ForumIAS

GS Advanced Program 2023

Generic Booklet, 693056

Test Name/Code/No. : ~~[illegible]~~

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Mobile No.		Date	~~[illegible]~~ 10/2/23

Allotted Time : 60 Minutes

Instructions to Candidates –

- There are 7 Questions in this Question paper.
- All Questions are Compulsory.
- For all updates, please visit the noticeboard – https://noticeboard.forumias.com/gsap-2023/

Important –

- Answers must be attempted in the QCA Booklet only.
- To upload the Answer Copies please visit to "My Course" section on – https://academy.forumias.com/
- Only those copies will be evaluated which will be submitted before the next class.

Q. No.	Grade/Score
1	
2	
3	
4	
5	
6	
7	
Overall Grade/Score	

This Generic QCA booklet can be used to attempt all GS Advanced Program Tests.

TEST CODE	6	9	3	0	5	6

GS Advanced Program 2023 | Batch 2

TEST #44

Instructions to Candidates -

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Q.1) 5G technology has potential to revolutionize the digital ecosystem in India. Analyse critically. (150 Words)

Q.2) Digital India's success is vitally linked to digitally secure India. Discuss the threats and Government response mechanism to ensure cyber secure India. (150 Words)

Q.3) Quantum computer marks quantum leap in domain of computing. It will open up fields of Quantum physics and also aid it socio economic development of India. Discuss (150 Words)

Q.4) Blockchain as a technology has many applications beyond crypto currency. But it is fraught with numerous risks. Discuss (150 Words)

Q.5) Stem cell therapy and Gene editing, while being different, find many applications in health care. Discuss (250 Words)

Q.6) Nuclear fusion technology holds the key to energy secure world. Analyse critically. (250 Words)

Q.7) Space is the new frontier. It holds numerous beneficial applications but it is fast becoming part of hybrid warfare. Disucss (250 Words)

Start Writing Here

5G is 5th generation wireless communication technology which uses micro wave and millimetre wave technology.

5G can revolutionize the digital ecosystem as:

1) Security – connect different agencies in record management
eg NATGRID

2) Smart cities – digital traffic management crowd management

3) E governance – Record & retrieval between multiple agencies easier.
eg common service centre will be able to deliver more effectively.

4) Industrial revolution 4.0 – 5G is at heart of IR 4.0 by connecting multiple physical objects in a digital ecosystem

5) Health – Tele surgery due to low latency.

However ~~alone~~ there are impediments to 5G revolutionizing the Indian digital ecosystem —

1) High spectrum price
2) Debt burden on telecom sectors
3) Telecom sector moving towards duopoly this will lead to poor market flourishment.
4) 5Gi standard makes it difficult for interoperability raising the cost
5) Majority of towers are not capable of handling 5G & needs a overhaul.

Thus, ~~5G~~ reforms are needed to ~~make~~ 5G capitalize over the potential of 5G to revolutionize the Indian digital ecosystem.

Overall Grading (√)

Poor			Average			Good		
1	2	3	4	5	6	7	8	9

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Q.2) As per NCRB there has been a consistent rise in cyber crimes in India.

Digital India's success is linked to digitally secure India as following threats hinders the success

1) Critical infrastructure - hijacked by hackers in order to demand ransom or as part of cyber warfare.
eg AIIMS server attack in 2022.

2) Rise in digital payments after demonetisation is under threat of cyber theft.

3) Digital illeteracy - amongst senior citizen, women makes them vulnerable. This prevents inclusion

4) Rise in social media use - Increased radicalization and deep fakes makes the users victim of exploitation.

5) Data privacy not adhered to by some social media intermediaries.

(Don't
anythin

Government's response mechanism —

1) Computer emergency response team - National level cyber agency.
2) National cybersecurity policy 2013 - increasing the cyber police, cyberthreat resilient infrastructure.
3) Cyber Suraksha Kendra
4) National critical information infrastructure protection centre - to protect the critical infrastructure for cyber attacks.
5) Cyber Suraksha Bharat initiative - ~~to~~ for capacity building.

Thus, ~~Do~~ need of hour is to implement BN Srikrishna committee's recommendation in order to ensure data protection and ultimately cyber security.

Overall Grading (√)

Poor			Average			Good		
1	2	3	4	5	6	7	8	9

Q.3) Quantum computers are those computer which use qubits for computational purpose.

They mark quantum leap in domain of computing as they can solve those problems what in 8 minutes which traditional computers aren't able to in centuries.

It will open up fields of quantum physics as -

1) Help in studying phenomena of quantum entanglement and superposition

2) Quantum computers require temperature ~0.01 K, this achievement will open other feilds as qubits will exist at such temperatures only.

3) It will help in exploring quantum com enabled communication.

It will aid in socio economic development

1) Industry 4.0 – bring more jobs

2) Disaster management – by modelling the climate and topographical data, earthquake, cyclone can be predicted. Lead to save of life and property, thus social and economic wellbeing

3) Health – Vaccine development can be faster because of quick genome sequencing etc.

4) Trade – will be increased as India can be

Thus, National mission on quantum and emerging technologies is a right step in this direction as this will make India a net exporter of quantum computers.

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Q.4) Blockchain is decentralized & digital public ledger.

Applications –

1) Crypto currency – because blockchain is decentralized, immutable and traceable.

2) Record management (Governance) – land records, census data can be managed in blockchain as this is secure, and can be accessed by anyone

3) Smart contracts – will benefit industry as it prevents litigation by recording entry at each point.

4) Health – Medical records can be anonymously kept.

5) Corruption – Easy Audit (as information is available) and prevents leakage in ~~direct~~ government schemes because it is immutable.

Risks -

1> Annonymous - Thus can be used by terrorist for money laundering

2> Privacy - As decentralized so each block (node) is accessible by everyone.

3> Security - can be The proof work algorithm, on which blockchain operates, can be hacked by luring the users.

4> Processing speed - Reduced as the blocks can be created finitely eg - it now takes around 10 minutes to add a new node in Bitcoin.

Thus, a government made blockchain can be rolled out as a pilot project and an evidence based decision can then be taken.

Overall Grading (√)

Poor			Average			Good		
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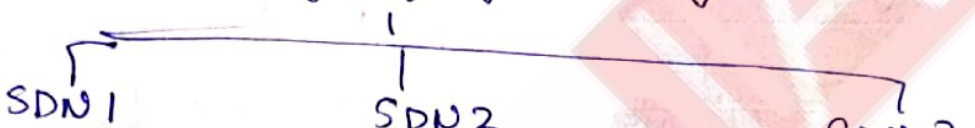
Q.5) Stem cell therapy is the process of extraction, specialization and implantation of stem cells.

Gene editing is the process of adding, removing, editing a gene in DNA.

Types of gene editing



Difference.

Stem cell therapy	Gene editing
• No alteration in DNA.	Alteration in DNA
• Use of stem cells	No use of stem cells.
• Doesn't pass to next generation.	May changes may be transferred to next generation.

(Don't W anything

(Q8) Application of stem cell therapy -

1) Regenerative disease treatment - Cells like neurons which can't regrow can be regenerated by stem cell therapy.
2) New tissue formation - also no risk of body non acceptance.
3) Minimal invasive surgeries.
4) Study the impact of medicines on organs / tissues by developing organs / tissues in external environment.
5) Treatment of disease like leukemia

Application of Gene editing -

1) Agriculture -
   - Farming (use of GM crops)
   - Animal husbandry - increasing milk yields or desirous traits
   - Marine - using gene editing to make marine organism climate resilient.

2> Health — can eliminate hereditary disease by germline editing
3> can prevent cancer by removing the gene responsible for cancer

3> Gene diagnostic — to foresee future disease in foetus / baby.

4> Disease modelling — make better test subjects (eg rat) for treatment of disease (like sickle cell anaemia) by injecting the ~~gene~~ infectious gene in rat

5> ~~And~~ Designer babies — to create of desirous traits.

Thus, there are multiple application of both the technologies in health care.

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Q6- ~~Nuclear f~~ Recently, the ignition facility at California was able to acheive a breakthrough in nuclear fusion.

It is a key to energy secure world as

1) Raw material - hydrogen is freely available in huge quantity.

2) Has higher energy density than other sources. ~~eg Land~~

3) Decrease in land use - A nuclear fusion plant uses 1000 times less space than a wind farm. ~~This &~~

4) Decentralized - Can be set up anywhere as opposed to proximity of thermal power plants near coal feild.

5) Safe - Radiation waste and radiation is minimal compared to fission

6) No emission of greenhouse gases.

Q thereby can run infin[illegible] without causing the global warming.

7) Continuous supply - as opposed to intermittent nature of renewable energy.

Impediments in nuclear fusion to become the key to energy secure world -

1) Nascent stage - The ITER project, which uses magnetic confinement is not able to generate the required energy.

2) Funding - Developing a reactor is difficult and requires huge funds.

3) Technology - No country in world has a commercial nuclear fusion reactor, signifying the technological ~~into~~ dwarfism in this sector.

4) Governance deficit – In India there is a conflict of interest for department of atomic energy. As it's two arms National power corporation of India limited (NPCIL) is operator and other ~~of~~ arm atomic energy regulatory board is regulator.

Way Ahead

- Inculcate private sector as done in space activities
- Synergy between nations to be increased by regular summits to fasten the work at ITER
- ~~Key~~ Policy to be formulated with time bound targets

Thus, if right steps are taken and ethics is inculcated then the fusion technology is key to the energy secure world.

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Q7. ~~The present Recently~~ ..

The present era space industry is worth 350 bn $ and is expected to grow to 5 trillion $ by 2030.

Applications –

1) Communication – satellite communication

2) Health – Tele medicine, robotic tele surgery via fast communicati

3) Exploration – of universe origin by telescope like James Webb

4) Resource mapping – satellite like RESOURCE SAT to map the Earth's resources.

5) Agriculture – to evaluate insurance claim, to disseminate information.

6) Disaster management – to monitor the impact of disaster by earth observation satellite.

7) Space tourism

8) Navigation - GPRS, IRNSS.

It is becoming part of hybrid warfare as -

1) Satellite collision - happened between inactive Russian satellite and active US satellite in 2009.

2) Space race - to reach moon, mars and militarize it.

3) Monitoring/Spying - ~~the~~ other countries by means of earth observation satellite. looking for nuclear arsenal, defence establishment of enemy country

4) Satellite monopolization → Weaponization of satellites like communication to hamper the communication infrastructure.

5) Space debris - Debris of one country's satellite falling on other country and destructing the infrastructure

6) Poor legislation - Outer space treaty is not comprehensive as does not deal with liability issue

7) Use of nuclear weapons in space

8) ~~Nuclear~~ Space waste - the ~~initial~~ frontrunners are eating the space for emerging countries to launch their space missions. This prevents emerging countries economy.

Hence, a global comprehensive consensus treaty over space needs to be adopted to reap the benefits.

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