as a vehicle for information dissemination. (10 Marks, 150 Words) [1993]

Brainstorming Space



Q.55) What is artificial intelligence? What is its current scenario and what are its prospects? (15 Marks, 250 Words) [1991]

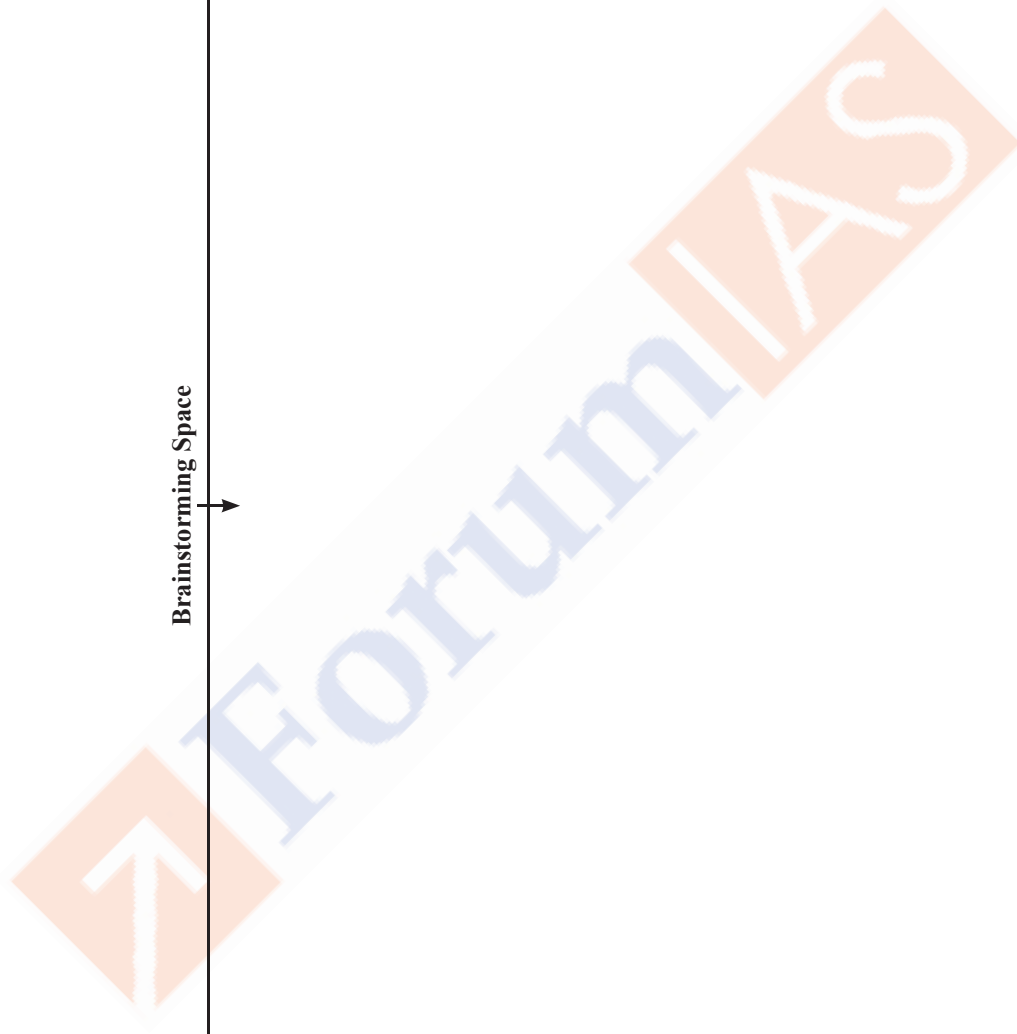
Brainstorming Space



Q.56) What is the application of superconductors in computers?

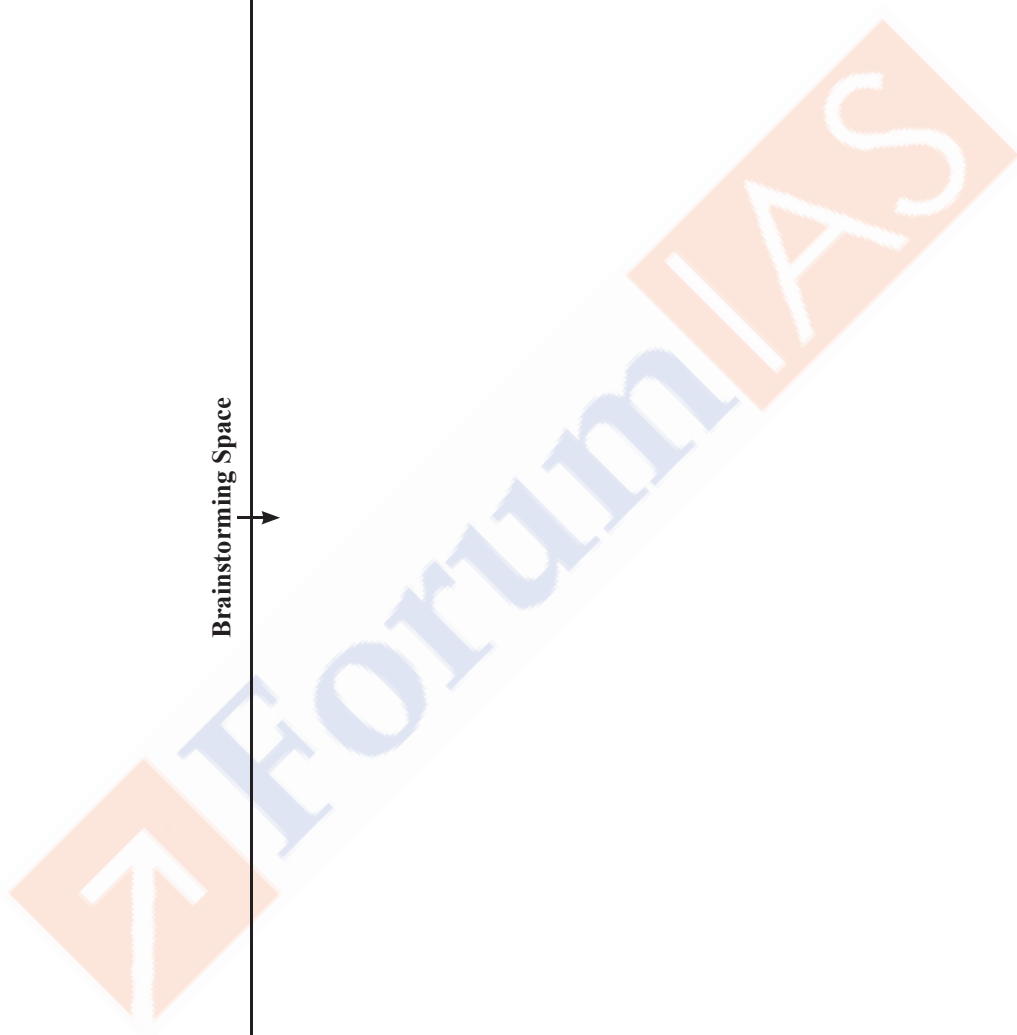
(10 Marks, 150 Words) [1991]

Brainstorming Space



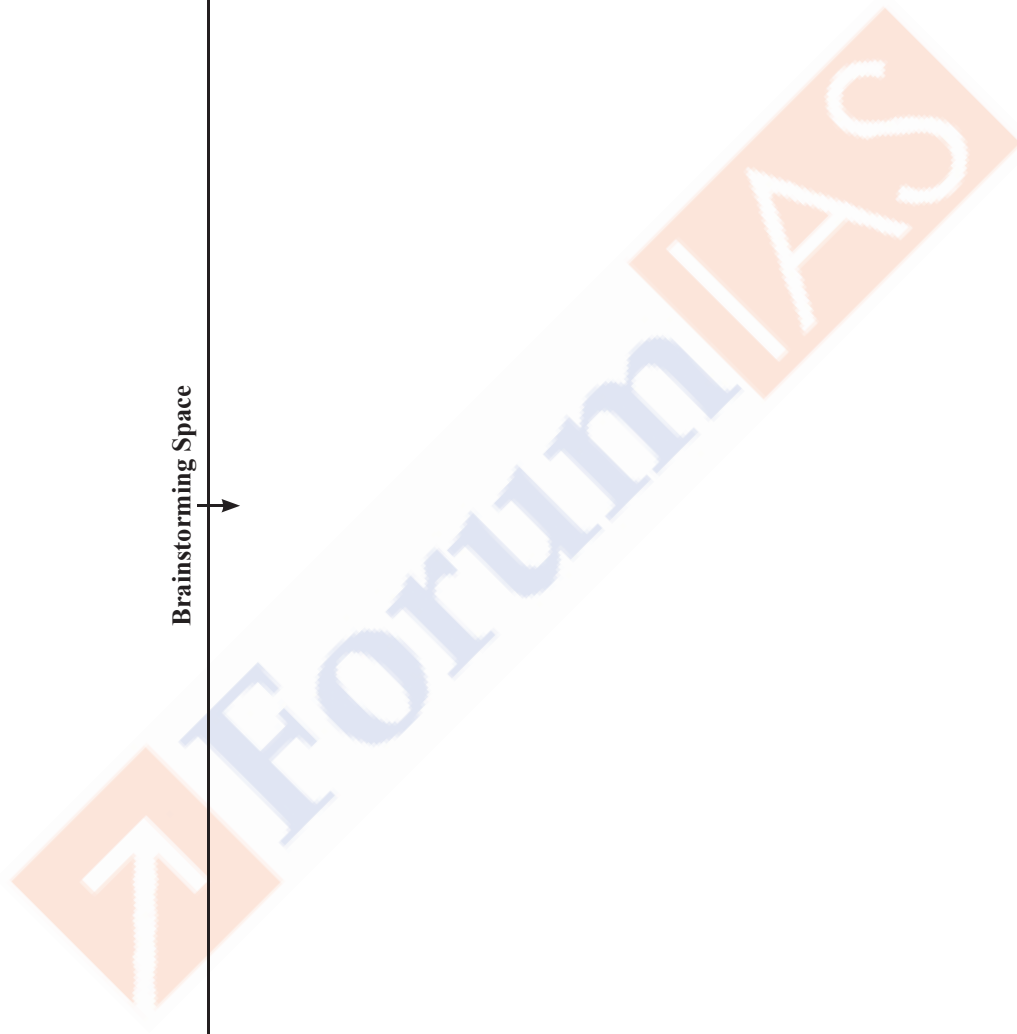
Q.57) "It is believed that the use of fiber optics will revolutionize the telecommunication technology. What progress has been made in India in this field?"
(15 Marks, 250 Words) [2005]

Brainstorming Space



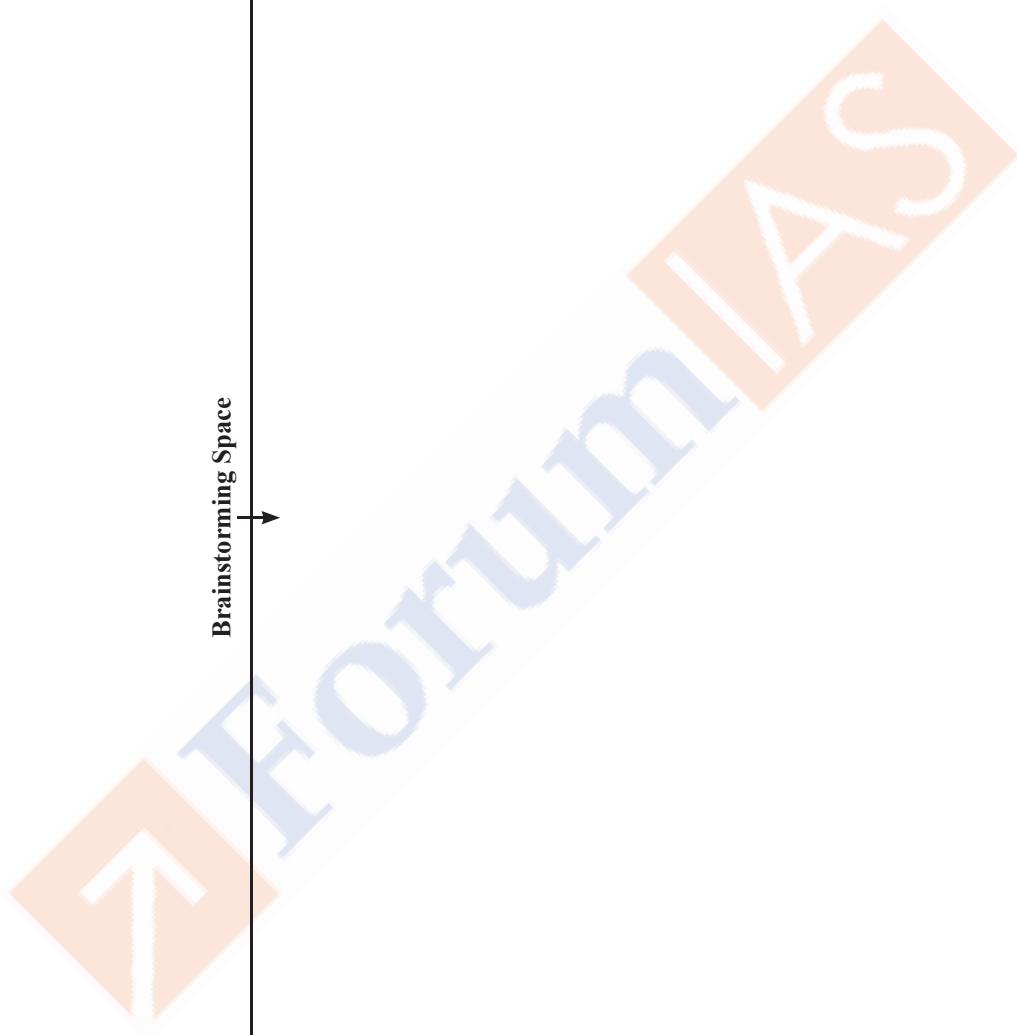
Q.58) "What are the areas of prohibitive labour that can be sustainably managed by robots? Discuss the initiatives that can propel research in premier research institutes for substantive and gainful innovation."
(12.5 Marks, 200 Words) [2015]

Brainstorming Space



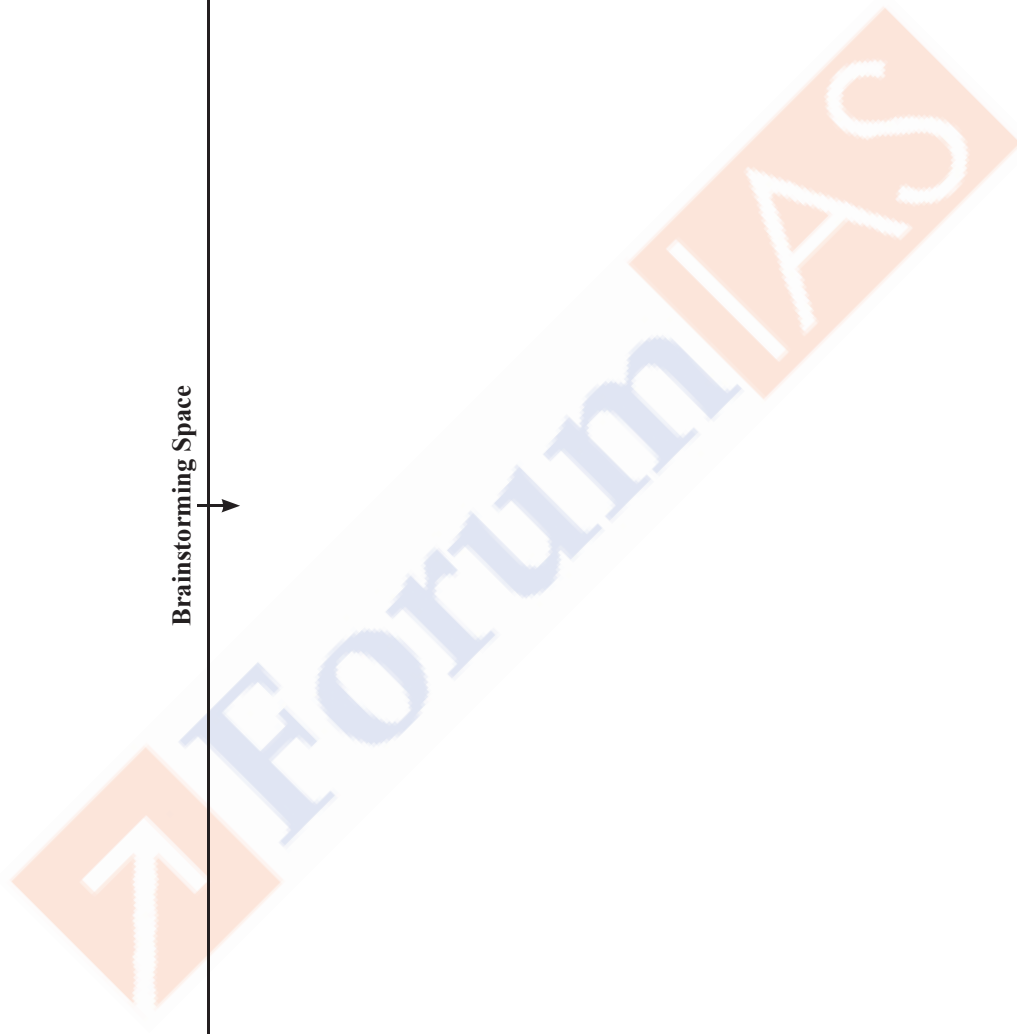
Q.59) How does nanotechnology offer significant advancements in the field of agriculture? How can this technology help to uplift the socio-economic status of farmers? (15 Marks, 250 Words) [2025]

Brainstorming Space



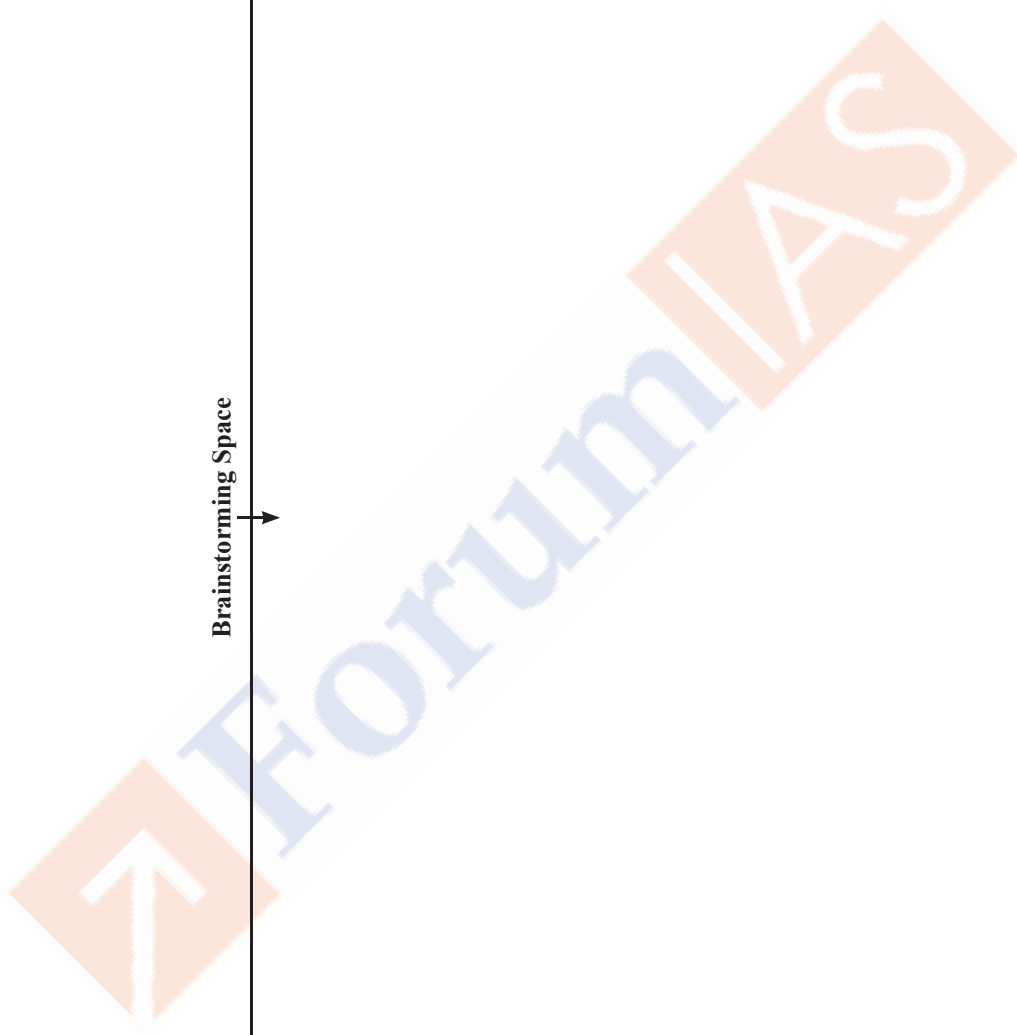
Q.60) What do you understand by nanotechnology and how is it helping in the health sector? (10 Marks, 150 Words) [2020]

Brainstorming Space



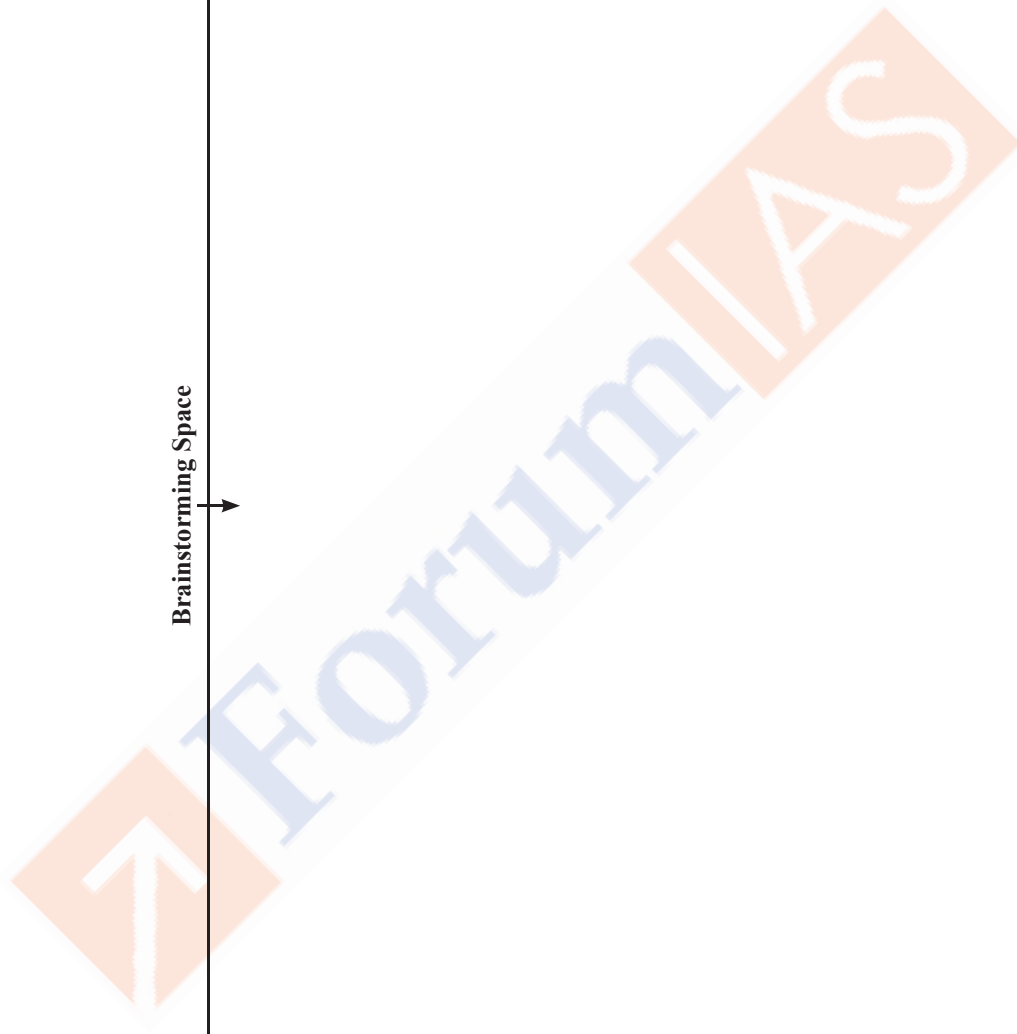
Q.61) Explain how Nanoscience and Nanotechnology have revolutionized modern technology. (15 Marks, 250 Words) [2006]

Brainstorming Space



Q.62) How can India achieve energy independence through clean technology by 2047? How can biotechnology play a crucial role in this endeavour? (10 Marks, 150 Words) [2025]

Brainstorming Space



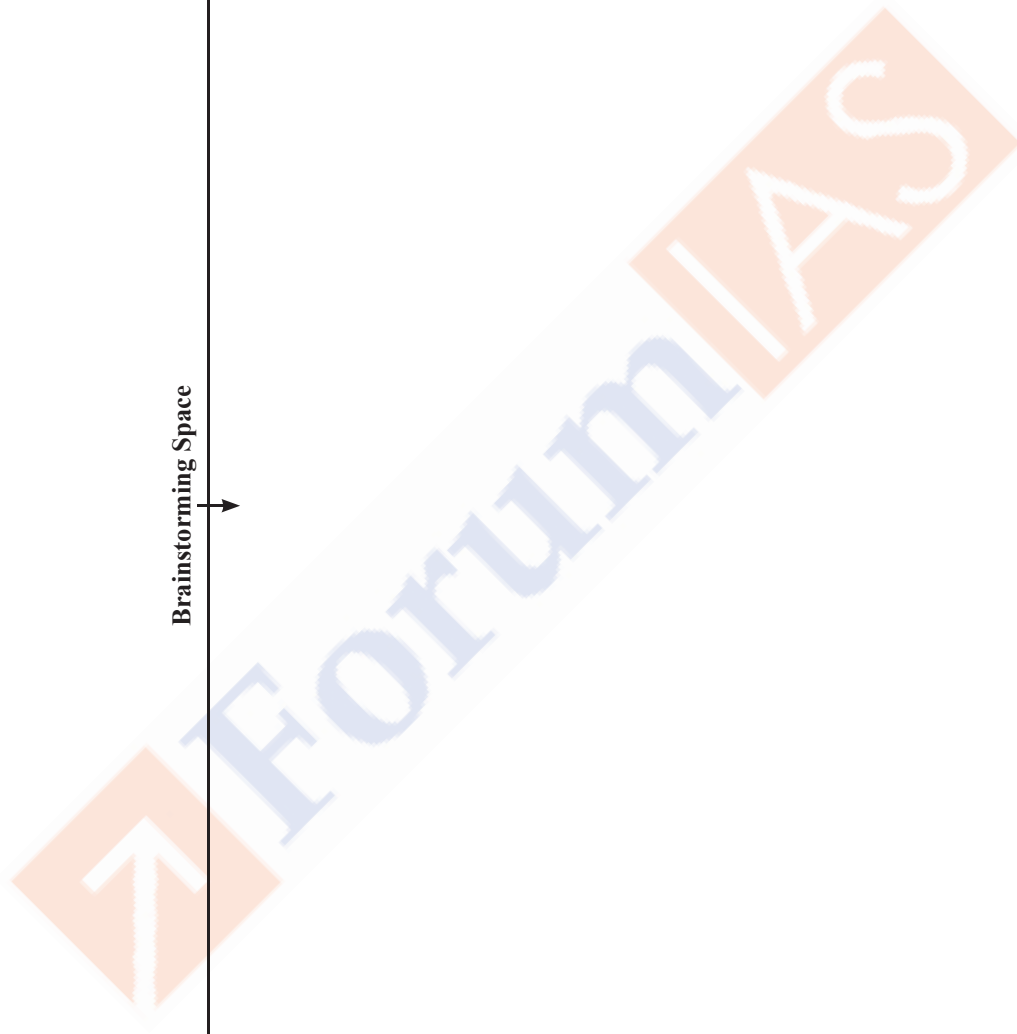
Q.63) Discuss several ways in which microorganisms can help in meeting the current fuel shortage. (10 Marks, 150 Words) [2023]

Brainstorming Space



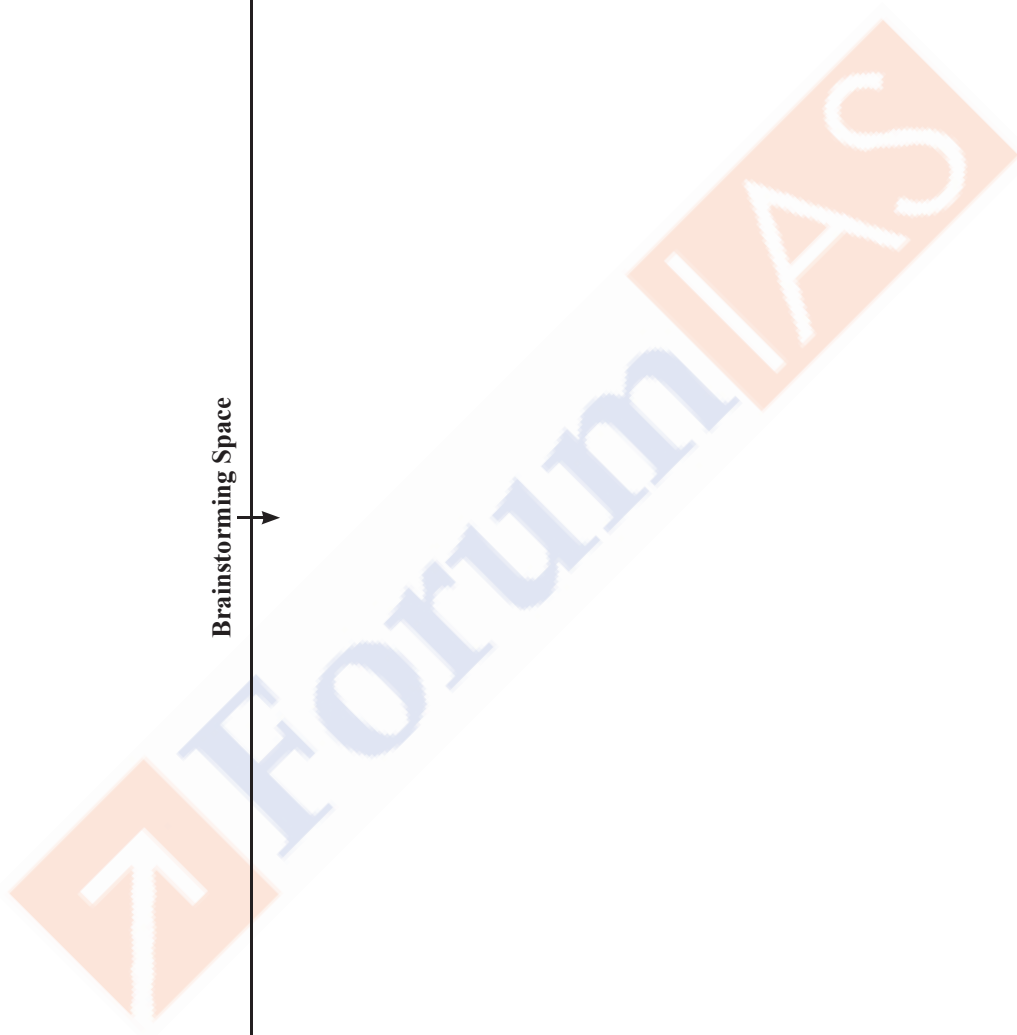
Q.64) The increase in life expectancy in the country has led to newer health challenges in the community. What are those challenges and what steps need to be taken to meet them? (10 Marks, 150 Words) [2022]

Brainstorming Space



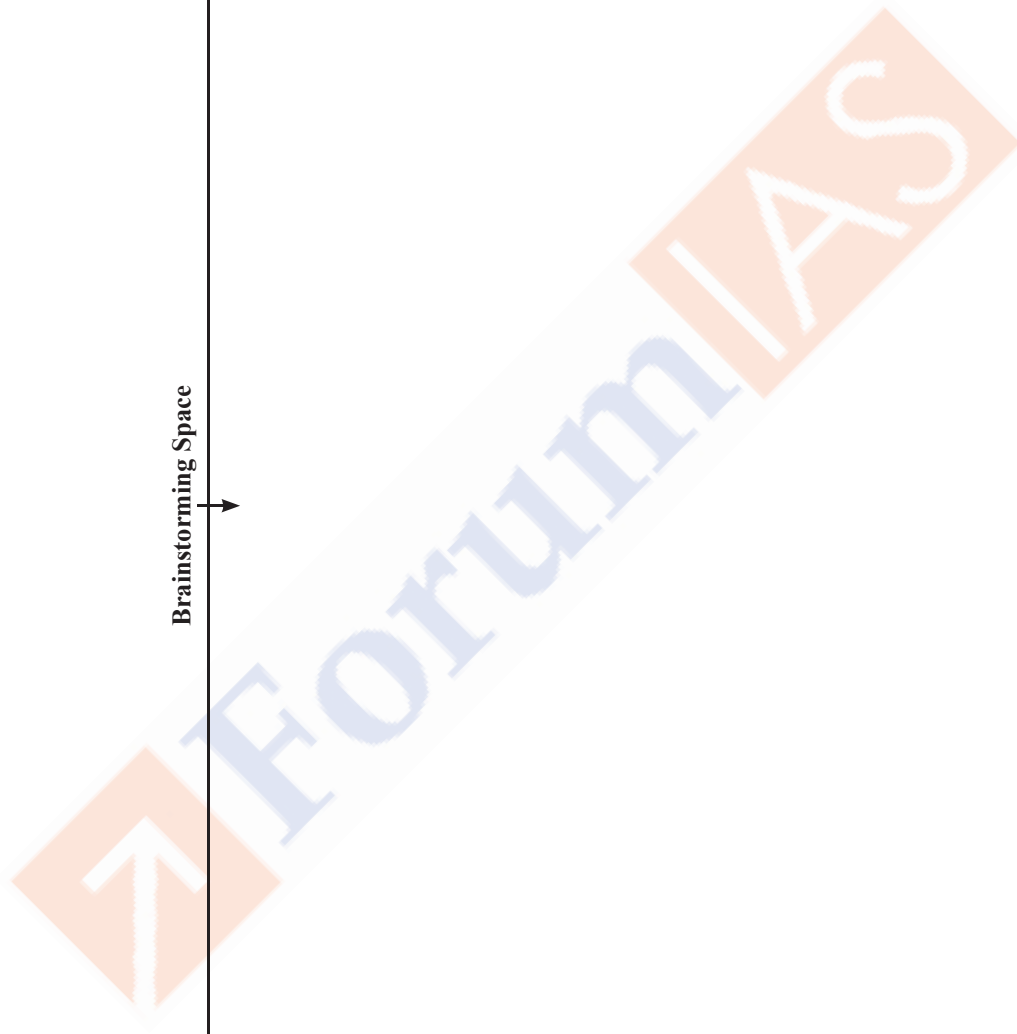
Q.65) What are the research and developmental achievements in applied biotechnology? How will these achievements help to uplift the poorer sections of society? (15 Marks, 250 Words) [2021]

Brainstorming Space



Q.66) How can biotechnology help to improve the living standards of farmers?
(15 Marks, 250 Words) [2019]

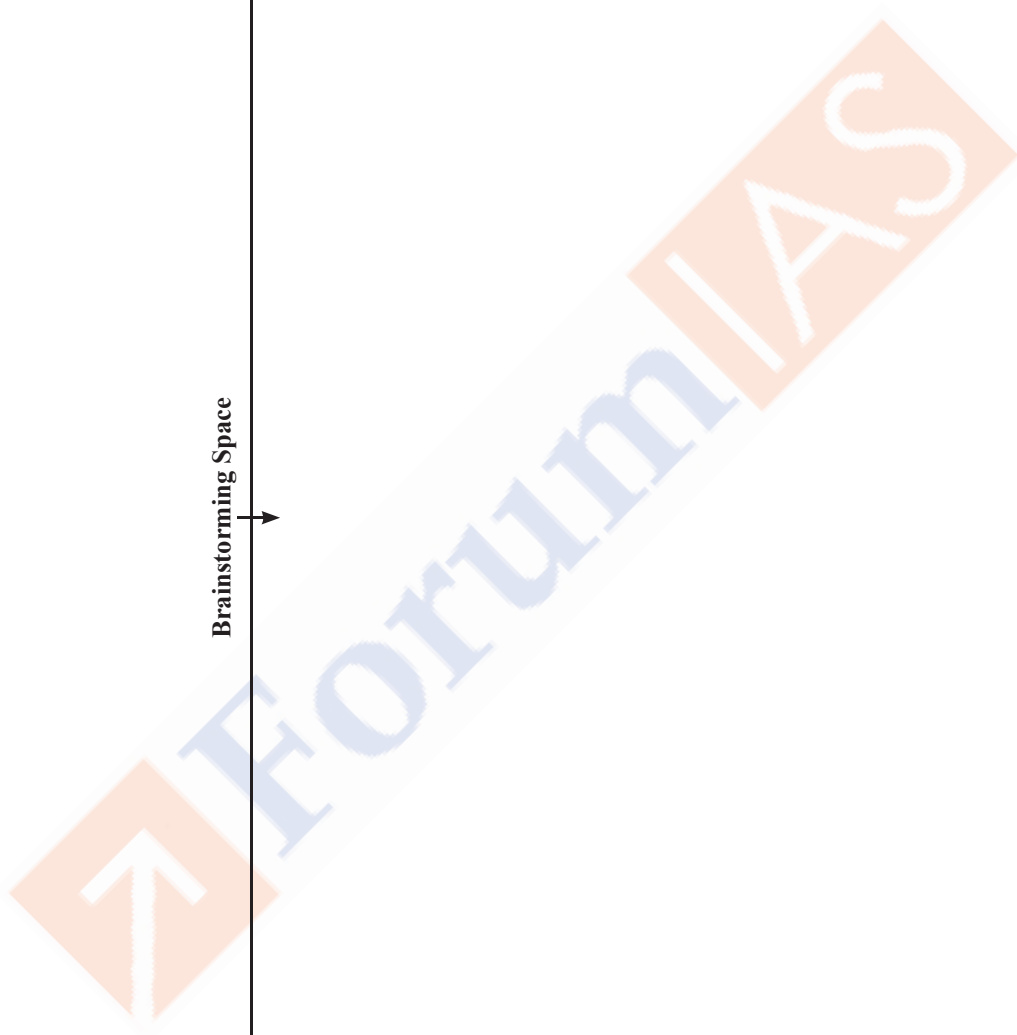
Brainstorming Space



Q.67) Why is there so much activity in the field of biotechnology in our country? How has this activity benefitted the field of bio-pharma?

(15 Marks, 250 Words) [2018]

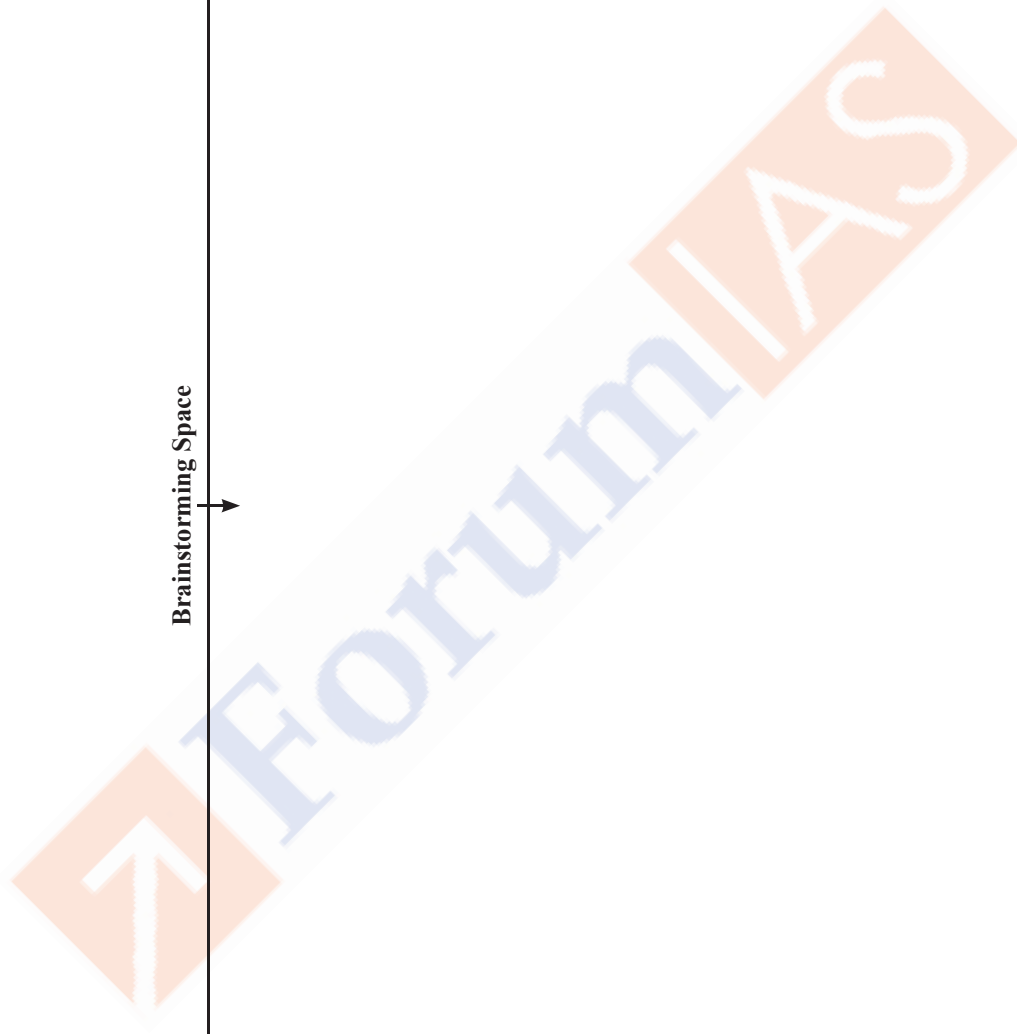
Brainstorming Space



Q.68) Stem cell therapy is gaining popularity in India to treat a wide variety of medical conditions including leukaemia, Thalessemia, damaged cornea and several burns. Describe briefly what stem cell therapy is and what advantages it has over other treatments?

(12.5 Marks, 200 Words) [2017]

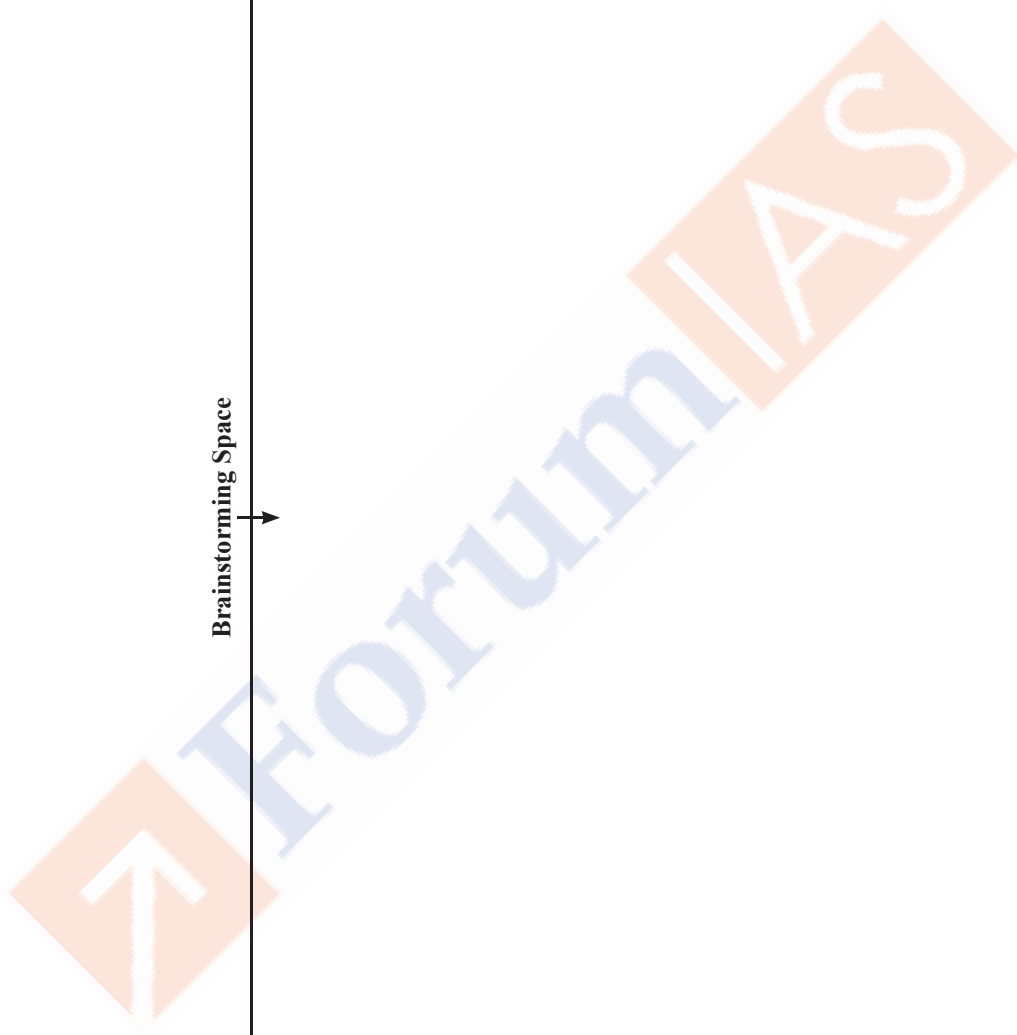
Brainstorming Space



Q.69) Can overuse and free availability of antibiotics without Doctor's prescription, be contributors to the emergence of drug-resistant diseases in India? What are the available mechanisms for monitoring and control? Critically discuss the various issues involved.

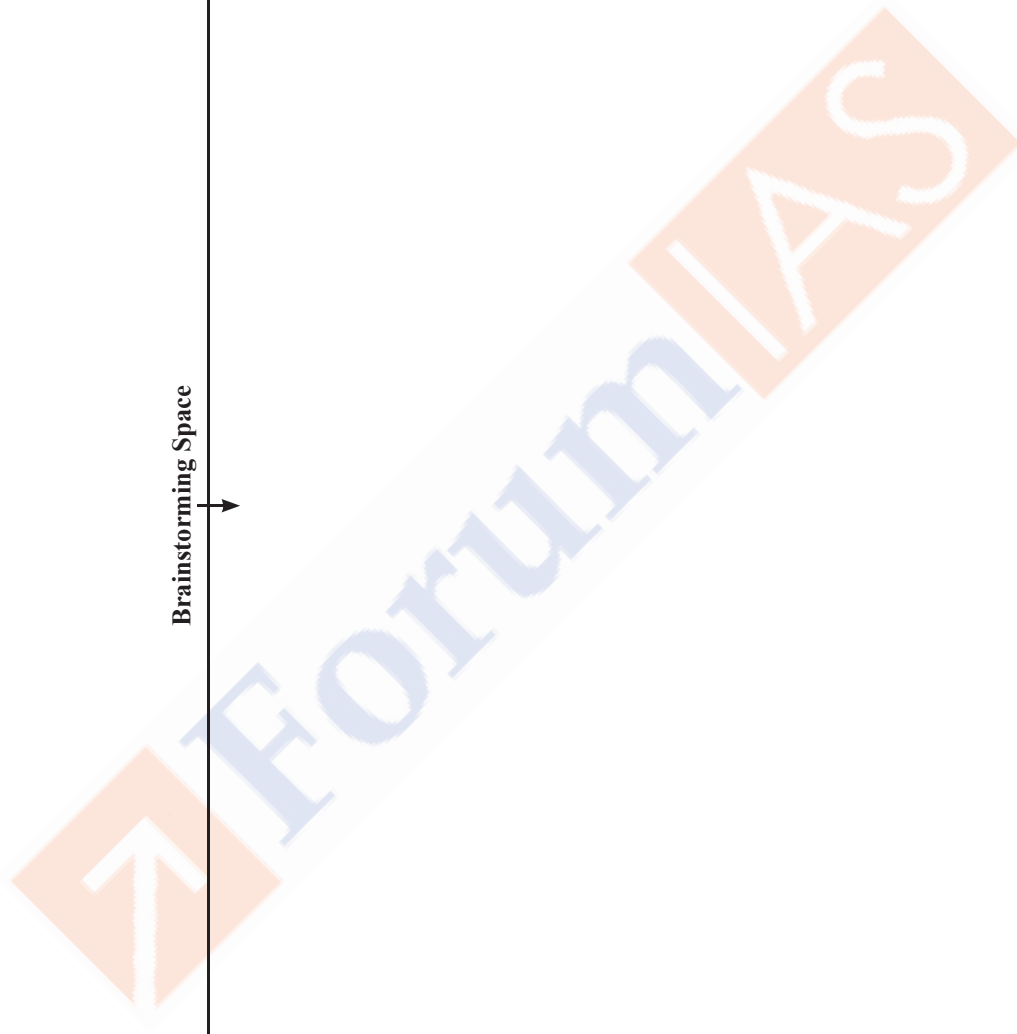
(12.5 Marks, 200 Words) [2014]

Brainstorming Space



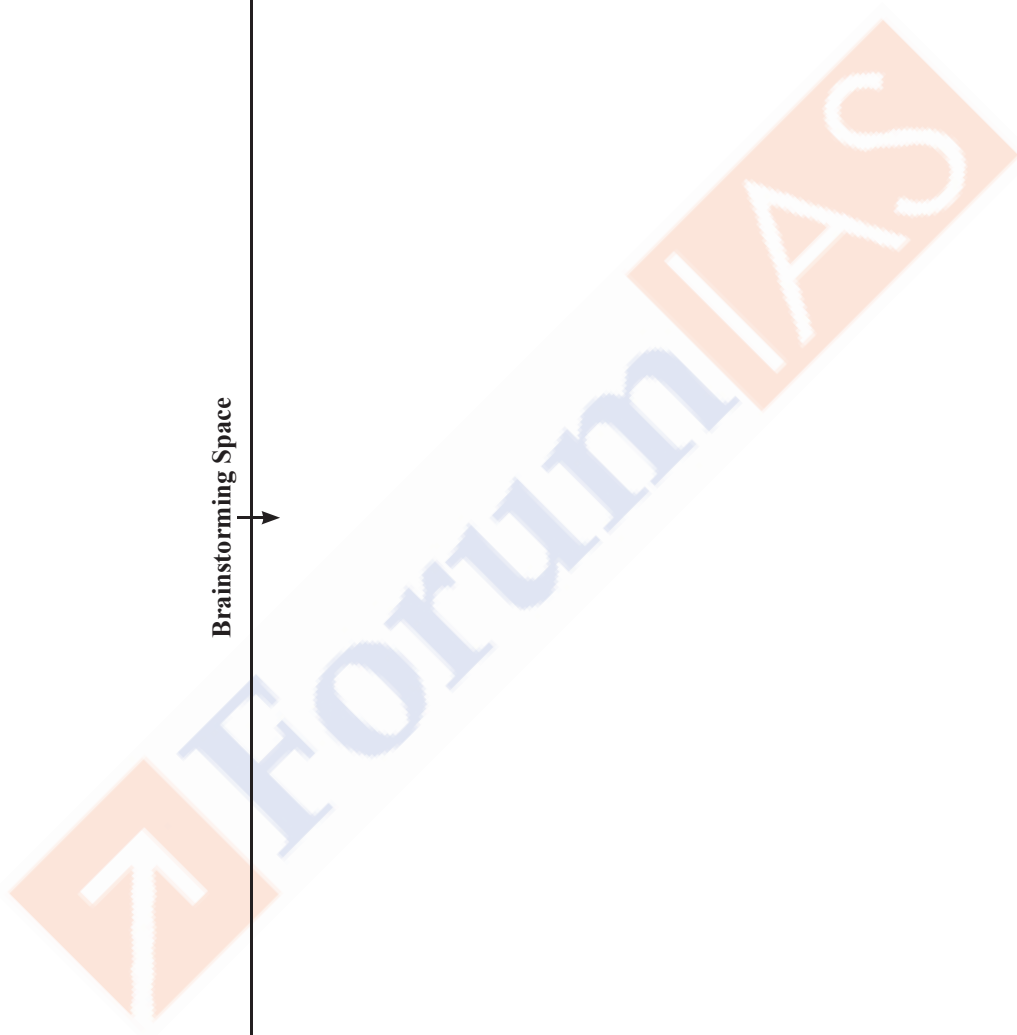
Q.70) What do you understand by Fixed Dose drug Combinations (FDCs)? Discuss their merits and demerits. (12.5 Marks, 200 Words) [2013]

Brainstorming Space



Q.71) What do you understand by the term “Multi-Drug Resistant Tuberculosis” (MDR-TB)? What measures would you advocate for its containment and what are the implications of its spread in the community? (15 Marks, 250 Words) [2012]

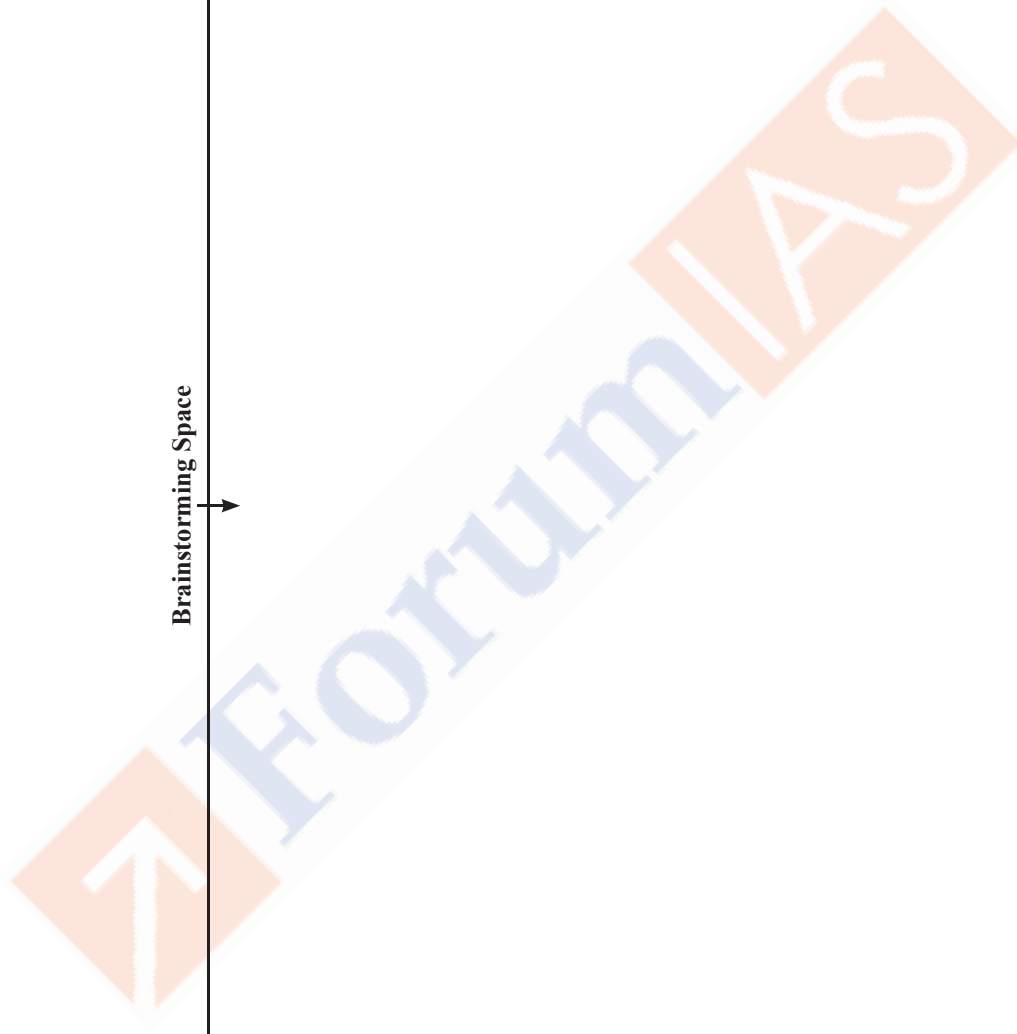
Brainstorming Space



Q.72) Many food items contain “trans fats”. What do you understand by this term? Which Indian food items contain trans fats? What are the implications of trans fats on human health?

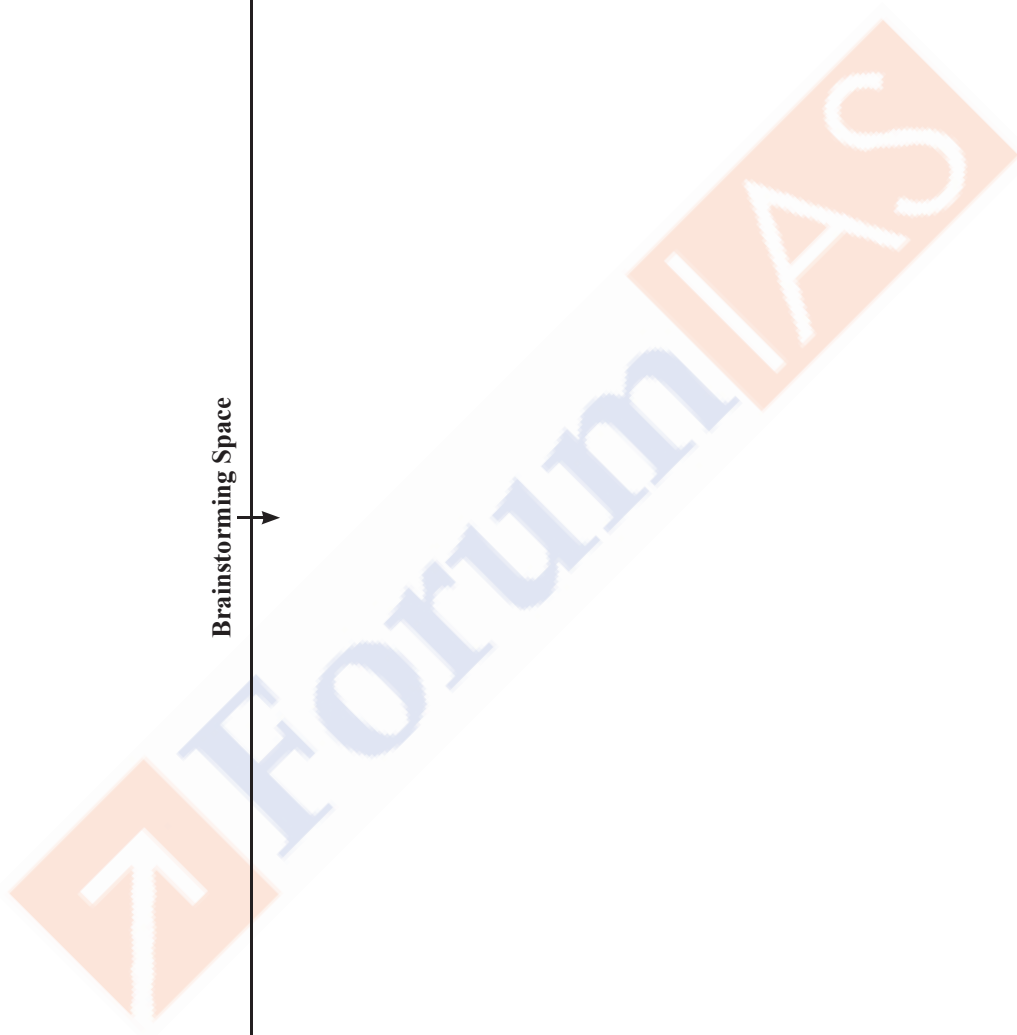
(15 Marks, 250 Words) [2012]

Brainstorming Space



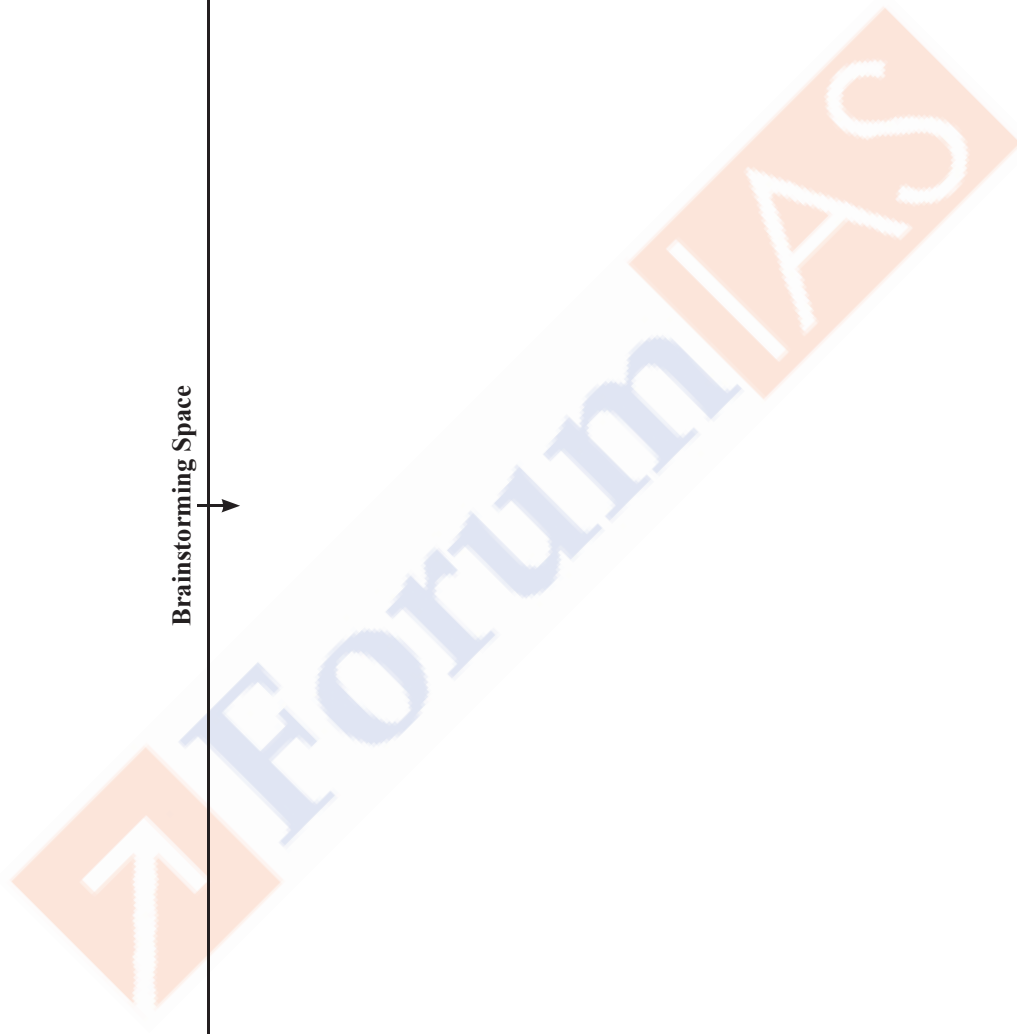
Q.73) Explain the objectives and the current achievements of human genome project. (10 Marks, 150 Words) [2007]

Brainstorming Space



Q.74) Justify with necessary logic “Biological clean-up methods can be cheaper than the conventional physical and chemical pollution treatments”.
(15 Marks, 250 Words) [2006]

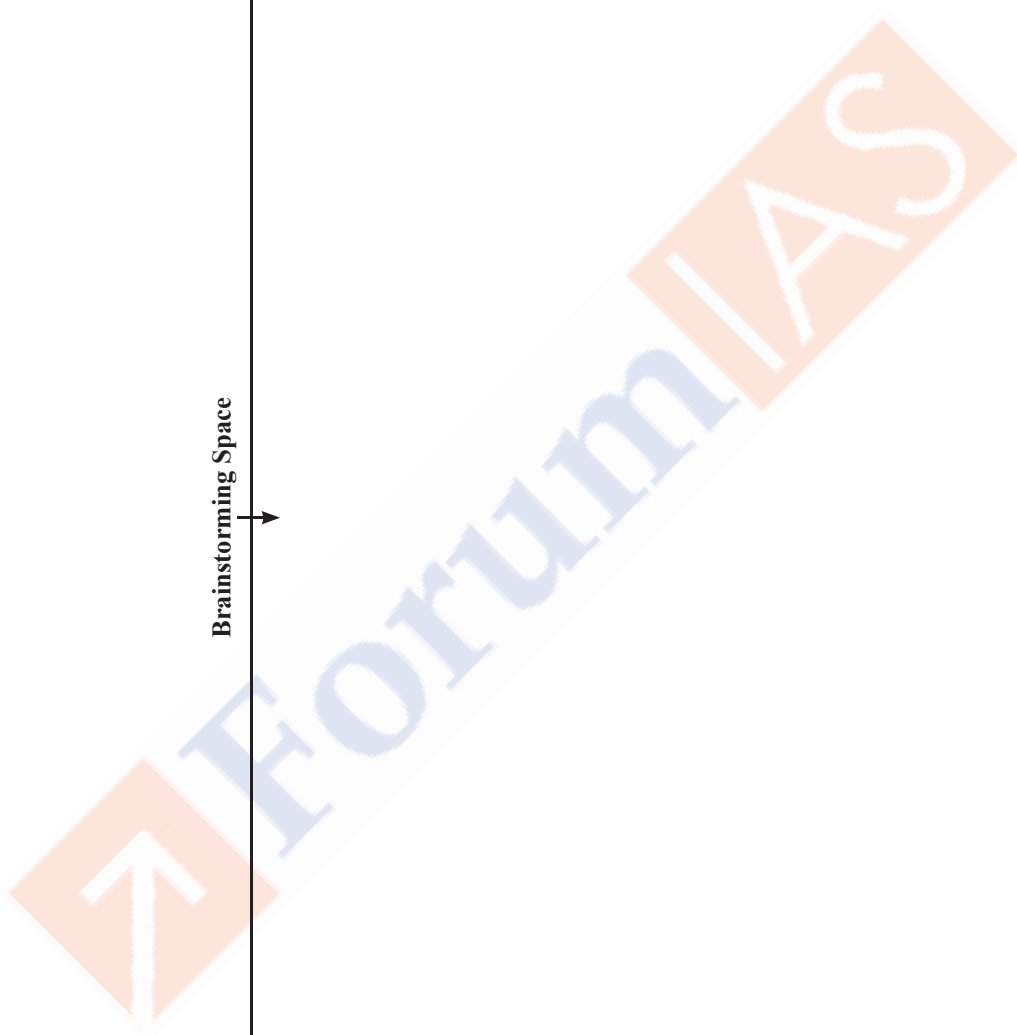
Brainstorming Space



Q.75) "Biotechnology boom may pave a golden path for India". Discuss.

(15 Marks, 250 Words) [2002]

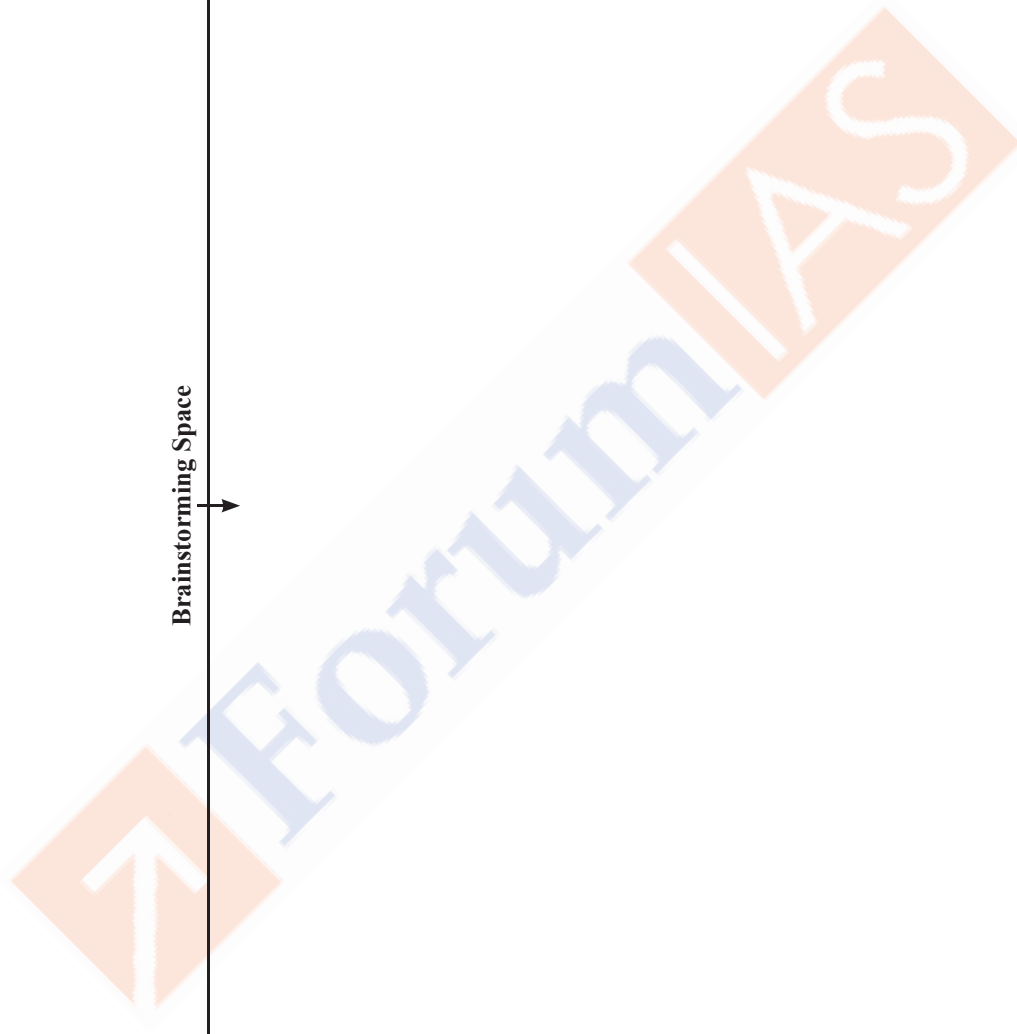
Brainstorming Space



Q.76) How are transgenic plants different from hybrid plants and what is their relevance in modern agriculture? Elaborate.

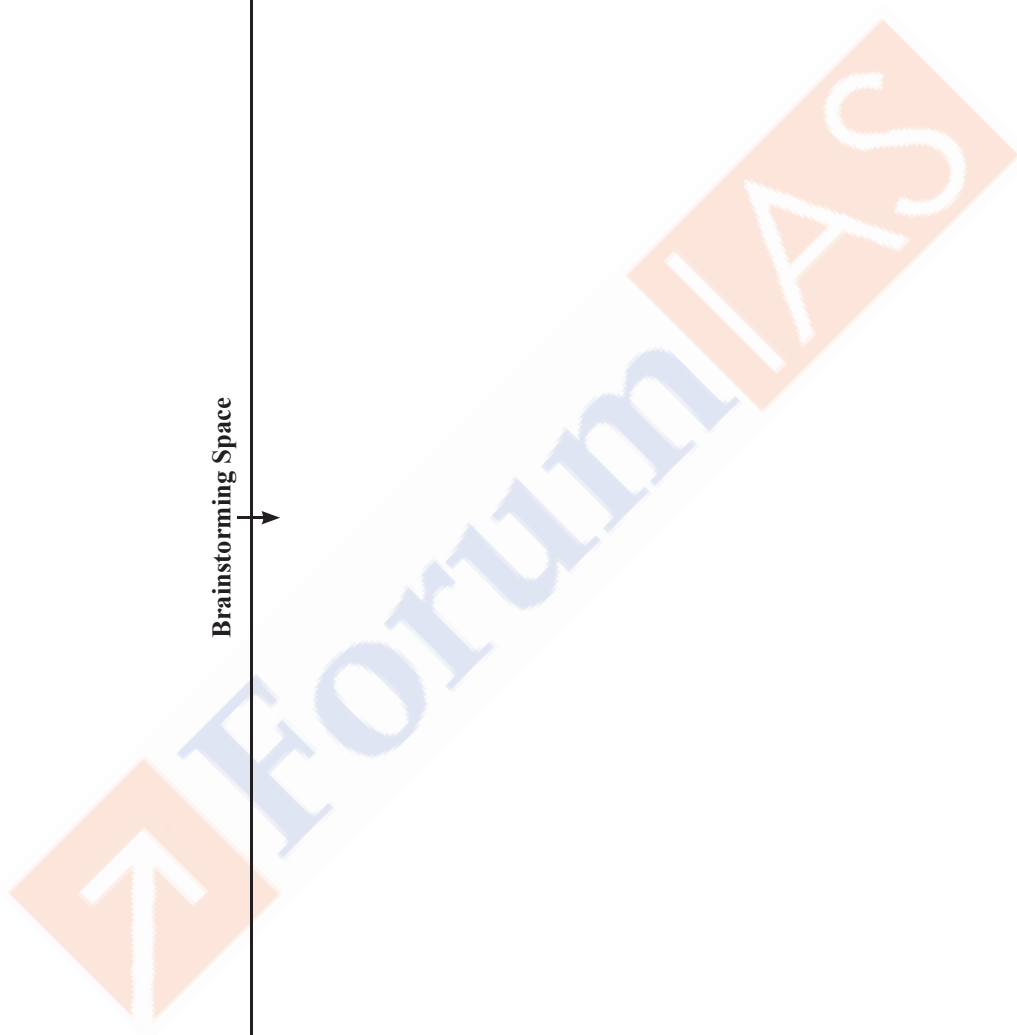
(10 Marks, 150 Words) [2000]

Brainstorming Space



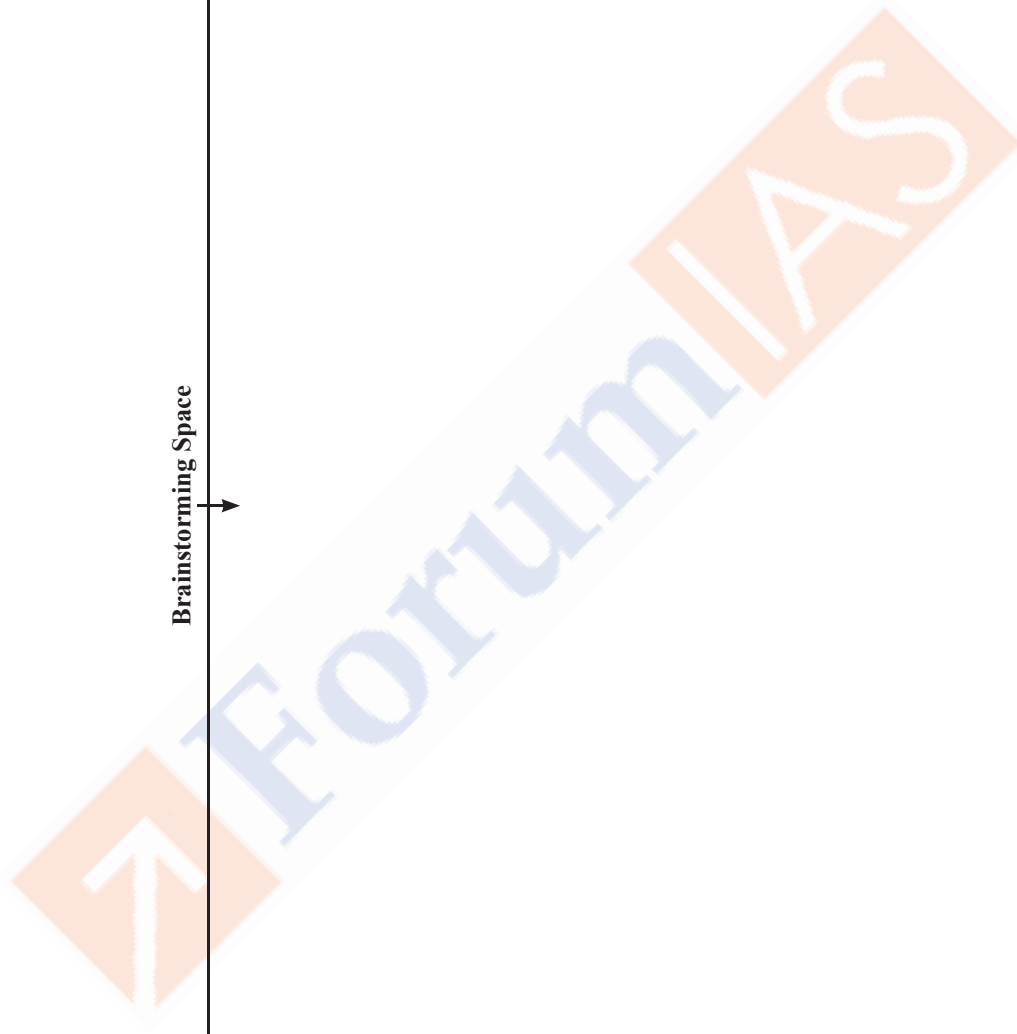
Q.77) What is the Human Genome Project? Discuss briefly its importance. (10 Marks, 150 Words) [1999]

Brainstorming Space



Q.78) What is genetic engineering? Why is it getting increasingly important these days?
(15 Marks, 250 Words) [1998]

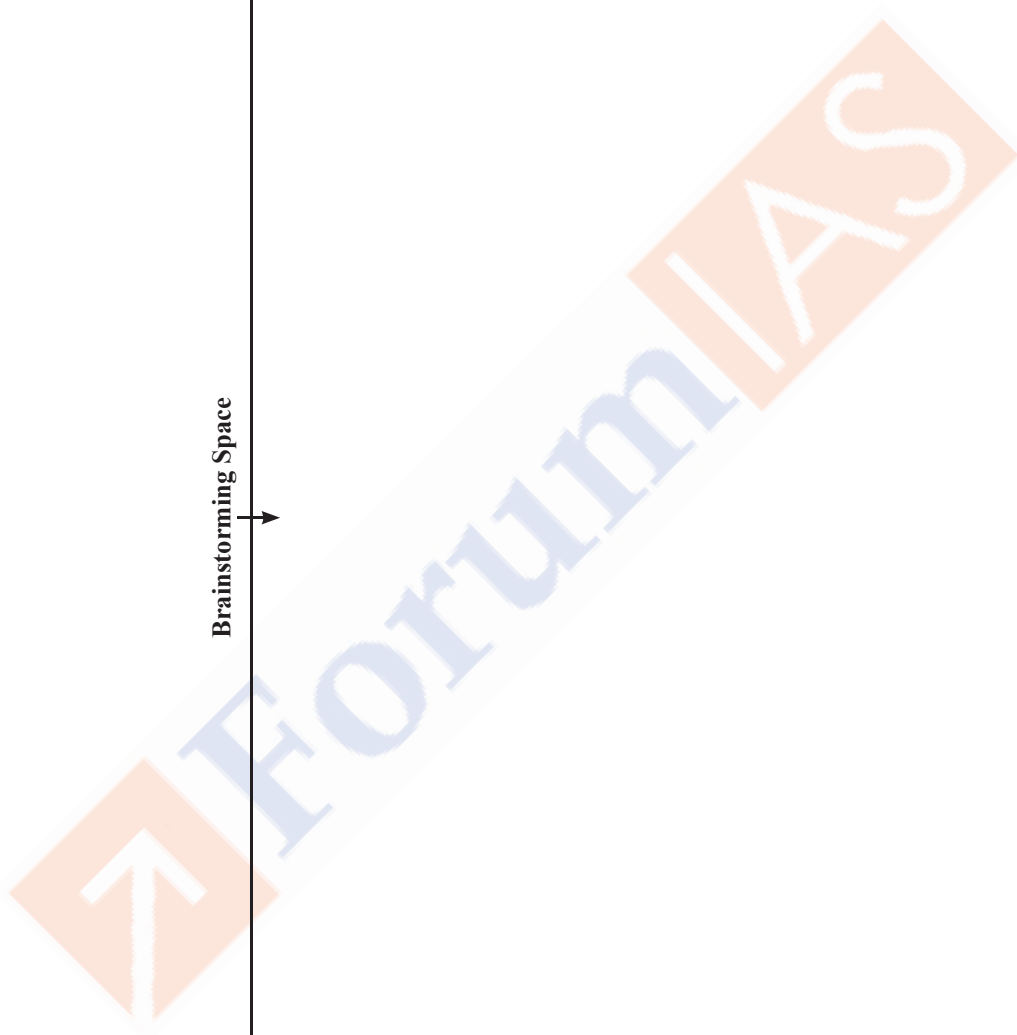
Brainstorming Space



Q.79) What are enzymes? What is their importance?

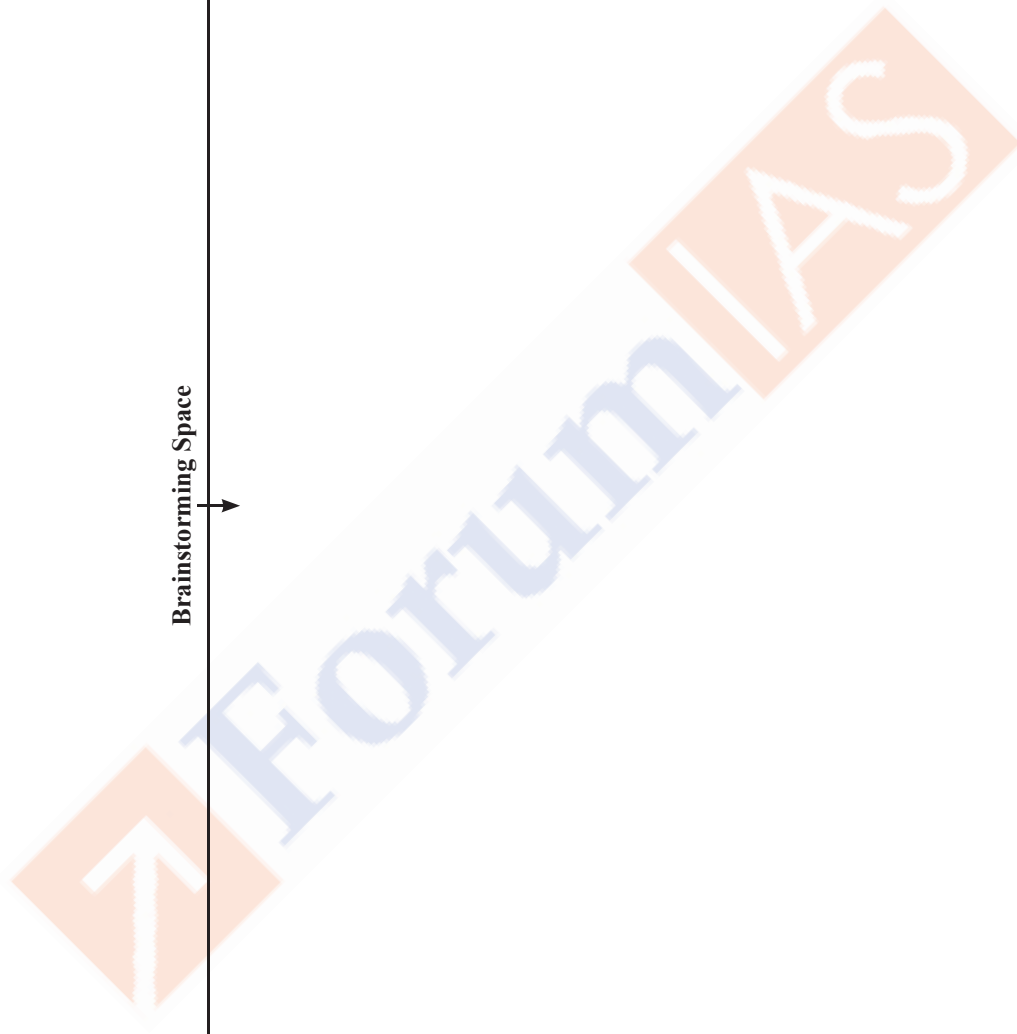
(10 Marks, 150 Words) [1998]

Brainstorming Space



Q.80) What is Polio? Name its few features and how it can be prevented.
(10 Marks, 150 Words) [1997]

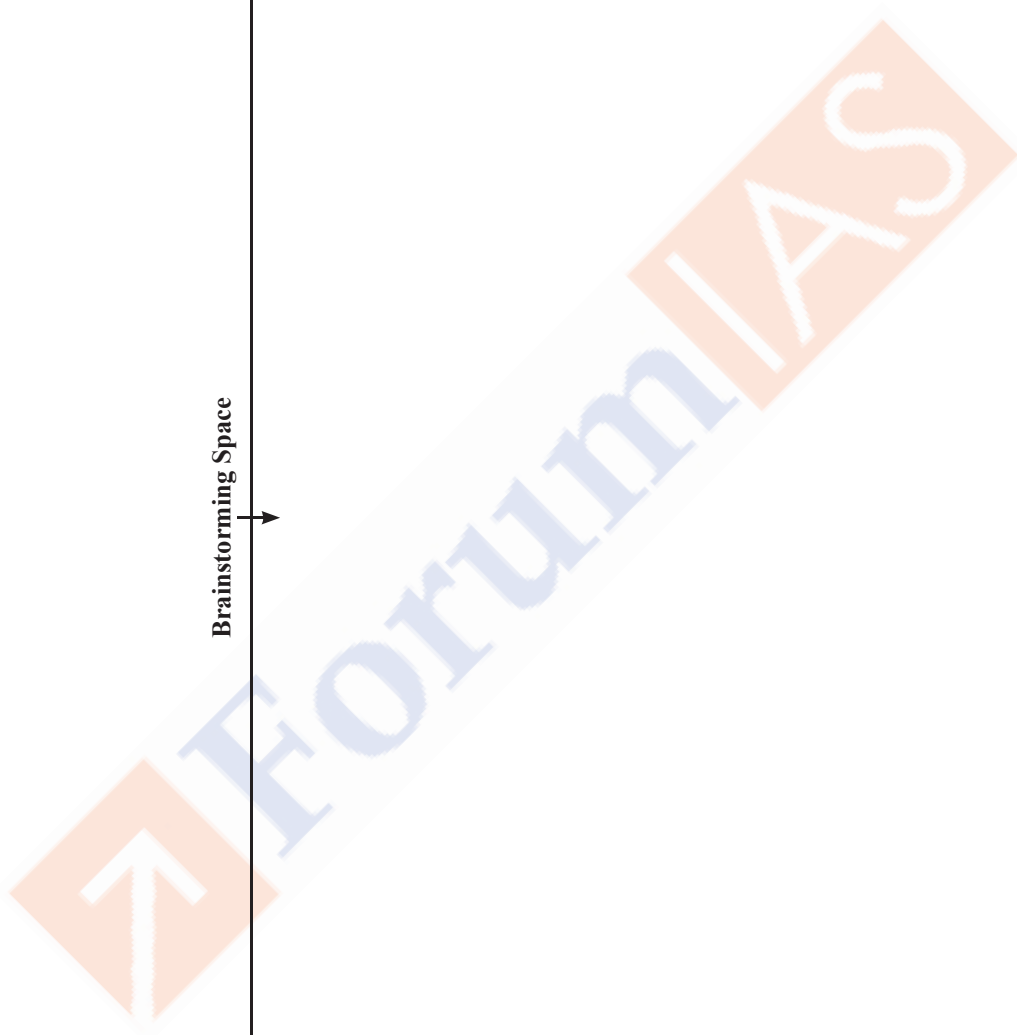
Brainstorming Space



Q.81) What are transgenic organisms? What are they used for?

(10 Marks, 150 Words) [1996]

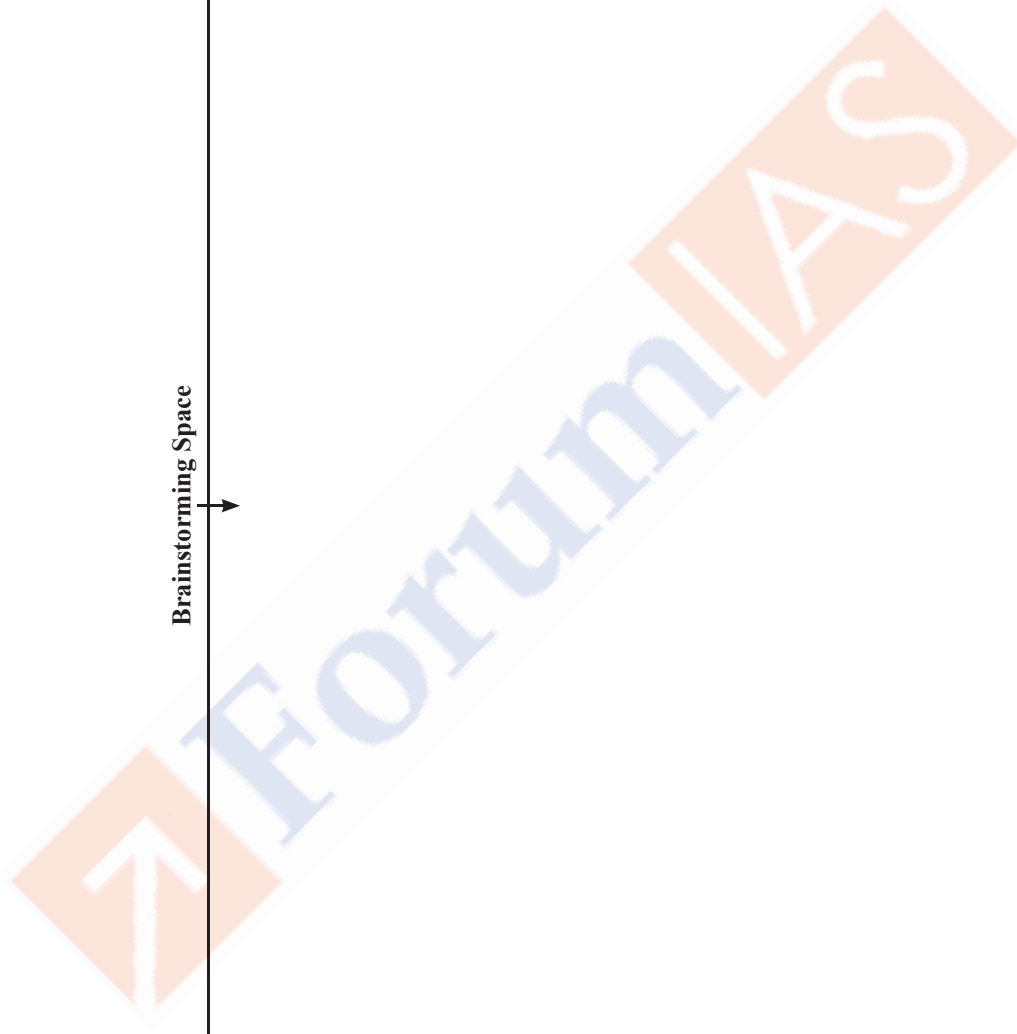
Brainstorming Space



Q.82) What is AIDS? Describe its salient features.

(15 Marks, 250 Words) [1998]

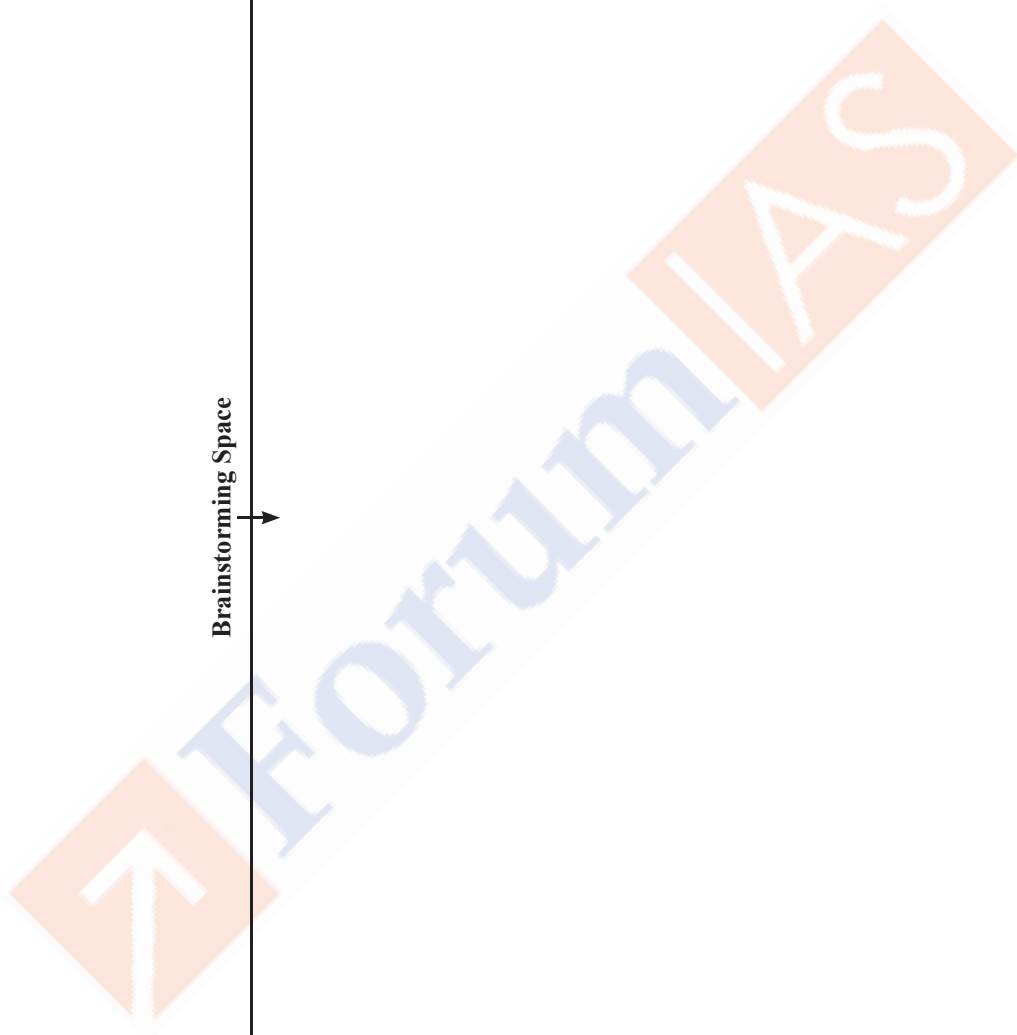
Brainstorming Space



Q.83) What do you understand by 'Karnal Technology' What is it used for?

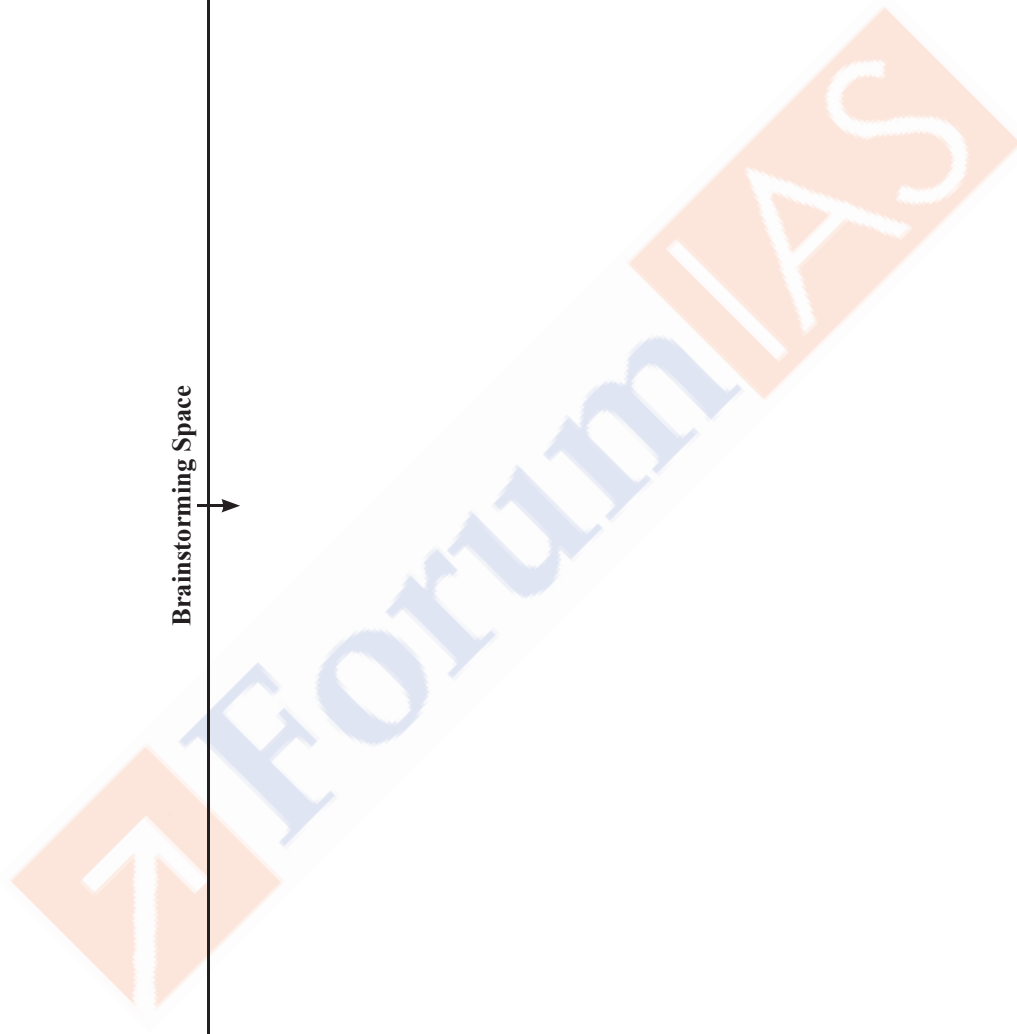
(10 Marks, 150 Words) [1996]

Brainstorming Space



Q.84) What is 'amniocentesis' What has made it a controversial technique?
(10 Marks, 150 Words) [1995]

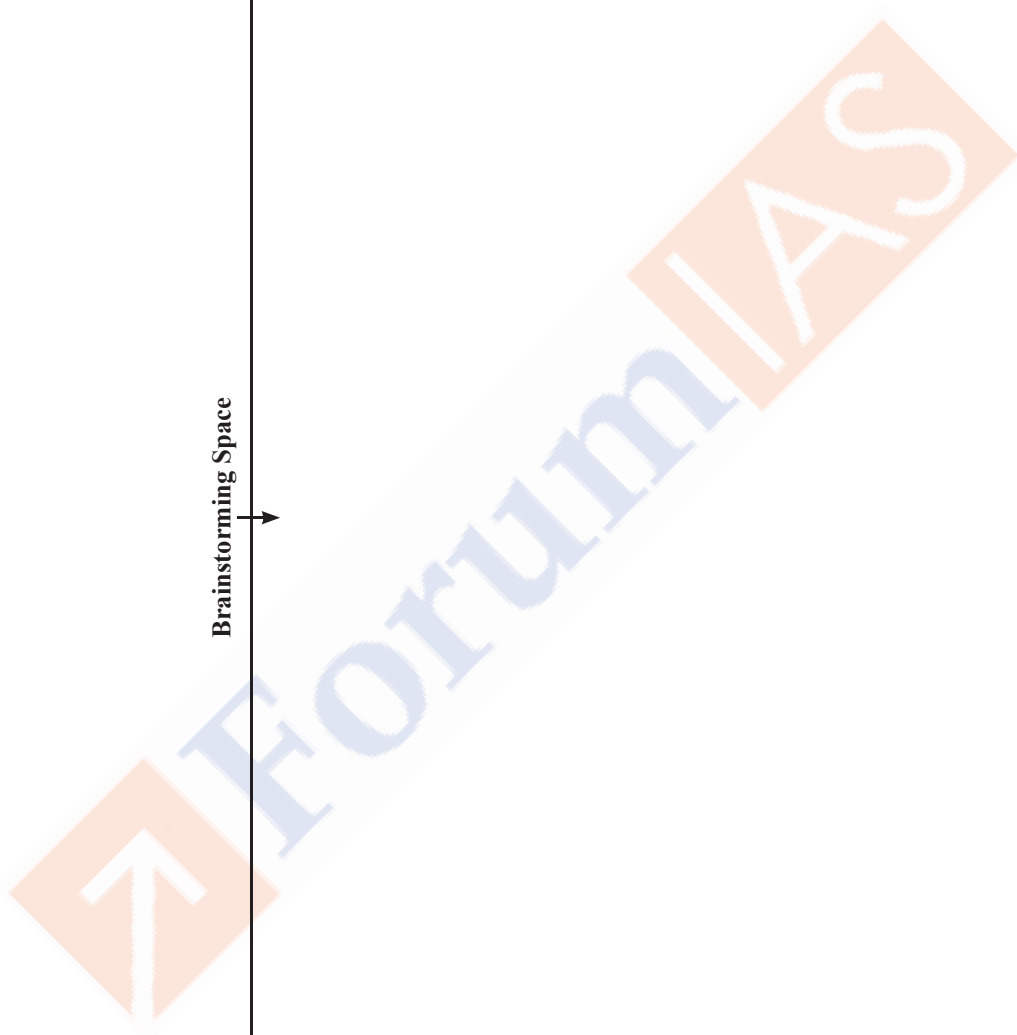
Brainstorming Space



Q.85) What are the diseases caused by Iodine Deficiency? What steps are beings taken to tackle the problem in India?

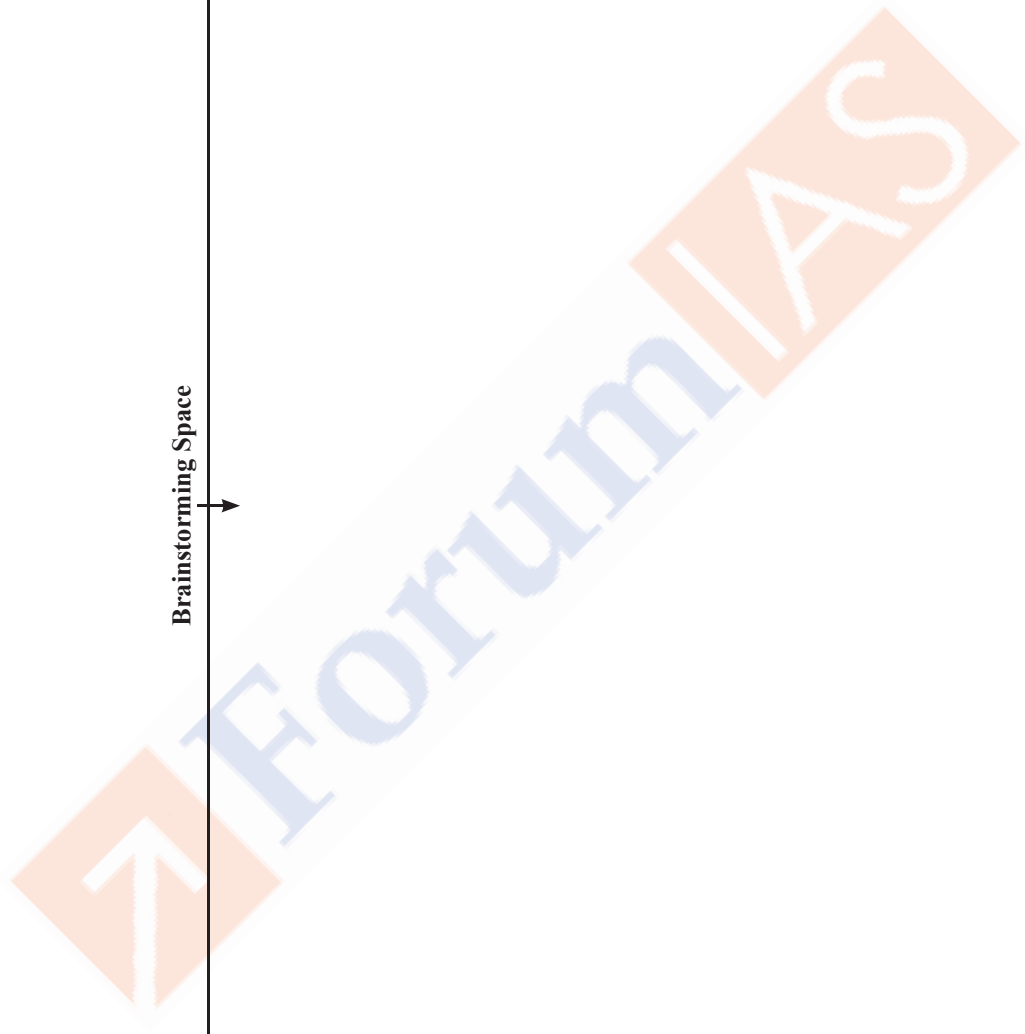
(15 Marks, 250 Words) [1994]

Brainstorming Space



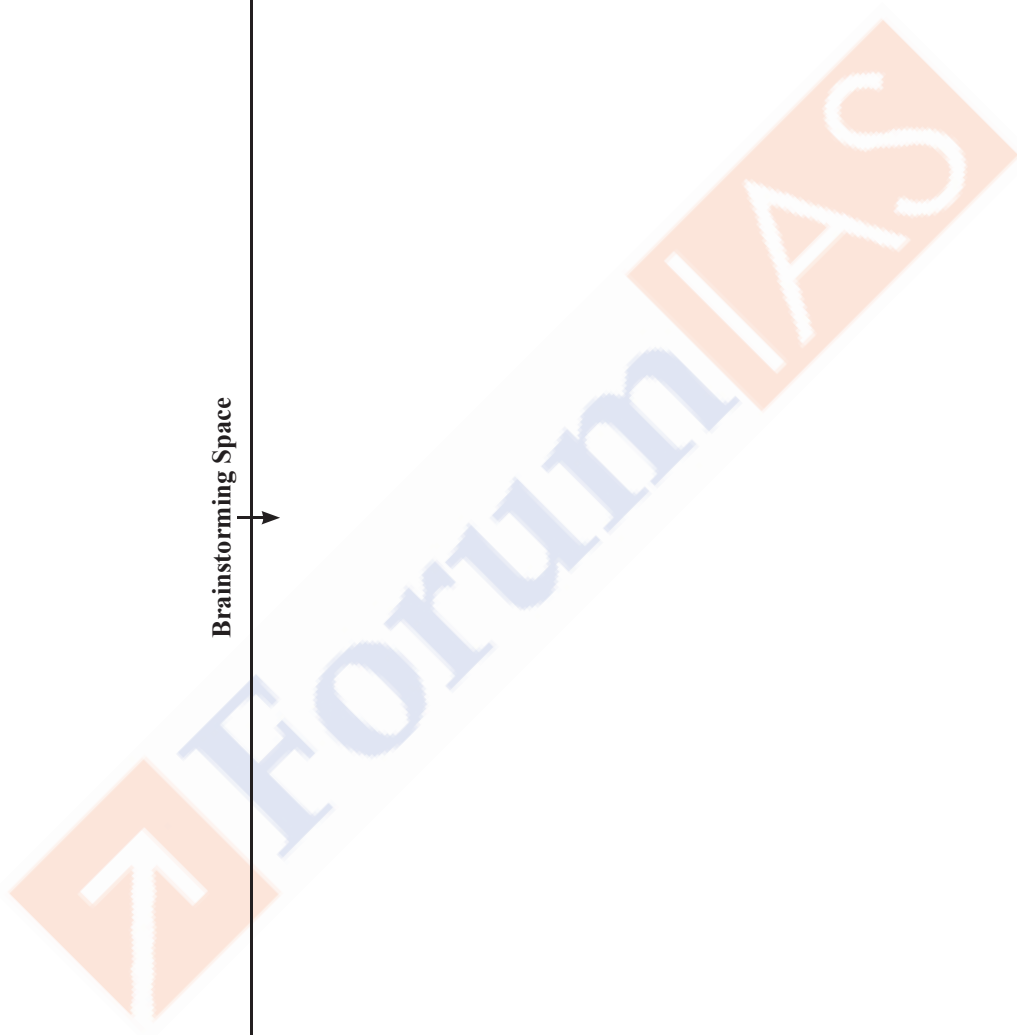
Q.86) What is DNA fingerprinting? Which research institution in India is working in this area? (10 Marks, 150 Words) [1994]

Brainstorming Space



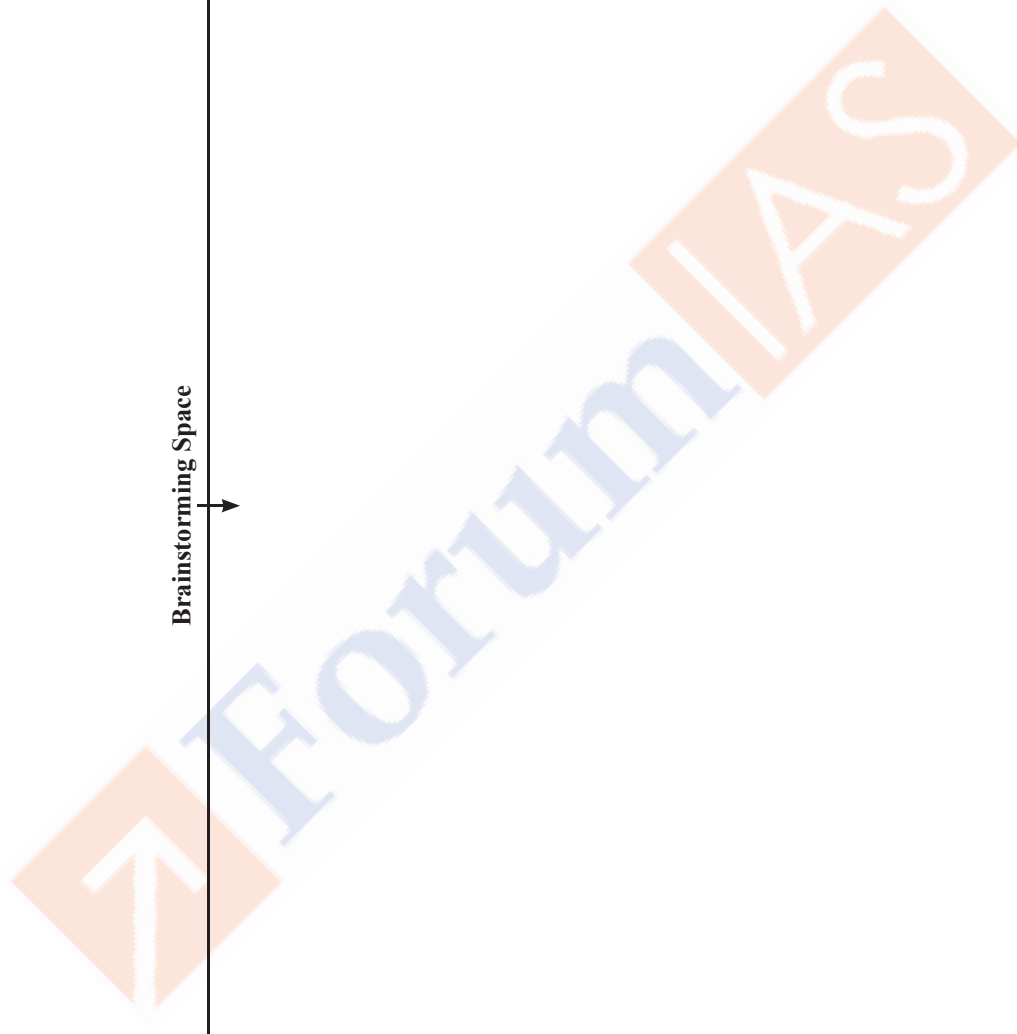
Q.87) What is genetic conservation? Bring out the salient features of genetic conservation activity in India. (15 Marks, 250 Words) [1993]

Brainstorming Space



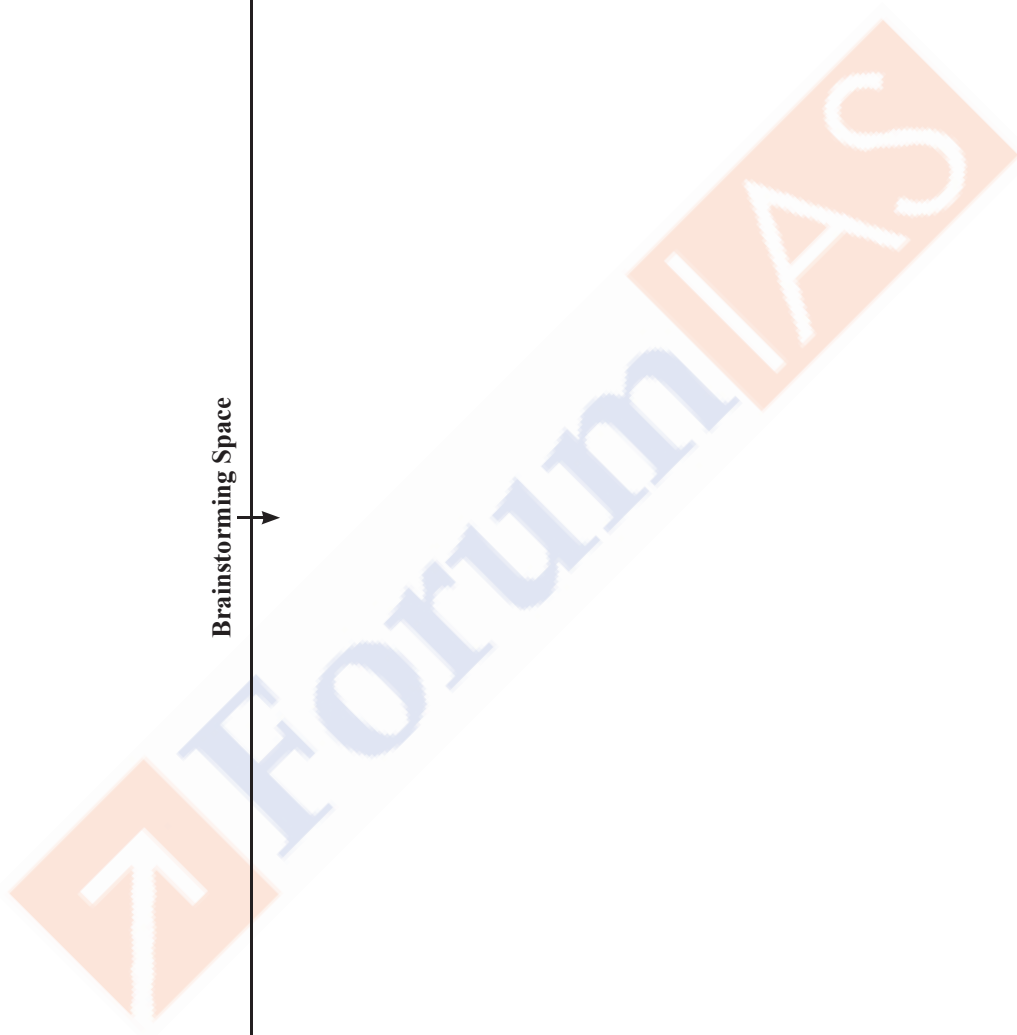
Q.88) Describe how biotechnology is finding use in medicine. Give a few current examples. (10 Marks, 150 Words) [1993]

Brainstorming Space



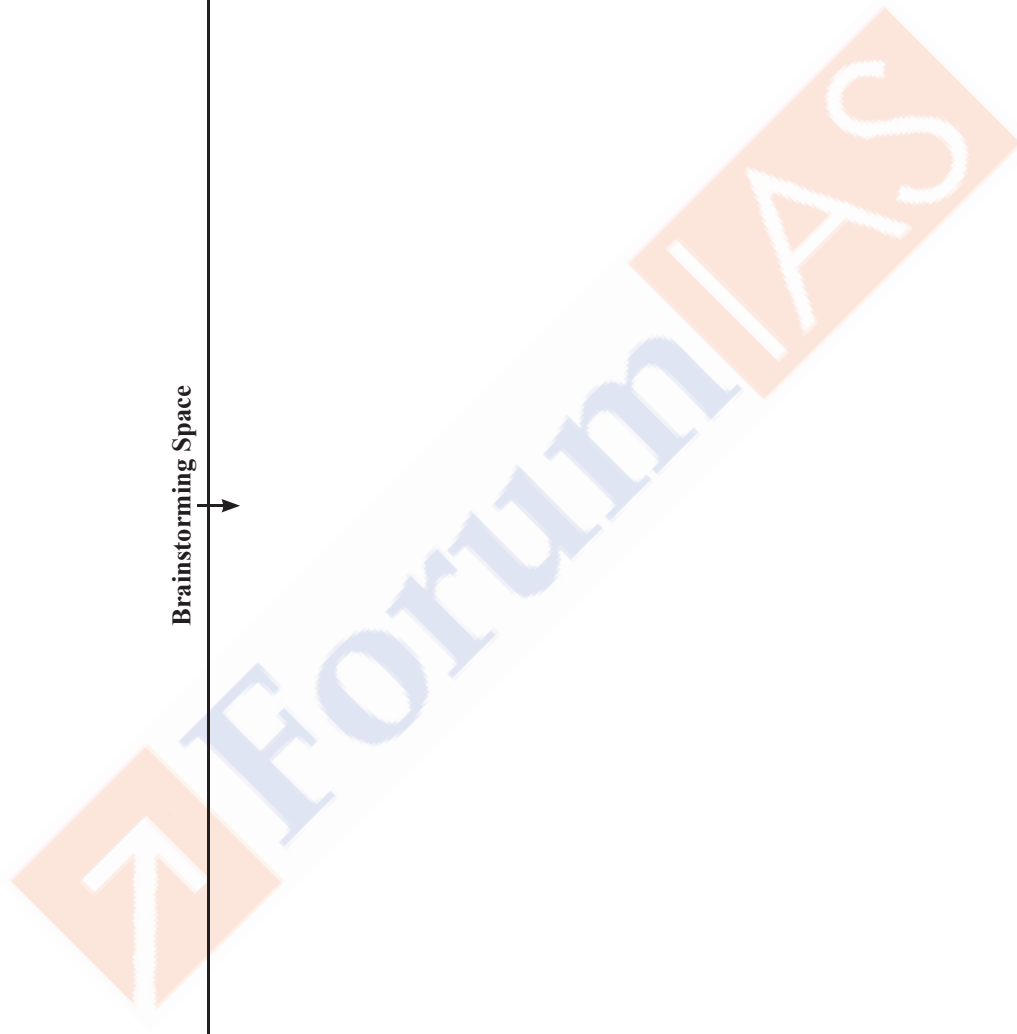
Q.89) What are bio fertilizers? What advantages do they have over chemical fertilizers?
(10 Marks, 150 Words) [1992]

Brainstorming Space



Q.90) Give a brief account of major achievements in the realm of biotechnology in India. (15 Marks, 250 Words) [1991]

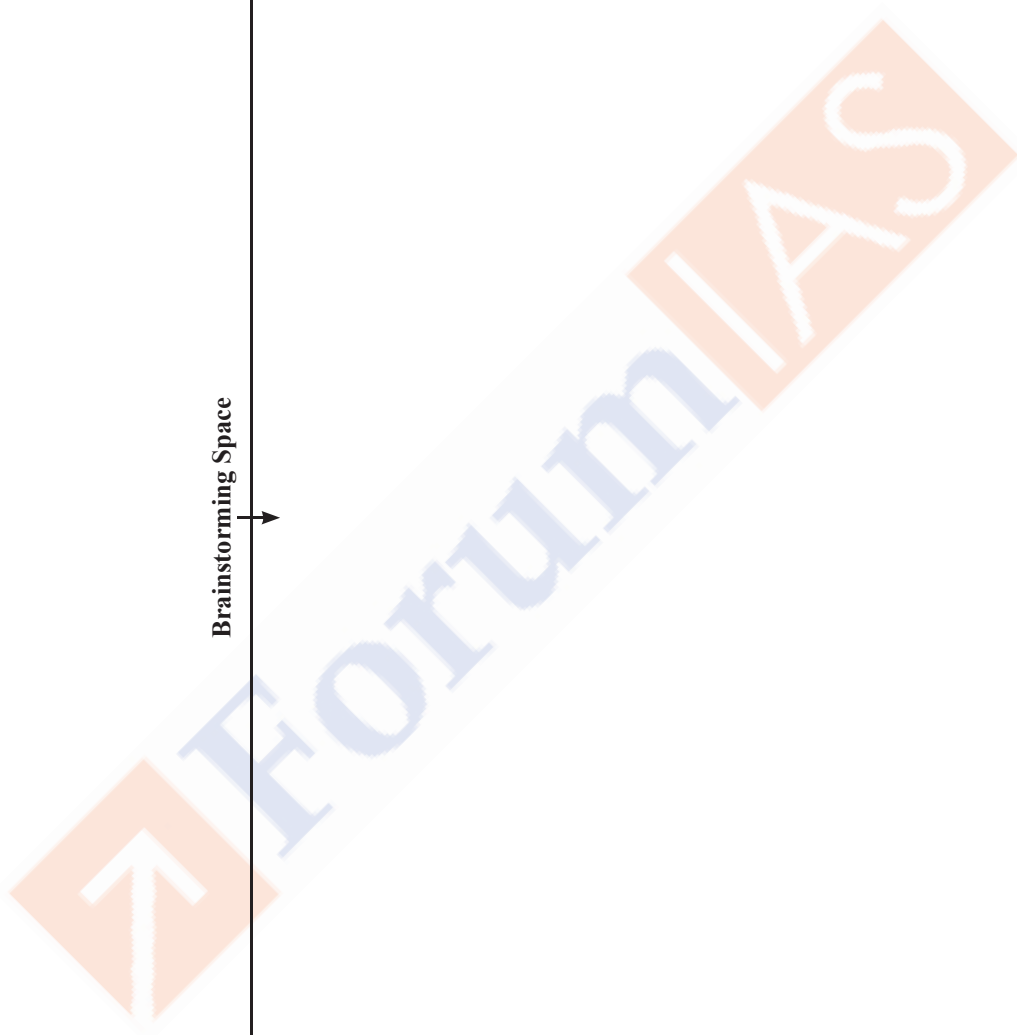
Brainstorming Space



Q.91) It has been estimated that there are more than four million leprosy patients in India. What steps are being taken by the Government of India for their treatment and rehabilitation?

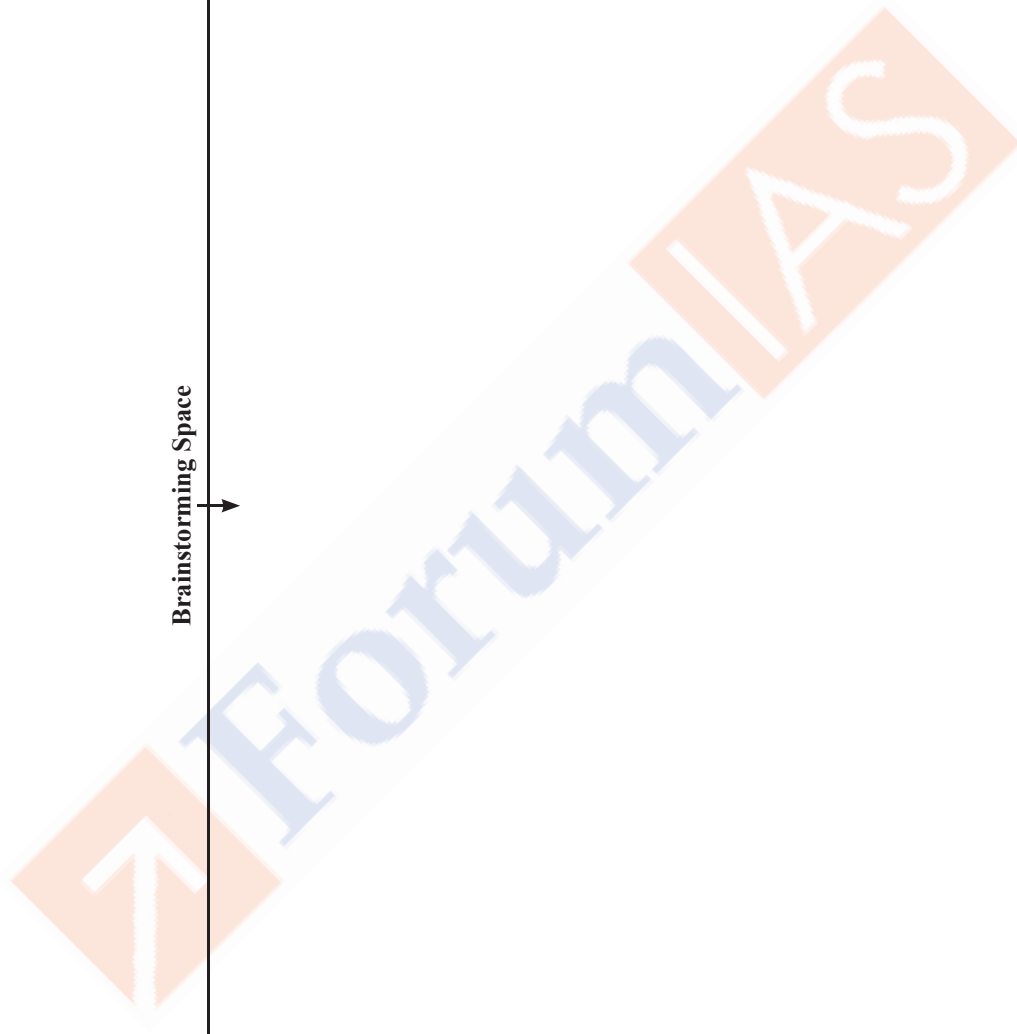
(10 Marks, 150 Words) [1989]

Brainstorming Space



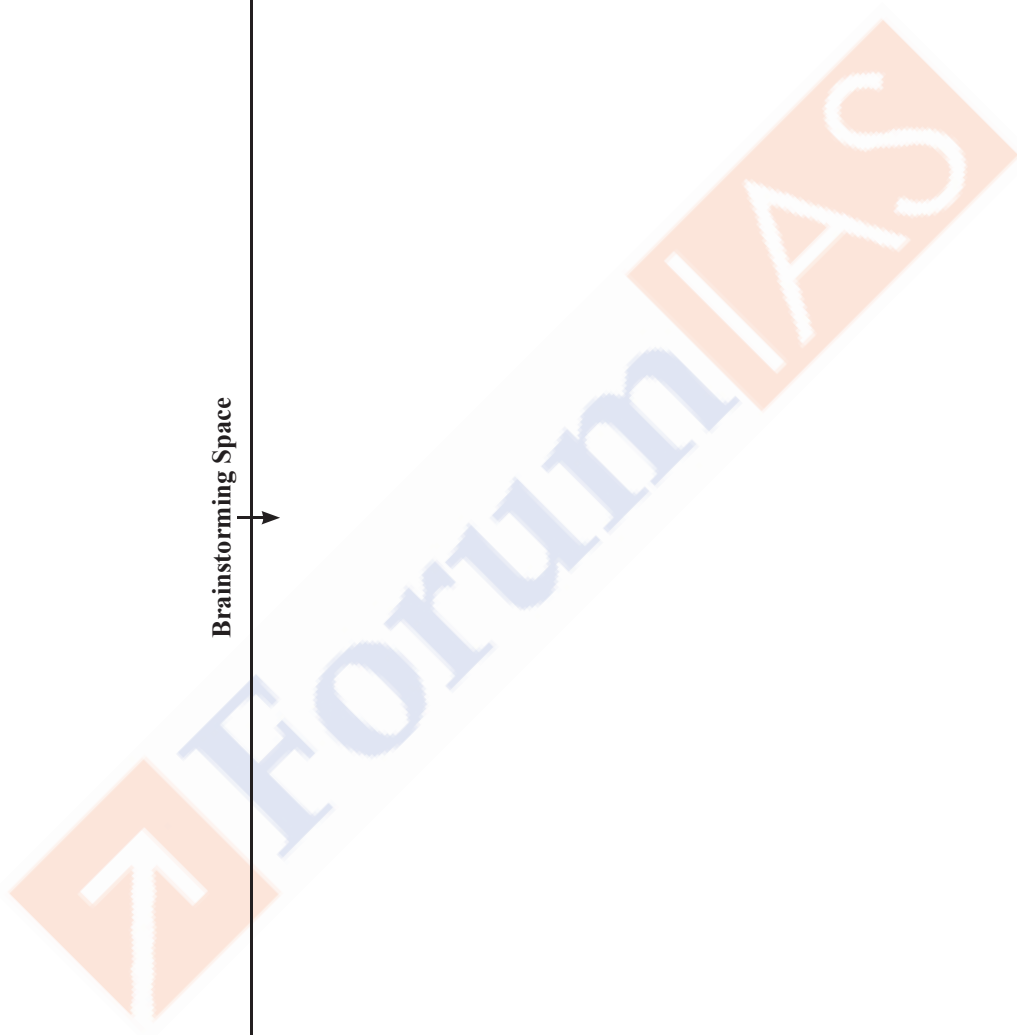
Q.92) What is ultrasound? State two of its uses in modern medical practice.
(10 Marks, 150 Words) [1989]

Brainstorming Space



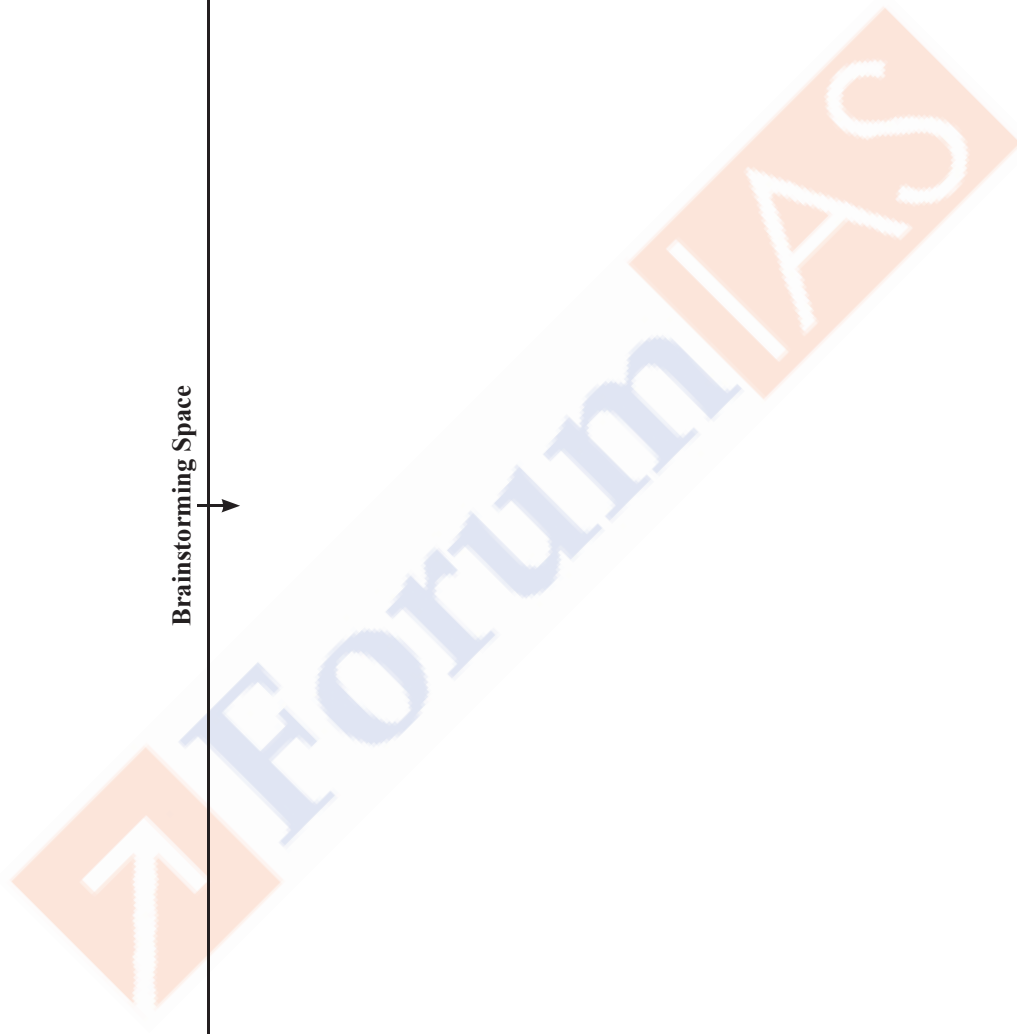
Q.93) What are genetic diseases give some examples? What are the prospects of treatment of patients suffering from such diseases? Can these patients be cured? (10 Marks, 150 Words) [1985]

Brainstorming Space



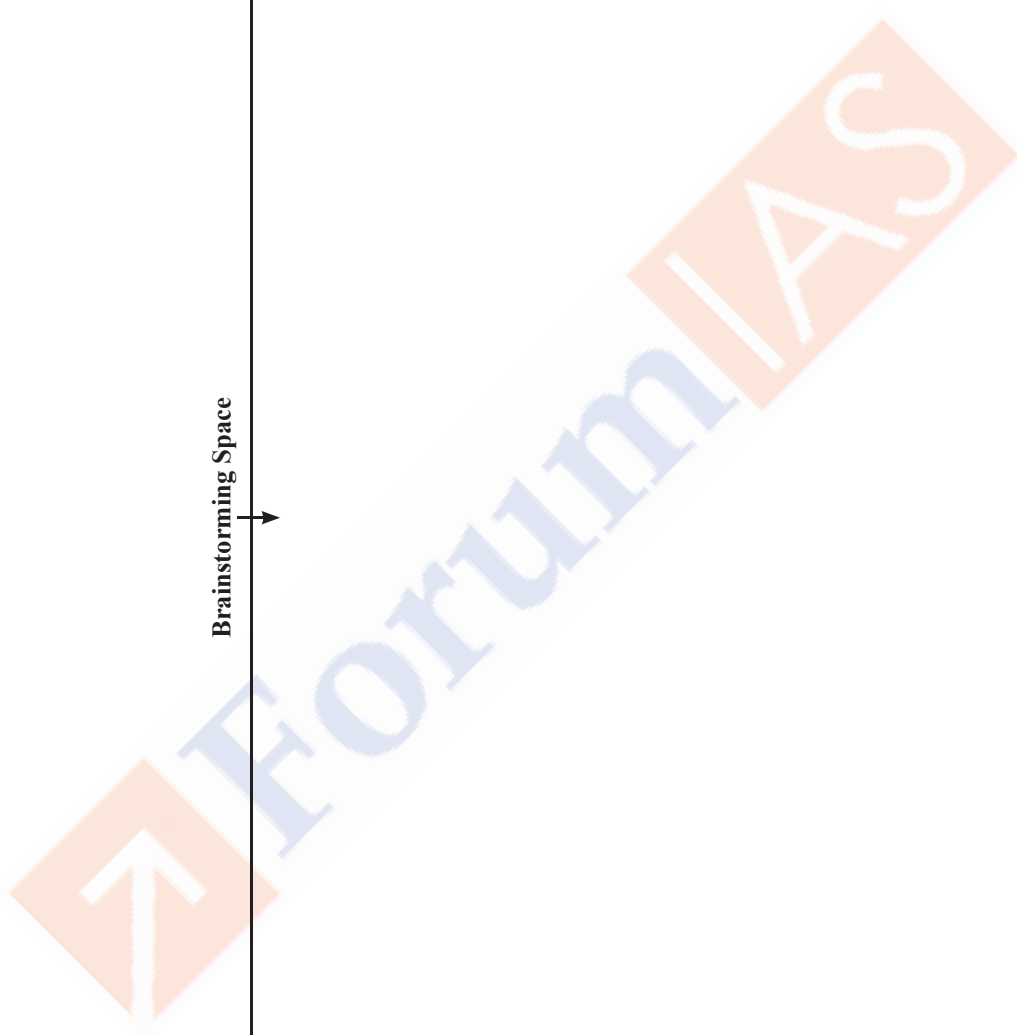
Q.94) Microorganisms have been harnessed by man for some time for the production of useful materials. Point out the important developments in this area. What is the current status microbial technology in our country? (10 Marks, 150 Words) [1985]

Brainstorming Space



Q.95) What is meant by 'Genetic Engineering' What are the dangers associated with it? Do you recommend we should go ahead in developing this technology? (10 Marks, 150 Words) [1981]

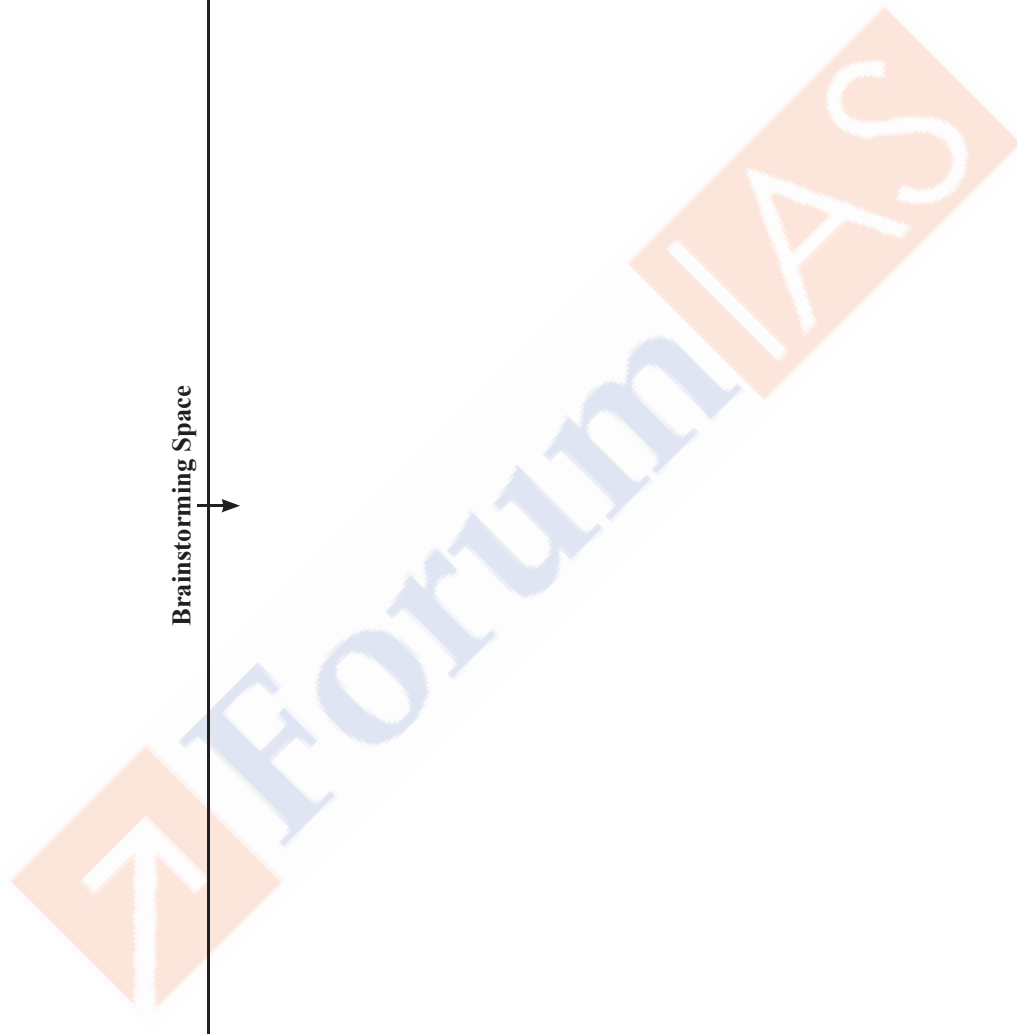
Brainstorming Space



Q.96) Why has there been a resurgence of Malaria in India? What steps should be taken to prevent its spread and to eradicate it eventually?

(10 Marks, 150 Words) [1980]

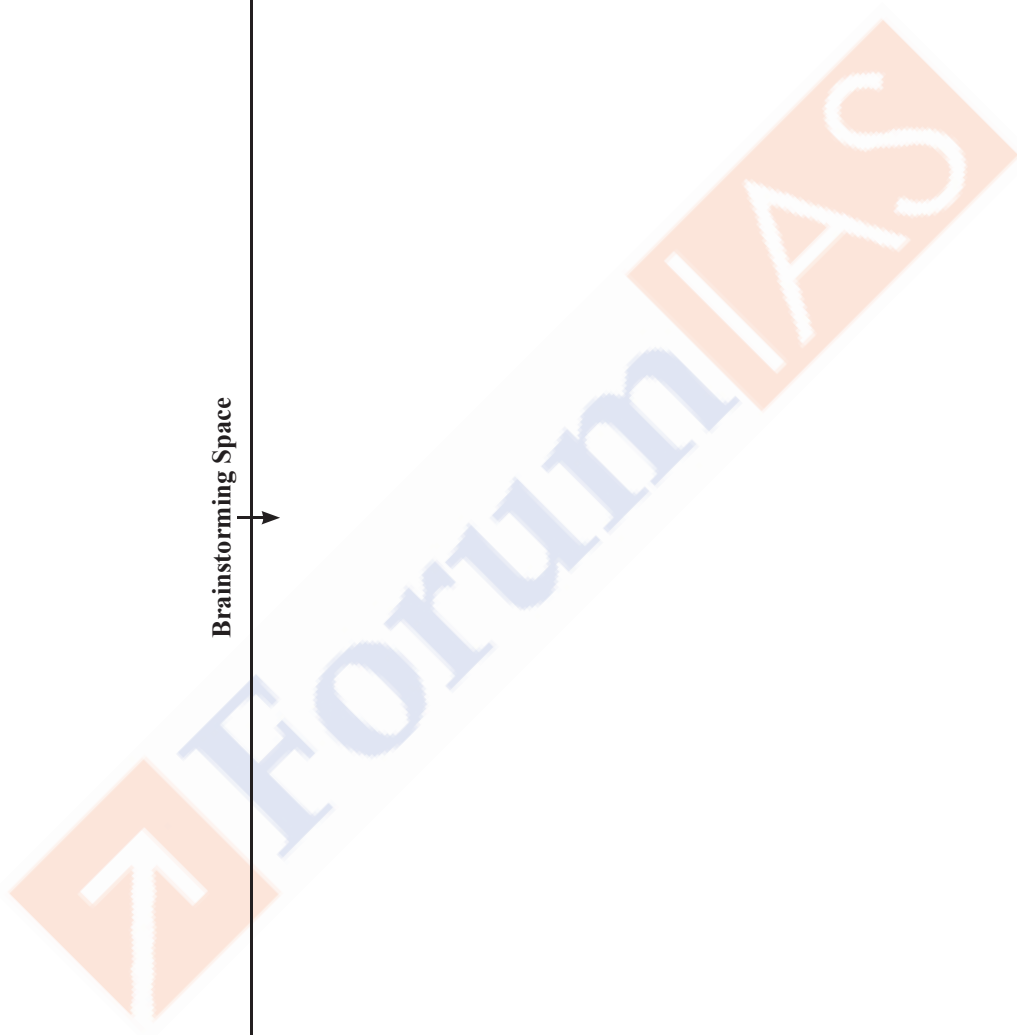
Brainstorming Space



Q.97) What is the present world scenario of intellectual property rights with respect to life materials? Although, India is second in the world to file patents, still only a few have been commercialized. Explain the reasons behind this less commercialization.

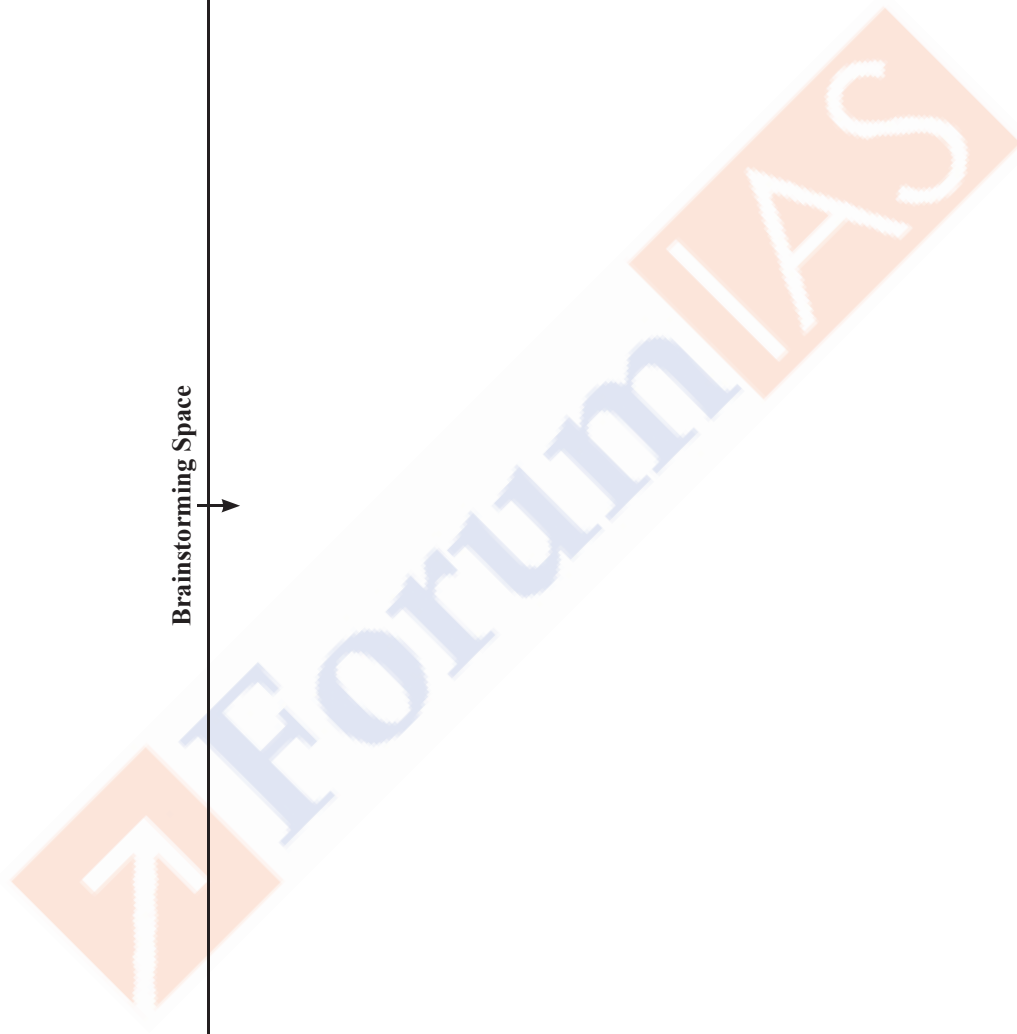
(10 Marks, 150 Words) [2024]

Brainstorming Space



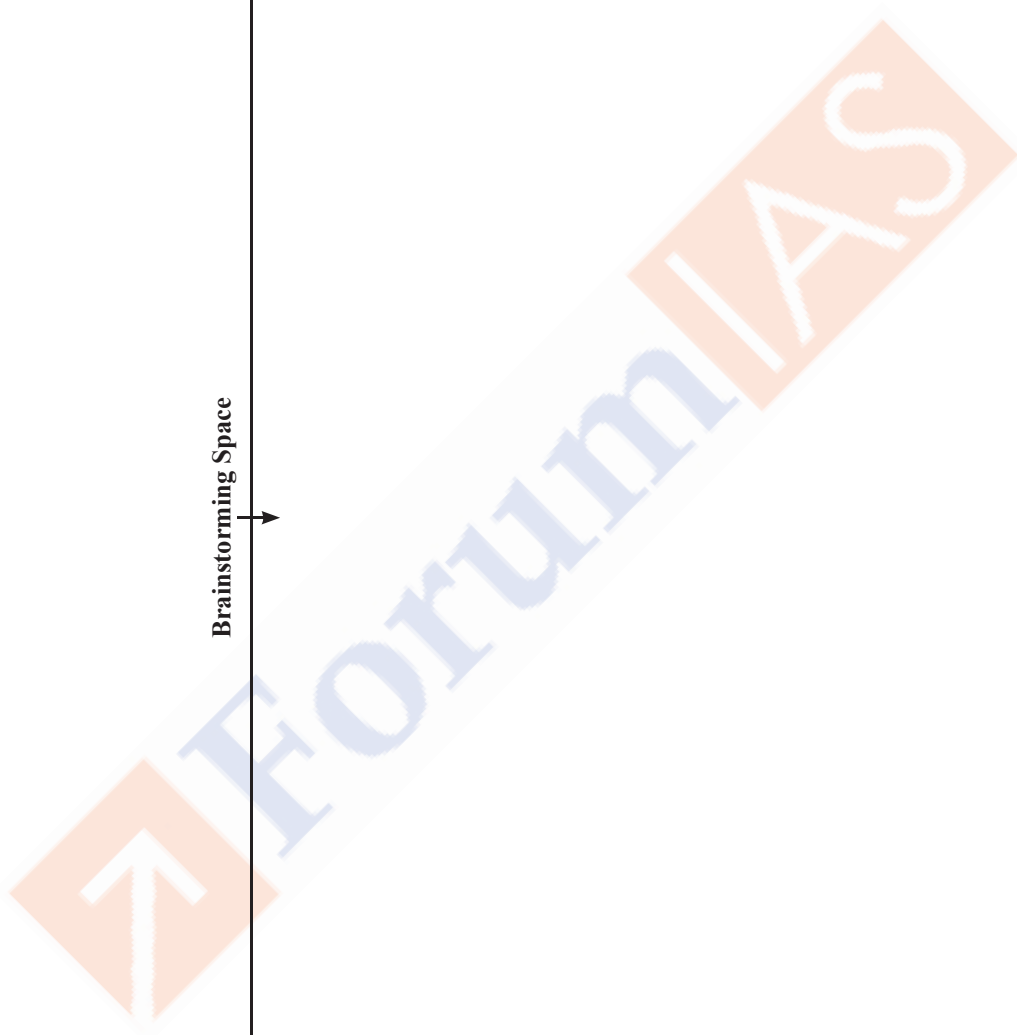
Q.98) In a globalized world, Intellectual Property Rights assume significance and are a source of litigation. Broadly distinguish between the terms— Copyrights, Patents and Trade Secrets. (12.5 Marks, 200 Words) [2014]

Brainstorming Space



Q.99) Did the TRIPS agreement helped in resolving trade conflicts arising out of variations in different nations IPR's regimes? Also list the steps taken by India to conform to TRIPS. (10 Marks, 150 Words) [2010]

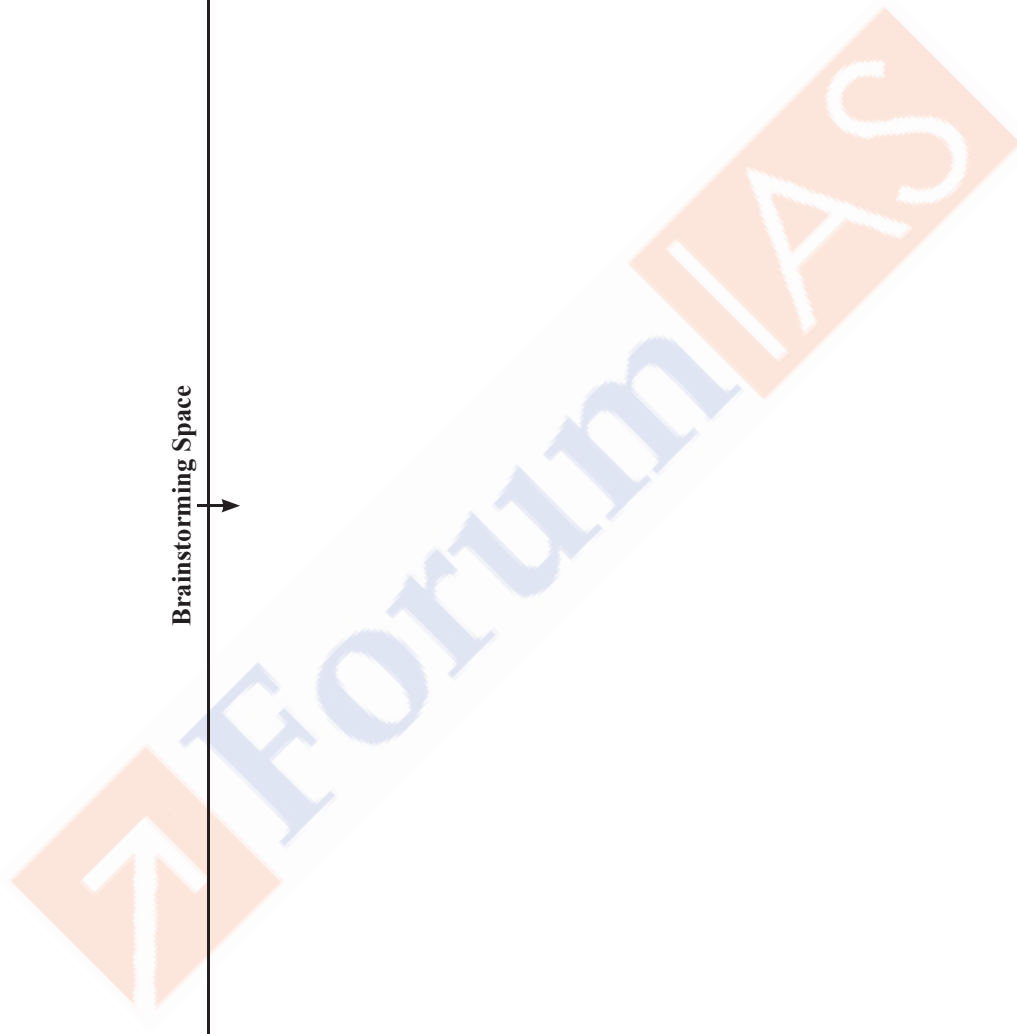
Brainstorming Space



Q.100) Explain the implications of the implementation of Intellectual Property Clauses in our patent law regime after joining the WTO.

(12 Marks, 250 Words) [2006]

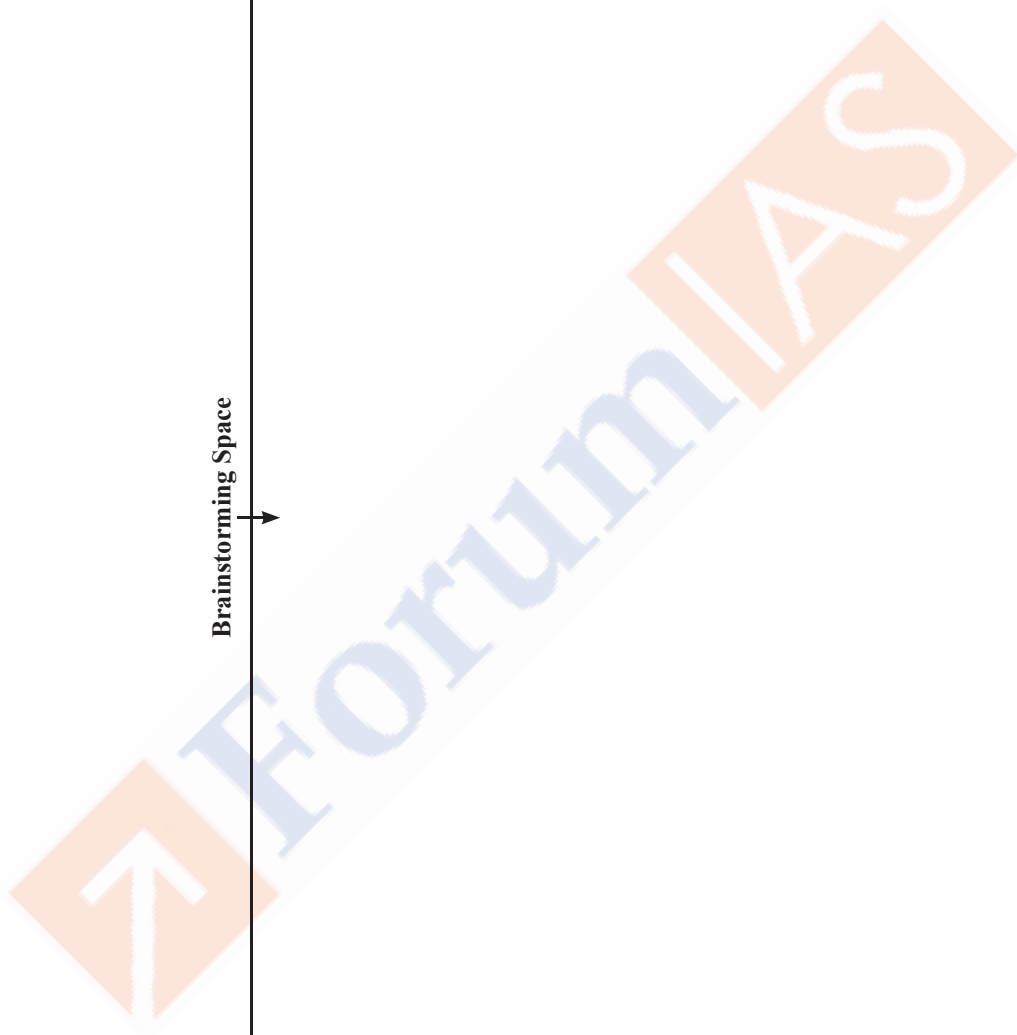
Brainstorming Space



Q.101) What are Intellectual Property Rights? Why are Indian scientists concerned about the new patent regimes?

(15 Marks, 250 Words) [1996]

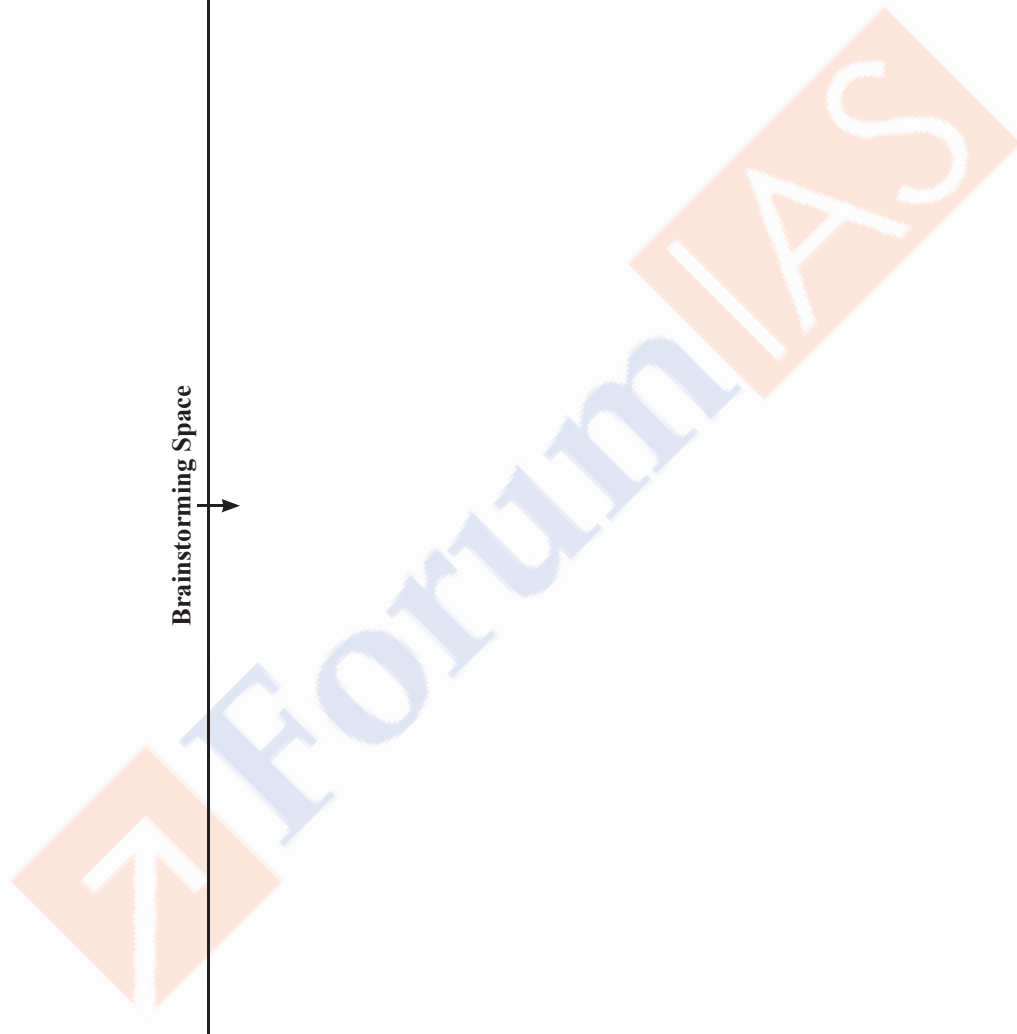
Brainstorming Space



Q.102) How is the Government of India protecting traditional knowledge of medicine from patenting by pharmaceutical companies?

(15 Marks, 250 Words) [2019]

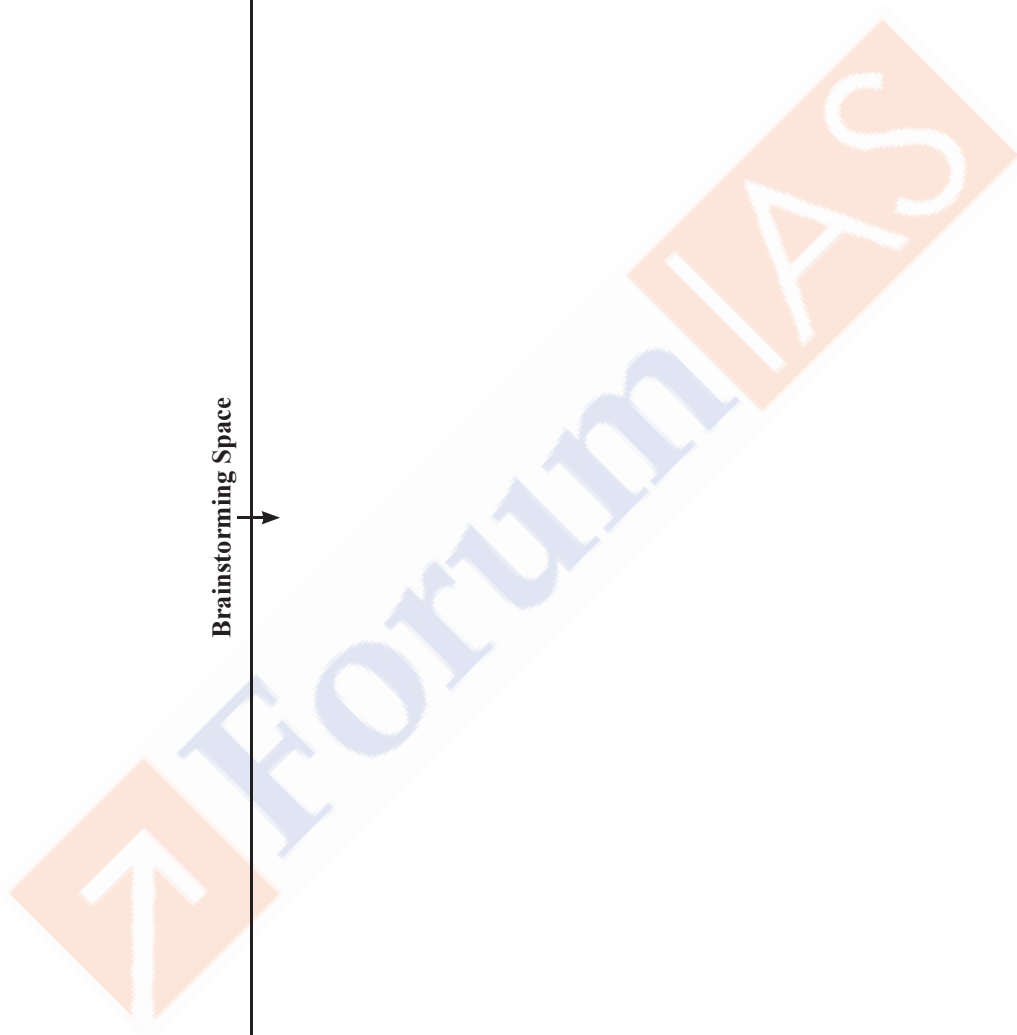
Brainstorming Space



Q.103) What do you understand by the term “Innovation”? Discuss the need for launching a national innovation policy in India.

(15 Marks, 250 Words) [2012]

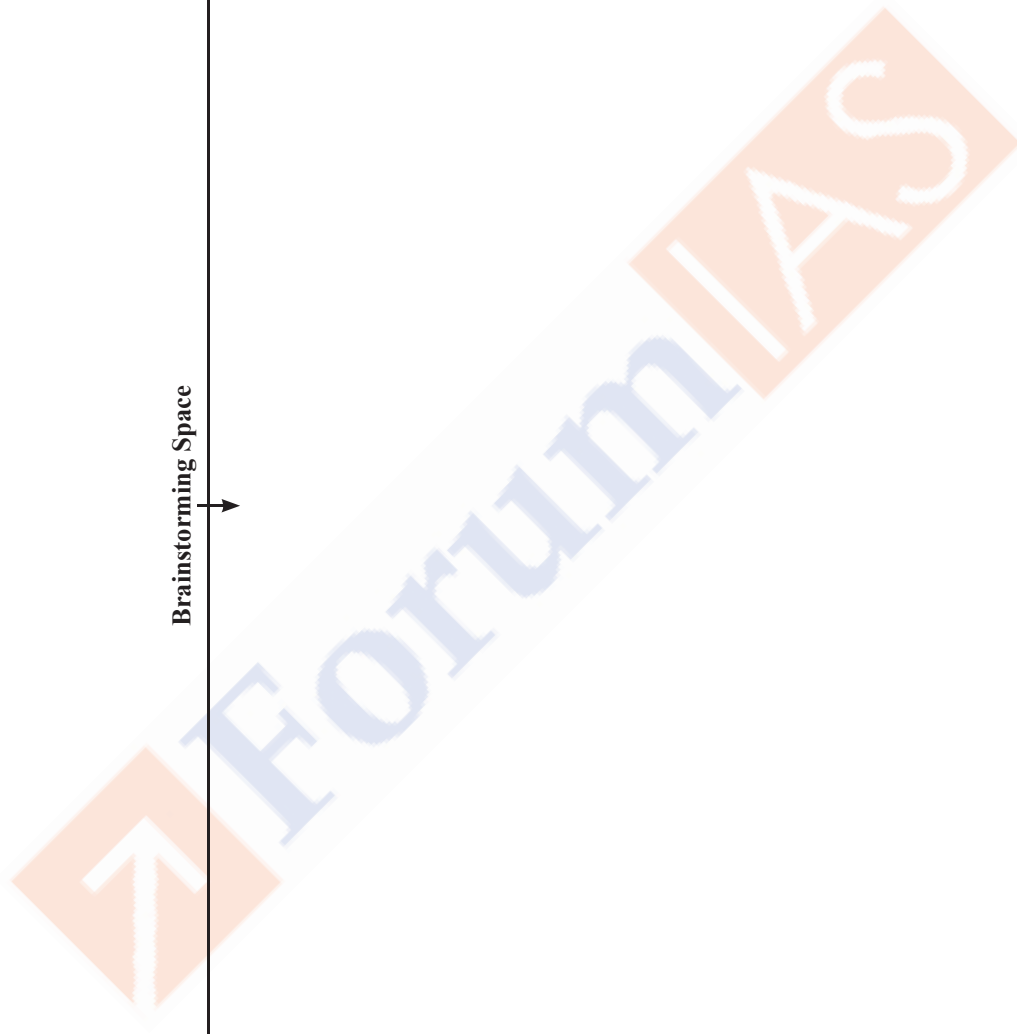
Brainstorming Space



Q.104) What is innovation? What kind of economic compulsions in a country like India, you think, could really stimulate innovations?

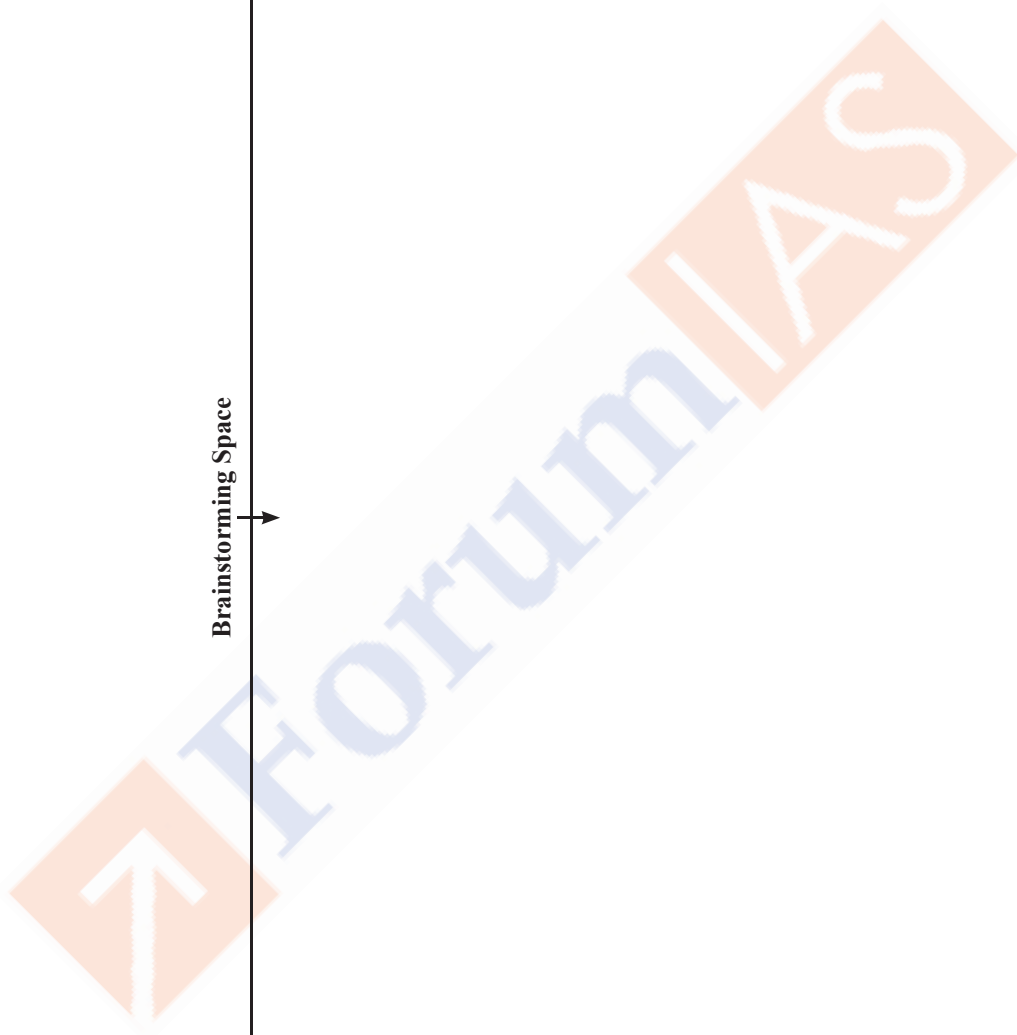
(10 Marks, 150 Words) [1994]

Brainstorming Space



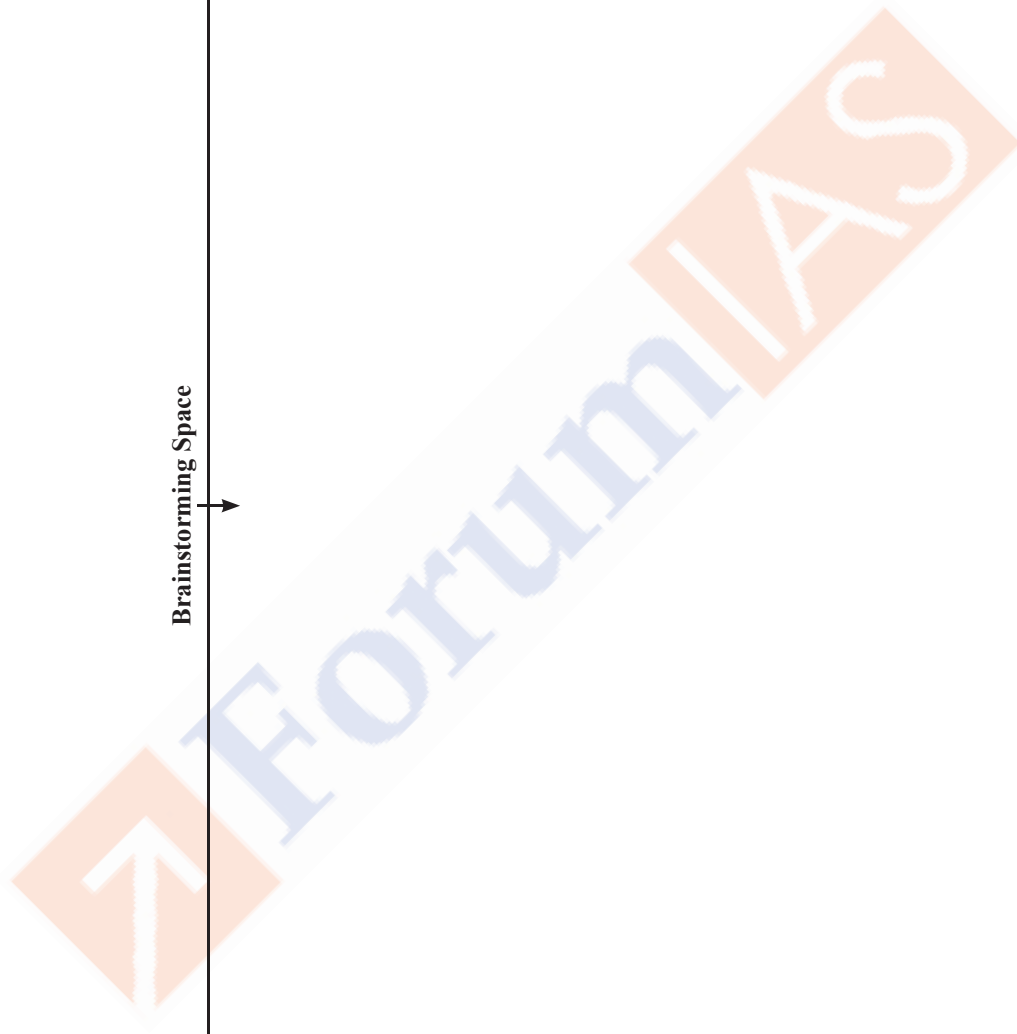
Q.105) The fusion energy programme in India has steadily evolved over the past few decades. Mention India's contributions to the international fusion energy project – International Thermonuclear Experimental Reactor (ITER). What will be the implications of the success of this project for the future of global energy? (10 Marks, 150 Words) [2025]

Brainstorming Space



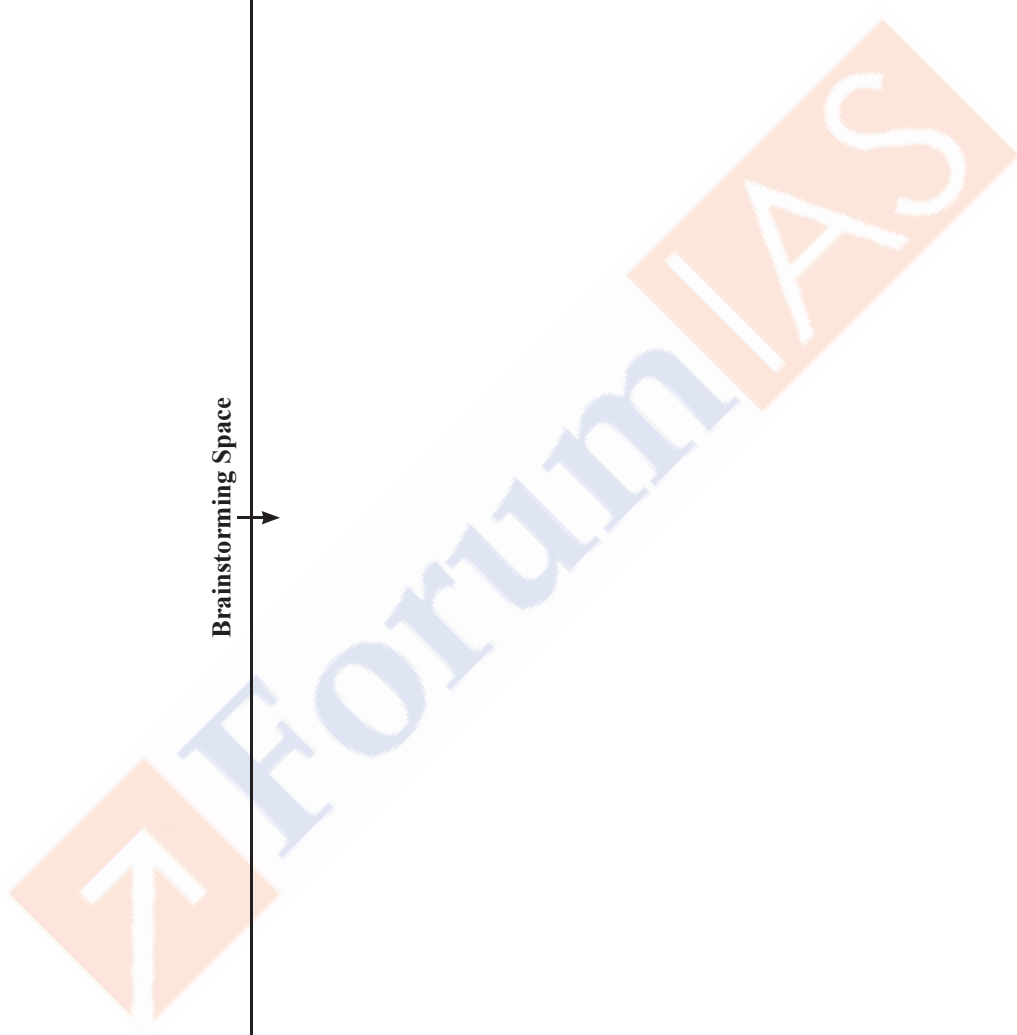
Q.106) With growing energy needs should India keep on expanding its nuclear energy programme? Discuss the facts and fears associated with nuclear energy. (15 Marks, 250 Words) [2018]

Brainstorming Space



Q.107) Give an account of the growth and development of nuclear science and technology in India. What is the advantage of fast breeder reactor programme in India? (12.5 Marks, 200 Words) [2016]

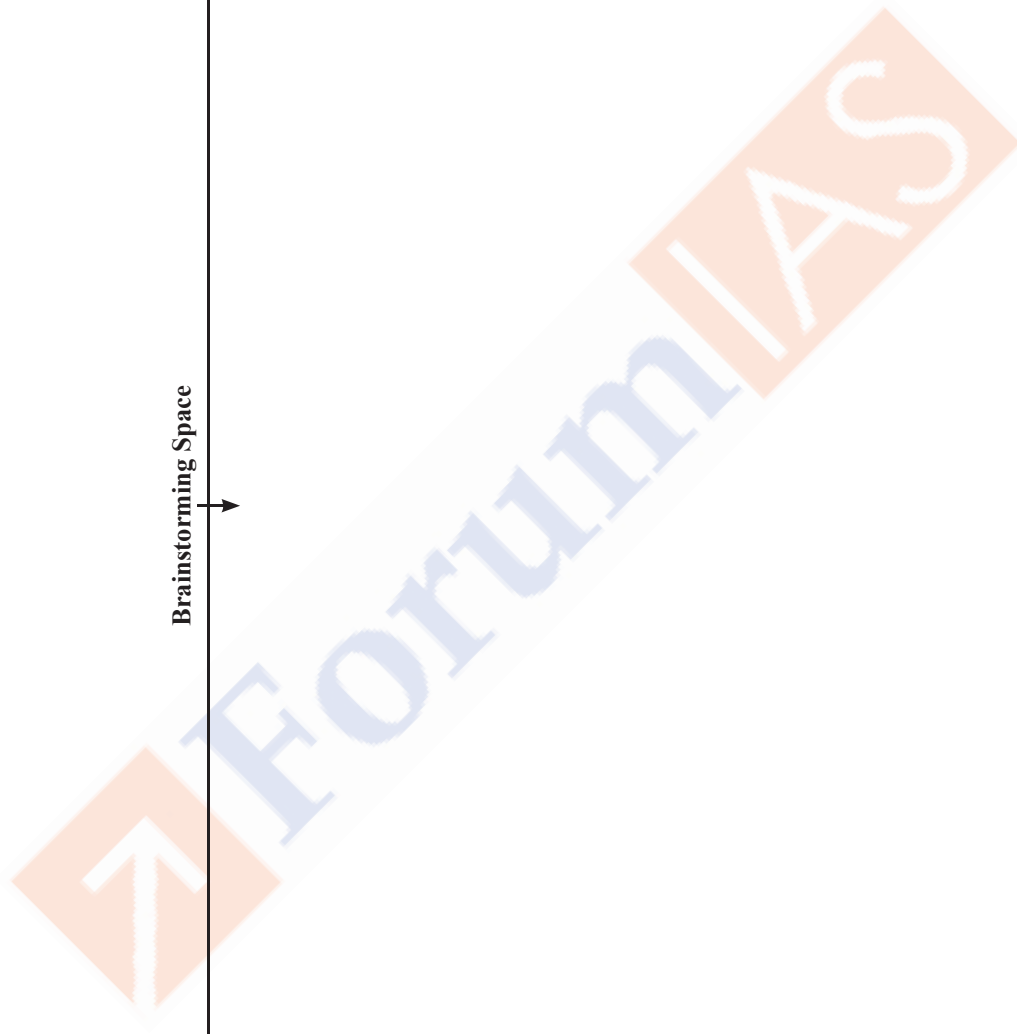
Brainstorming Space



Q.108) How has India's Nuclear Programme contributed to the economic and defence requirements of the country?

(15 Marks, 250 Words) [1994]

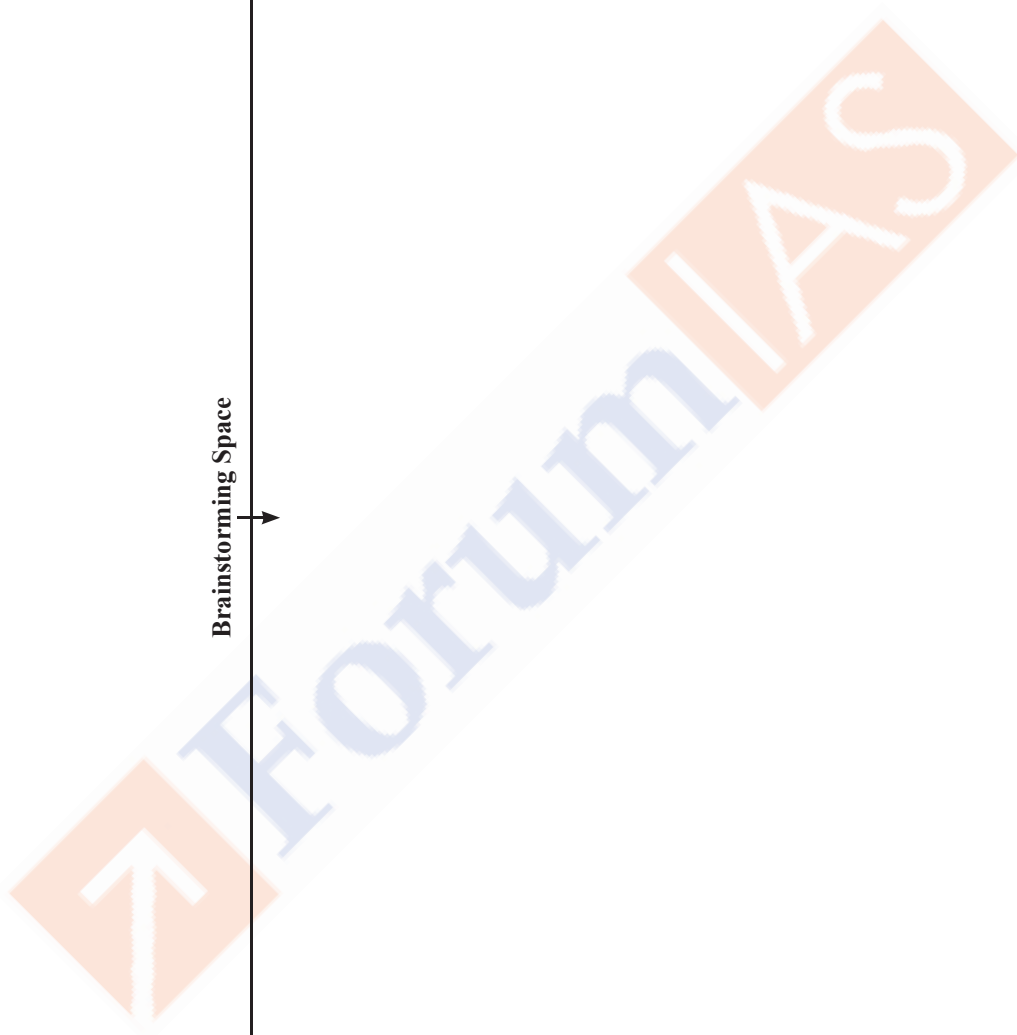
Brainstorming Space



Q.109) What is nuclear medicine? Describe briefly its different uses.

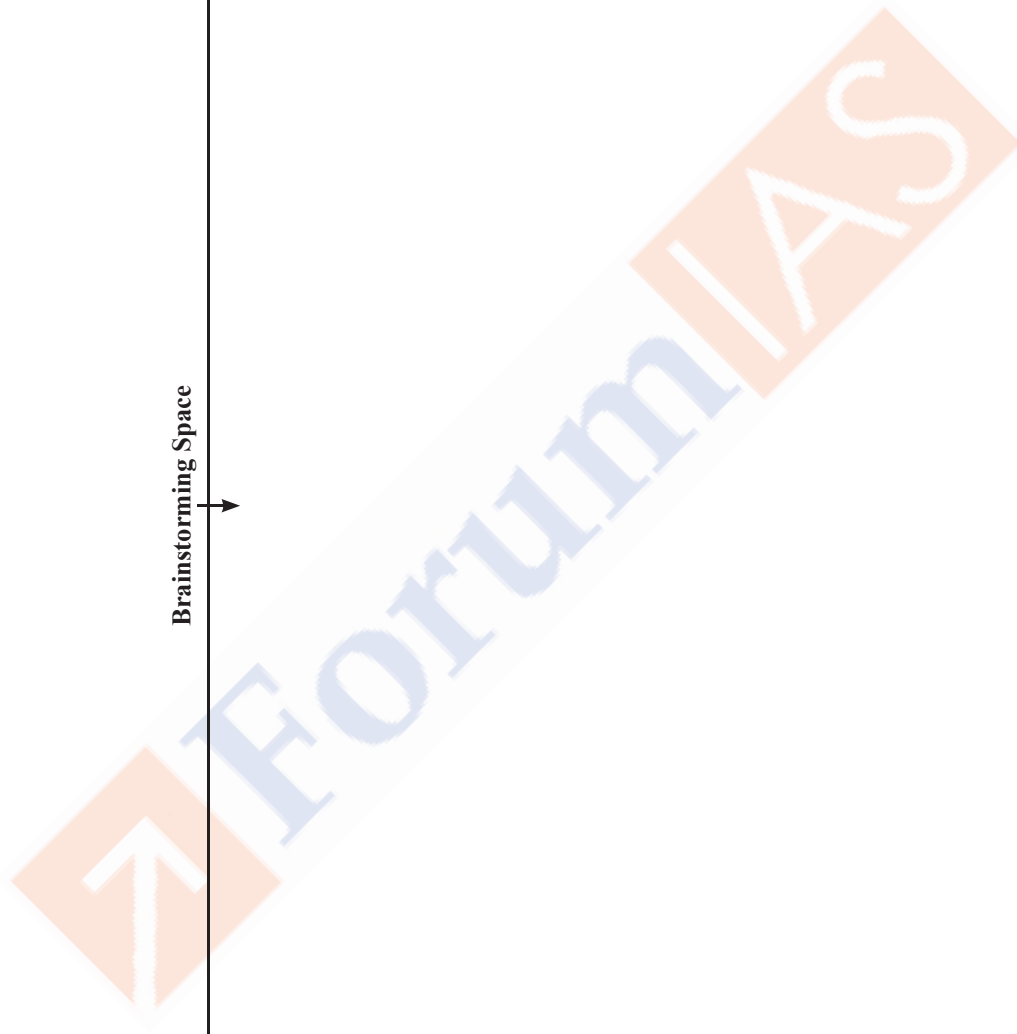
(10 Marks, 150 Words) [1996]

Brainstorming Space



Q.110) Describe briefly the different phases of India's nuclear energy programme. (10 Marks, 150 Words) [1994]

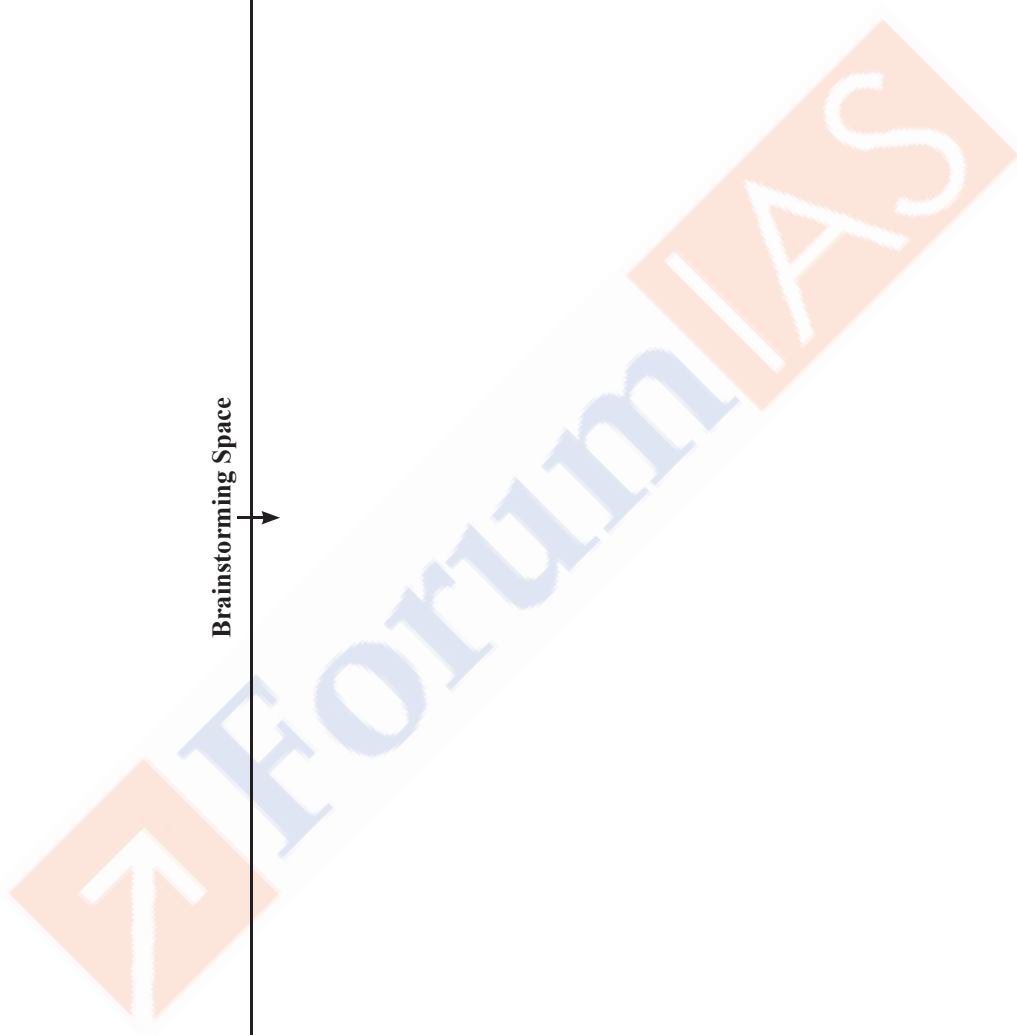
Brainstorming Space



Q.111) Mention some of the new programmes that have been undertaken in recent years in respect of nuclear research in India.

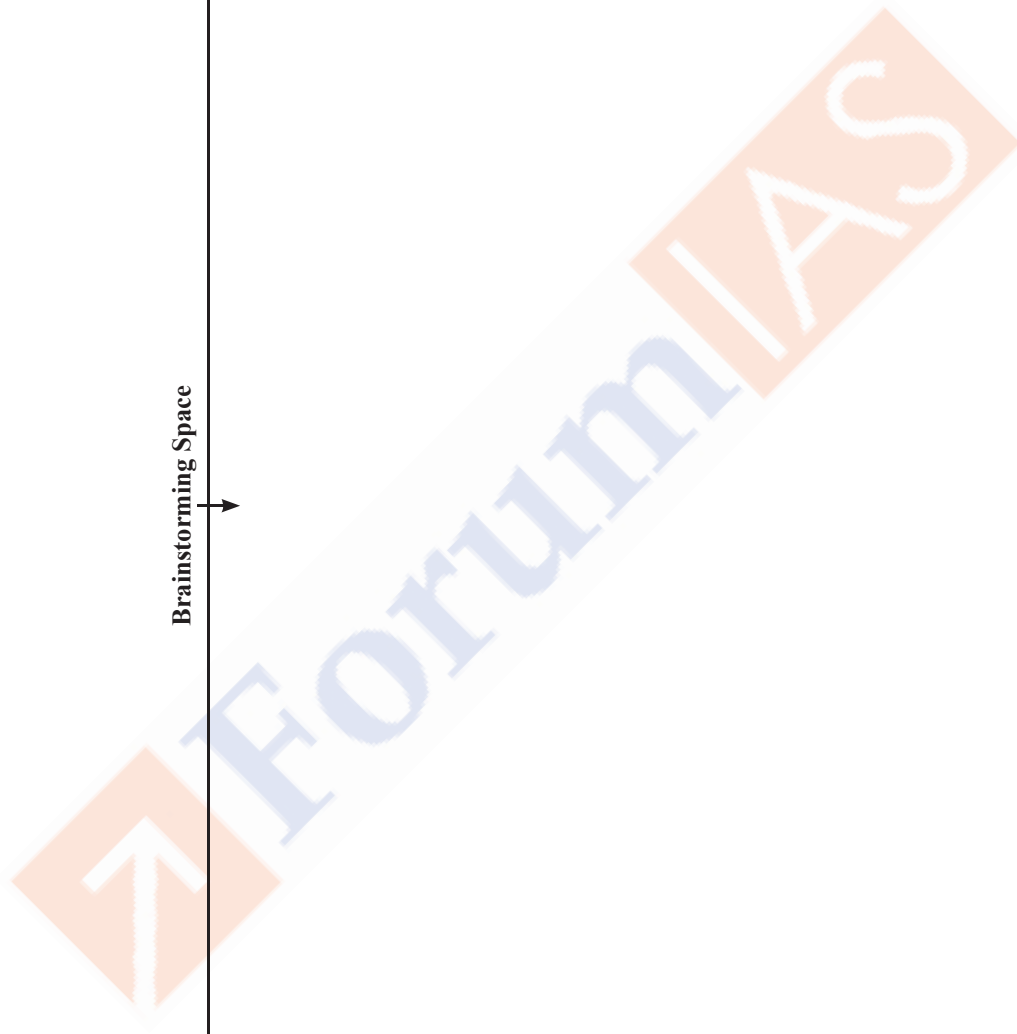
(10 Marks, 150 Words) [1992]

Brainstorming Space



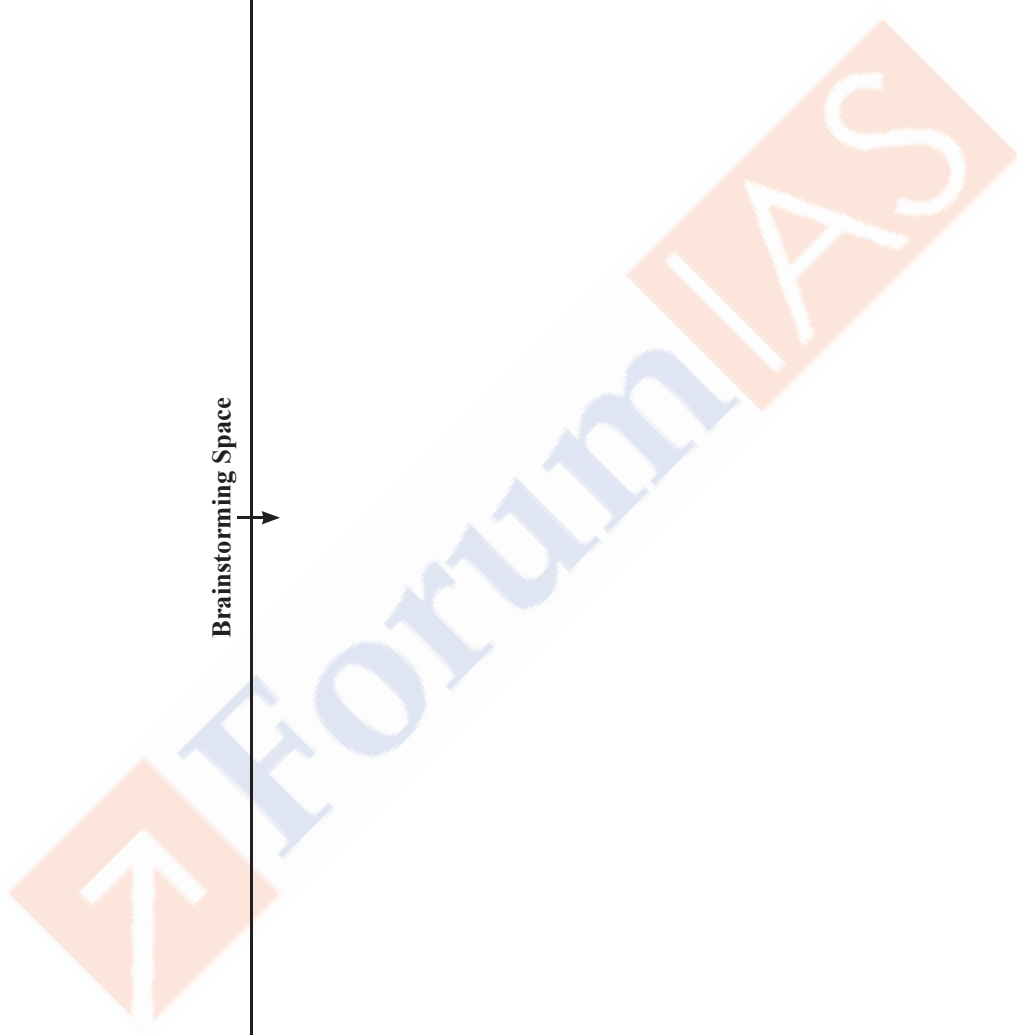
Q.112) What is a fast breeder reactor? Discuss briefly its role in India's nuclear energy programme. (10 Marks, 150 Words) [1992]

Brainstorming Space



Q.113) What are the non-conventional sources of energy relevant in the Indian Context? Comment on the status of the technologies available for their utilization. (10 Marks, 150 Words) [1989]

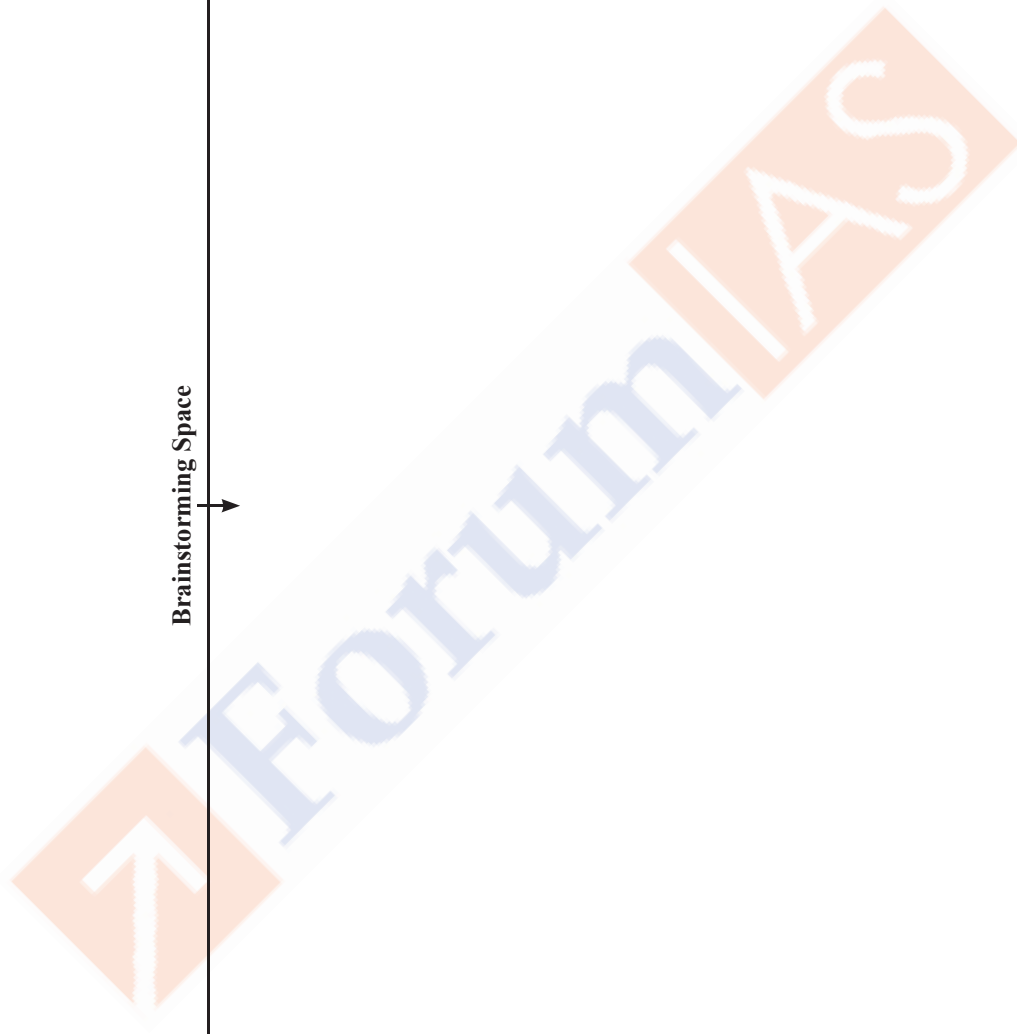
Brainstorming Space



Q.114) The current tech of nuclear power generation is based upon the fission process, what are the other methods possible for the generation of nuclear power with reference to the Indian condition?

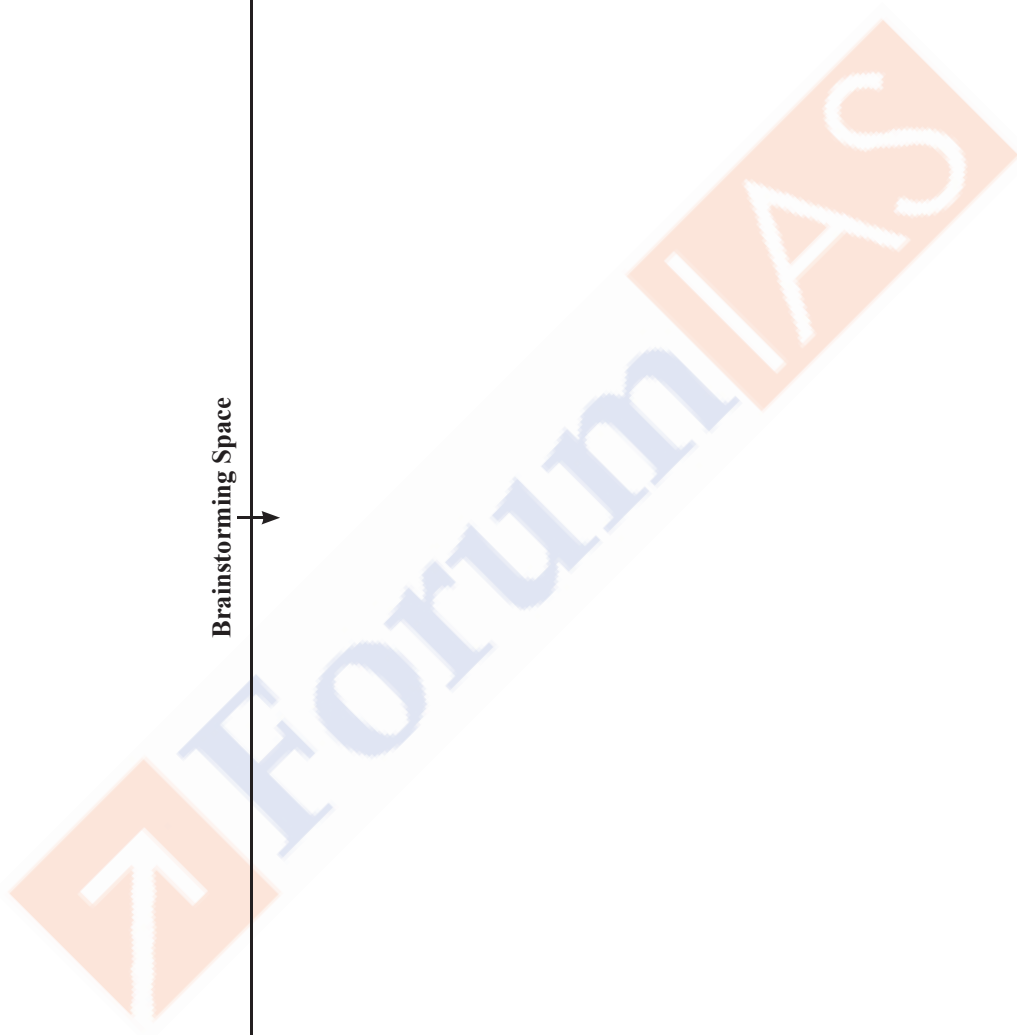
(10 Marks, 150 Words) [1984]

Brainstorming Space



Q.115) Explain the purpose of the Green Grid Initiative launched at the World Leaders Summit of the COP26 UN Climate Change Conference in Glasgow in November 2021. When was this idea first floated in the International Solar Alliance (ISA)? (10 Marks, 150 Words) [2021]

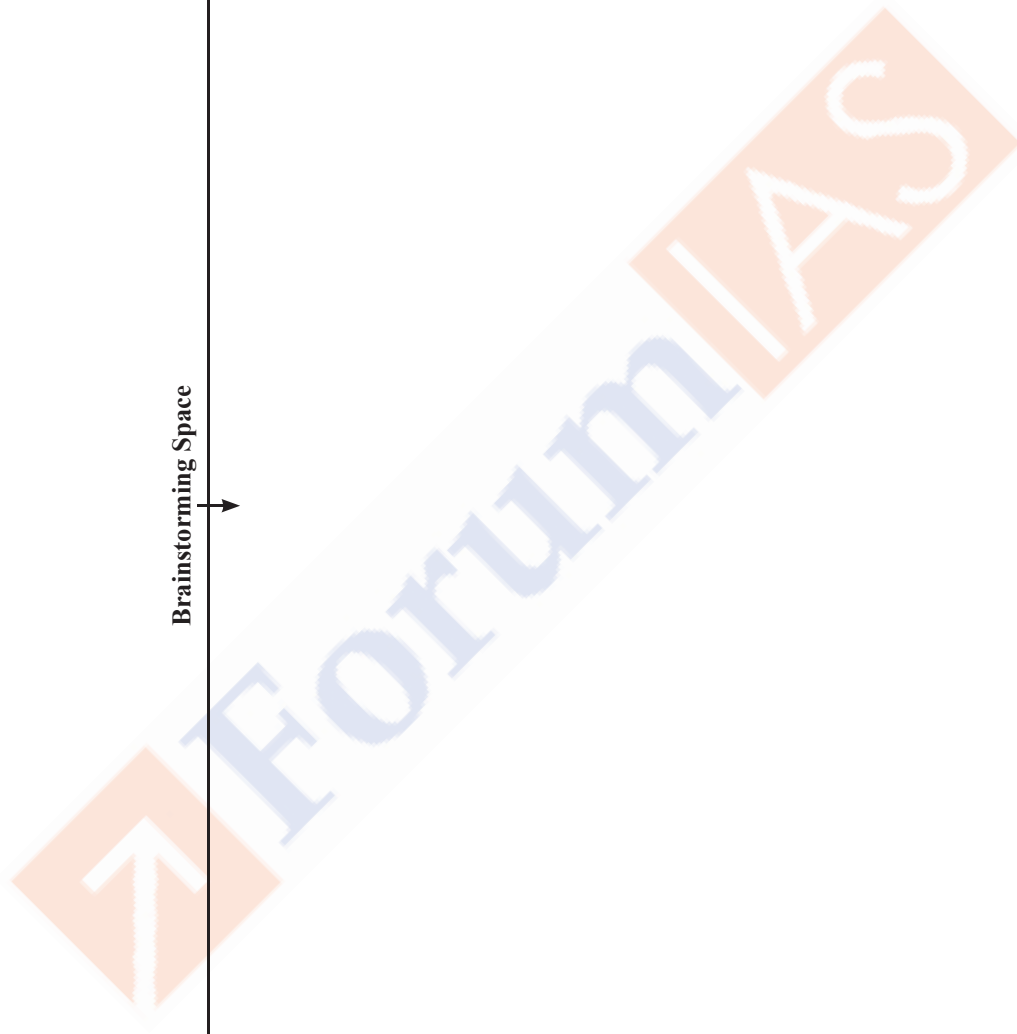
Brainstorming Space



Q.116) Describe the benefits of deriving electric energy from sunlight in contrast to the conventional energy generation. What are the initiatives offered by our Government for this purpose?

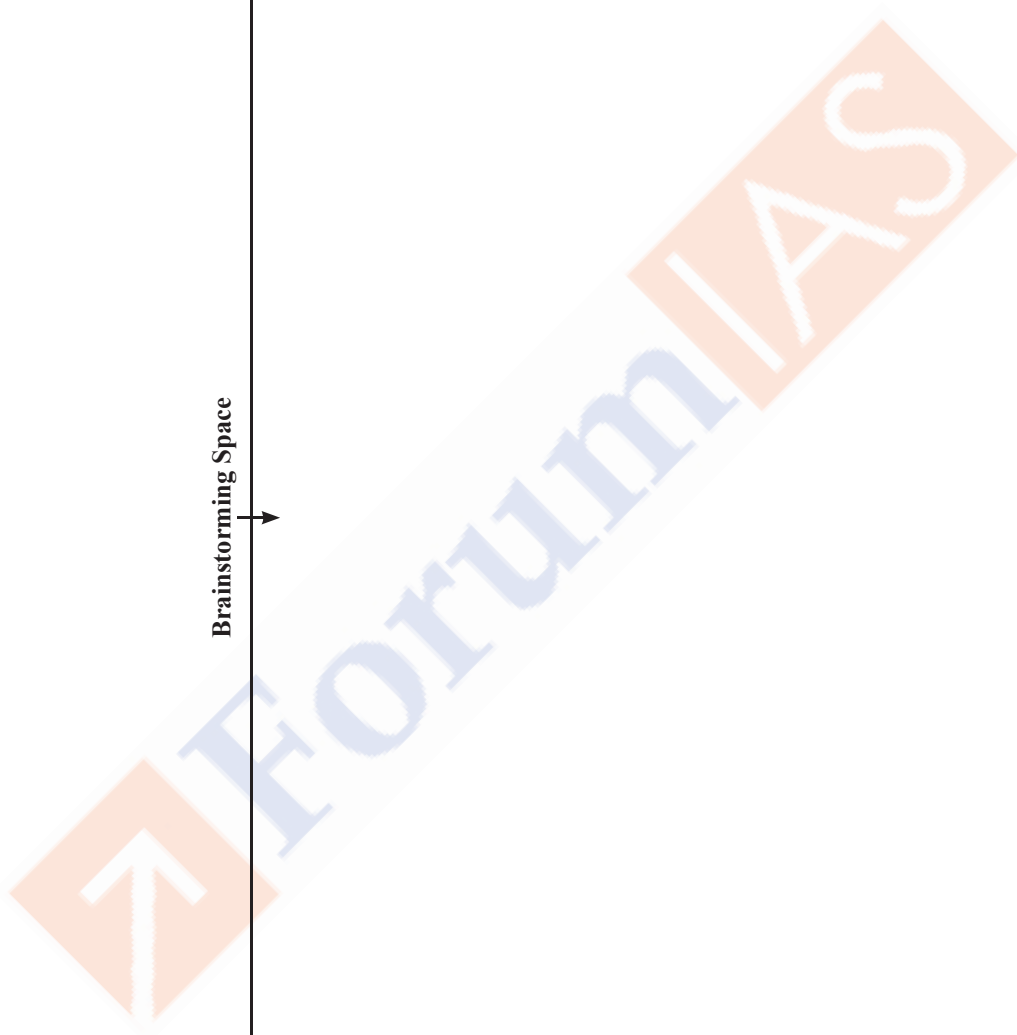
(15 Marks, 250 Words) [2020]

Brainstorming Space



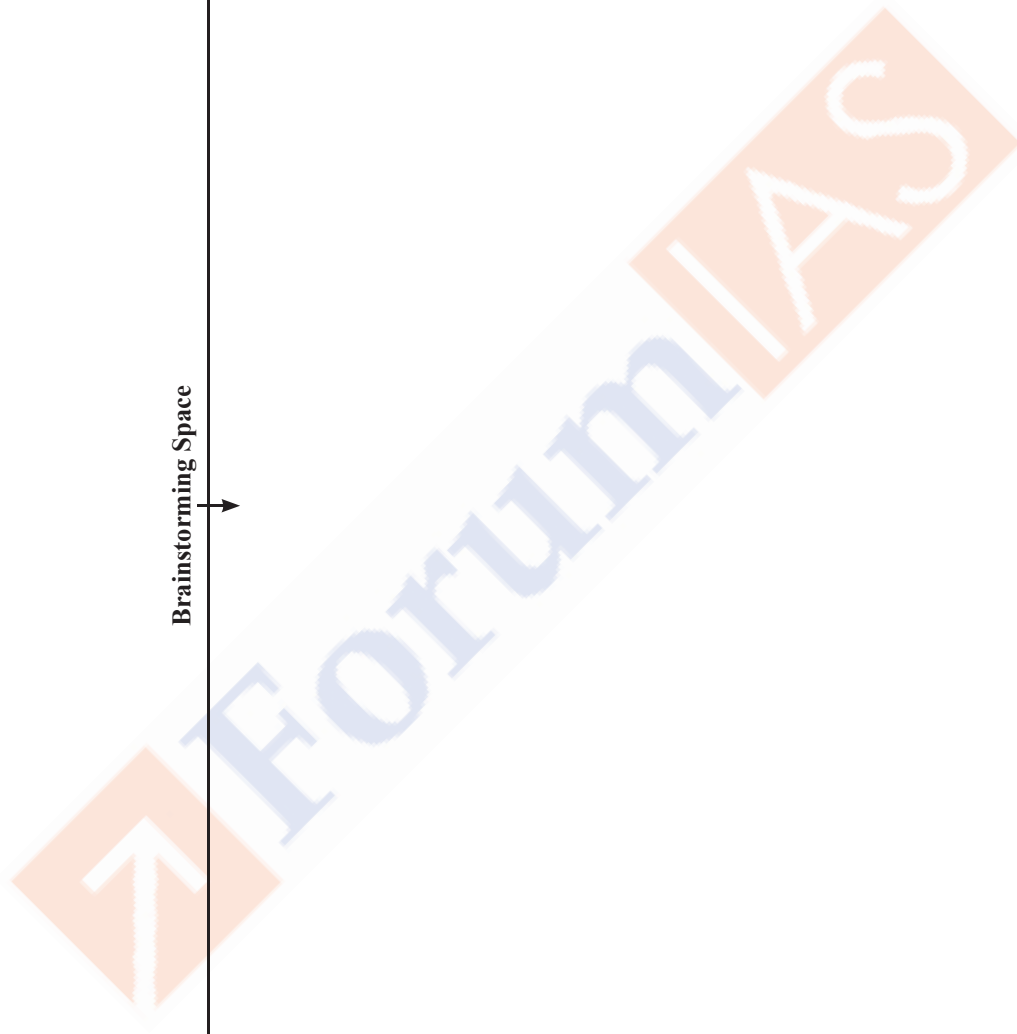
Q.117) Given the accelerated pace development and demand for energy, would you consider renewable energy as a viable option for India's future?
(10 Marks, 150 Words) [2012]

Brainstorming Space



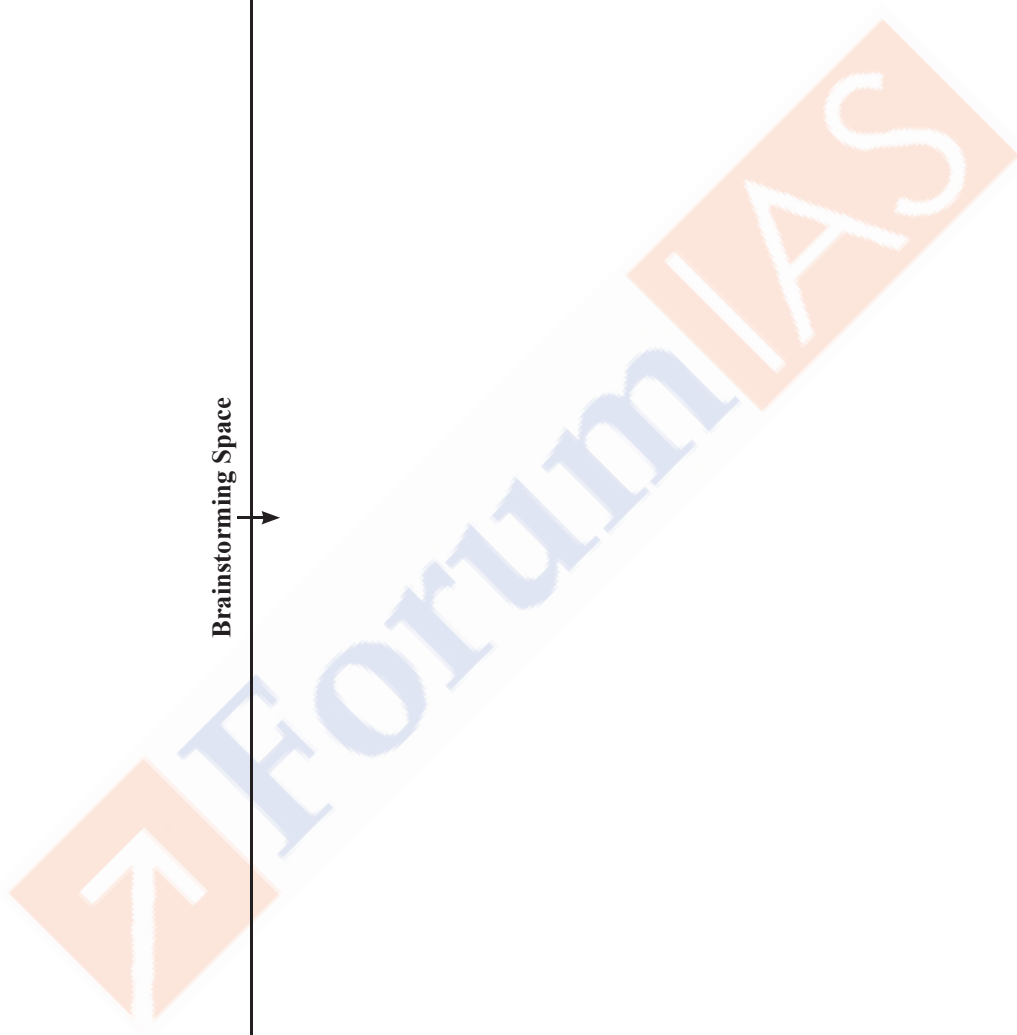
Q.118) What are the alternative fuels available for the transport sector? Discuss their characteristics, advantages and disadvantages in their utilization. (10 Marks, 150 Words) [2007]

Brainstorming Space



Q.119) Bring out the prospects of development of alternative energy sources of India. (10 Marks, 150 Words) [2006]

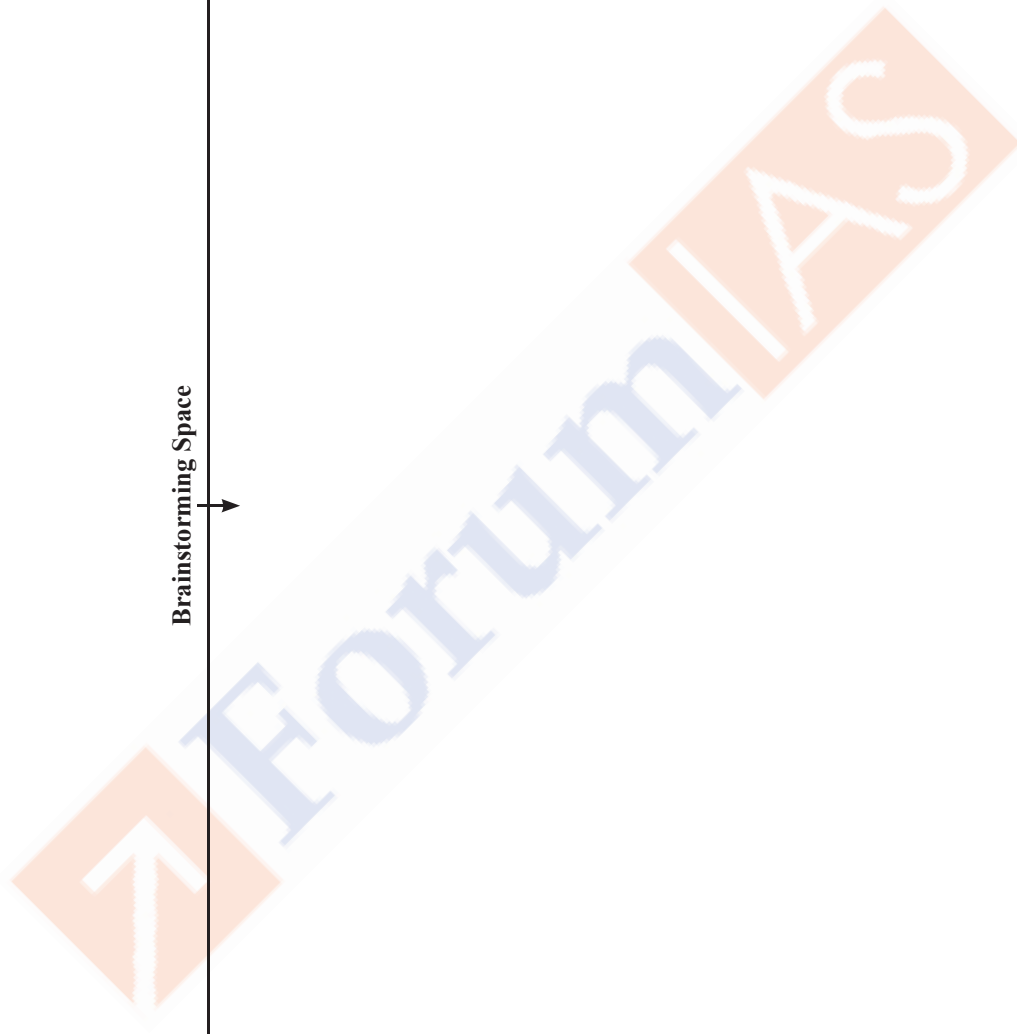
Brainstorming Space



Q.120) Why is hydrogen being acclaimed as the fuel of the future?

(10 Marks, 150 Words) [2005]

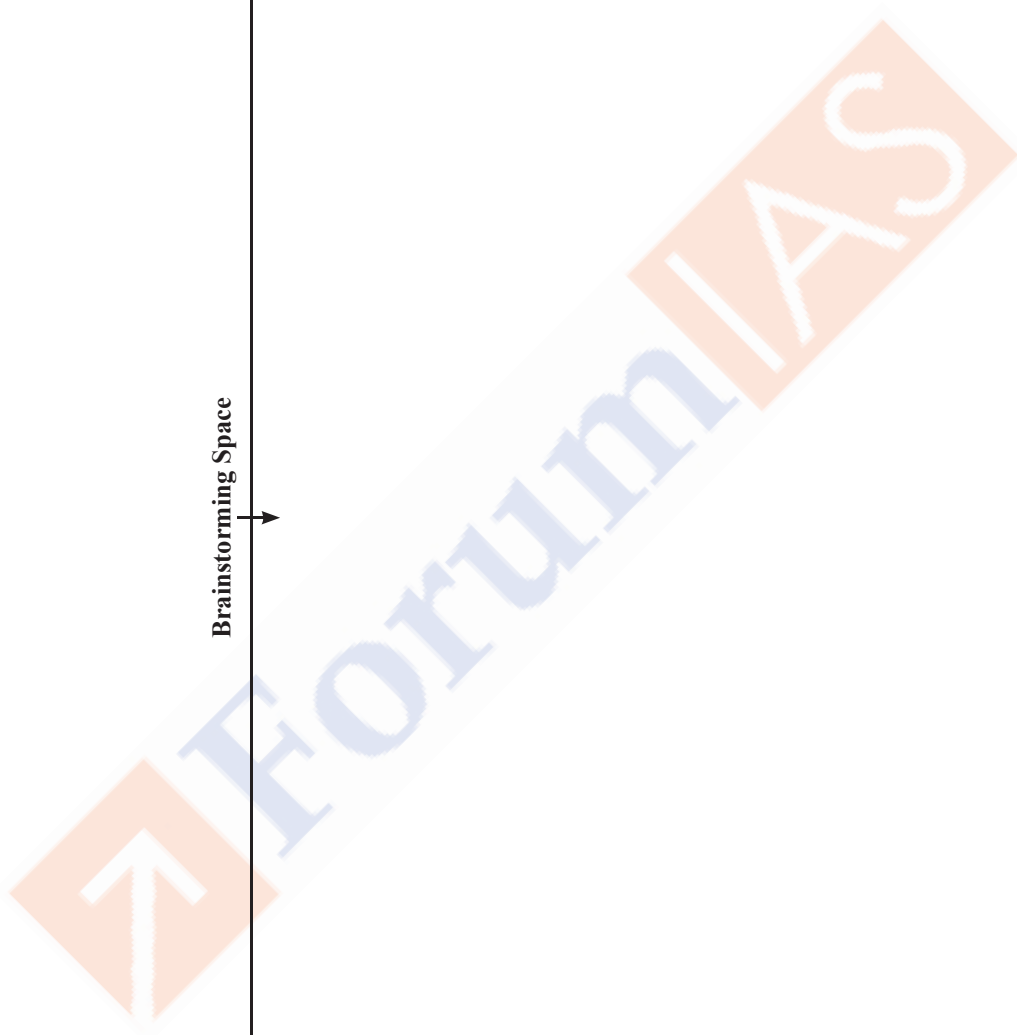
Brainstorming Space



Q.121) Discuss in detail "Alternative Energy Sources".

(15 Marks, 250 Words) [2004]

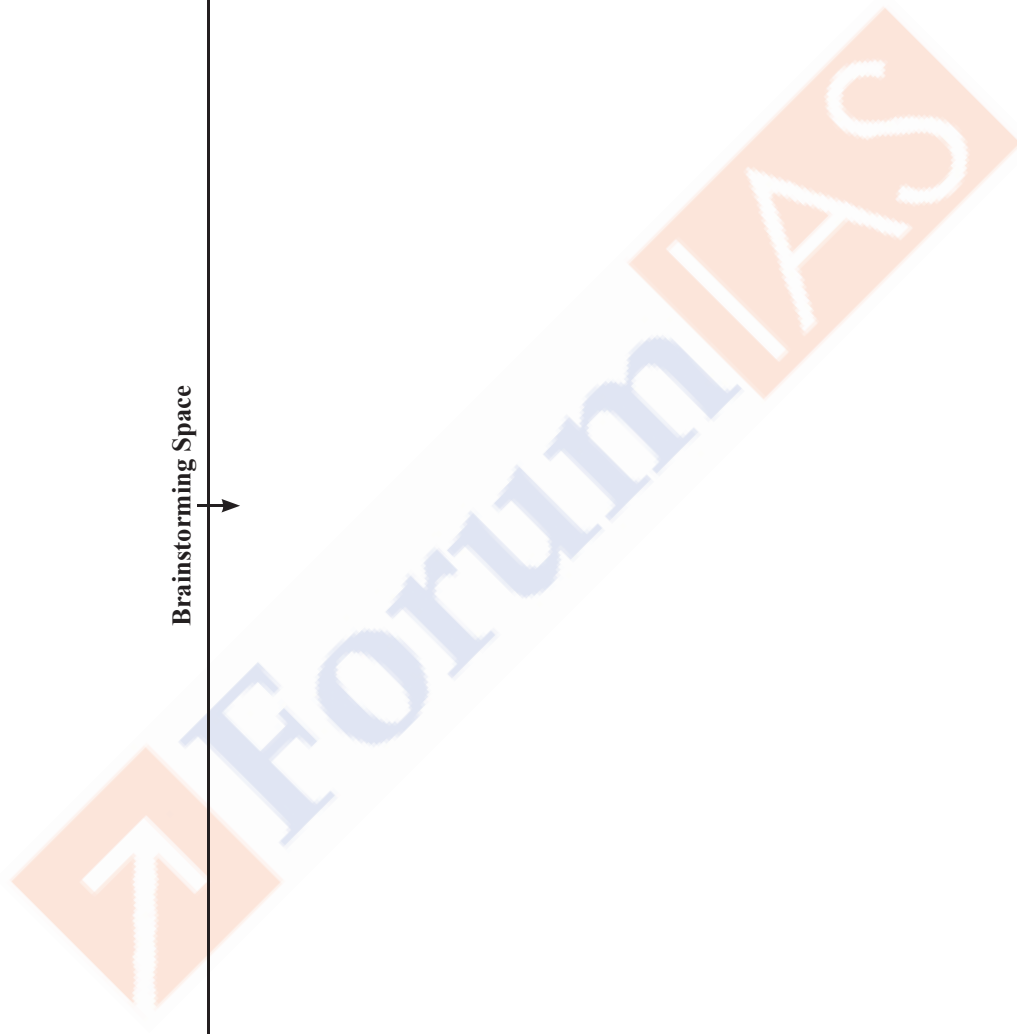
Brainstorming Space



Q.122) Discuss the potential of solar energy utilization in India.

(15 Marks, 250 Words) [1991]

Brainstorming Space



Q.123) What do you understand by the Integrated Rural Energy System? Also mention at least three new sources of Energy.

(10 Marks, 150 Words) [1991]

Brainstorming Space

