



GS Advanced Program 2023

Generic Booklet

Test Name/Code/No. : 693057 (#45)

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|------------|------------------|------|------------|
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| Mobile No. | | Date | 26/02/2023 |

Allotted Time : 60 Minutes

Instructions to Candidates -

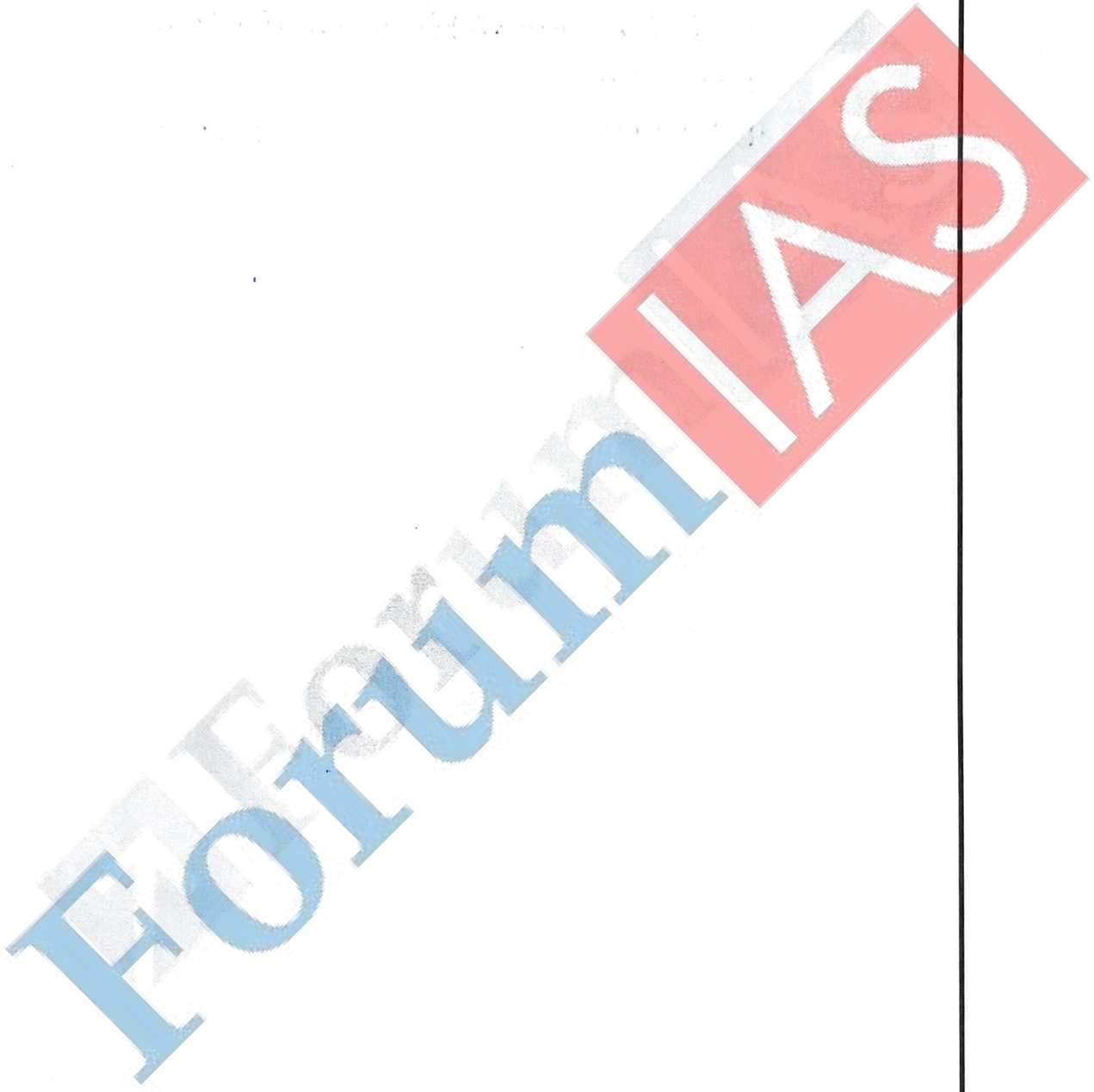
- There are 7 Questions in this Question paper.
- All Questions are Compulsory.
- For all updates, please visit the noticeboard - <https://noticeboard.forumias.com/gsap-2023/>

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 |
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| 6 | |
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| Overall Grade/Score | |

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Q.1)

Owing to ~~a~~ strong defence systems, augmented by weapons and missile support by other western countries, has ensured that Ukraine still holds the line after one year since crisis broke out.

Likewise, given two hostile neighbours on ^{India's} northern borders, effective defence systems become critical part of defence preparation for India.

India's Air Defence Systems

① Prithvi Air Defence Missiles

↳ anti ballistic missile

↳ to thwart enemy missiles in outer atmosphere itself.

↳ can attain a speed upto Mach-5.

↳ range upto 2000 km.

② Advanced Air Defence System

- ↳ to target missiles that pass through Prithvi's defence.
- ↳ anti-ballistic, range upto 200km.

③ Akash Surface to Air missile defence

- ↳ versatile with respect to objects it can target — fighter jets, ballistic missiles, etc.
- ↳ speed upto Mach 3.5.
- ↳ range upto 45km.

There are many more similar air defence systems customised to unique requirements. Induction of 5400 air defence systems will further enhance India's air defence capabilities.

Overall Grading (✓)

| Poor | | | Average | | | Good | | |
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Q.2)

Fast Breeder Reactor is the second stage in India's 3-stage nuclear program, wherein Thorium is transmuted into Uranium.

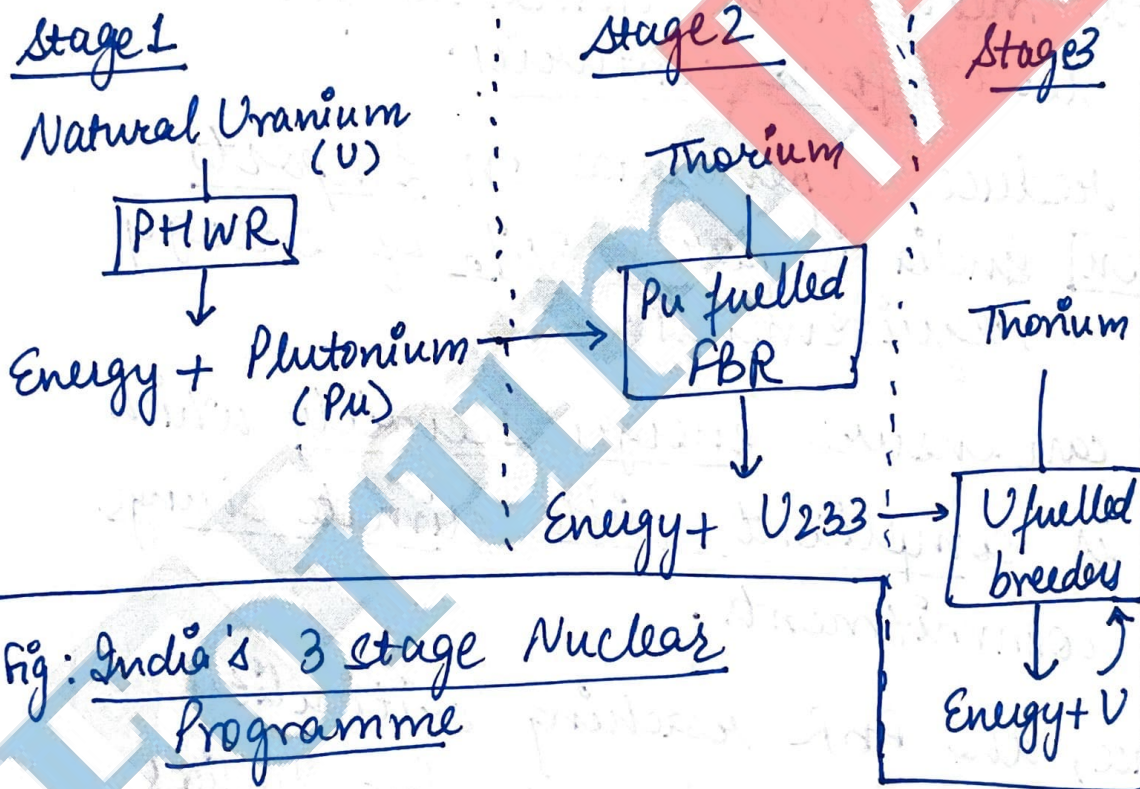


Fig: India's 3 stage Nuclear Programme

- Fast** → requires fast neutrons (hence, no moderator like water used).
- Breeder** → breeds more Plutonium - makes it self-sustaining
- Reactor** → Reaction transmutes Th → U-233.

Significance of FBR for India's Energy security

- ① India can leverage its large Thorium reserves.
- ② these can supply enough energy to meet India's demands for at least four centuries.
- ③ reduce dependence on Imports
 [ex] India imports 80% of energy requirements.
- ④ can ensure energy security which is compliant with climate change commitments.

Hence, the FBR reaching criticality can be a game changer for India's development.

Overall Grading (✓)

| Poor | | | Average | | | Good | | |
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Q.3)

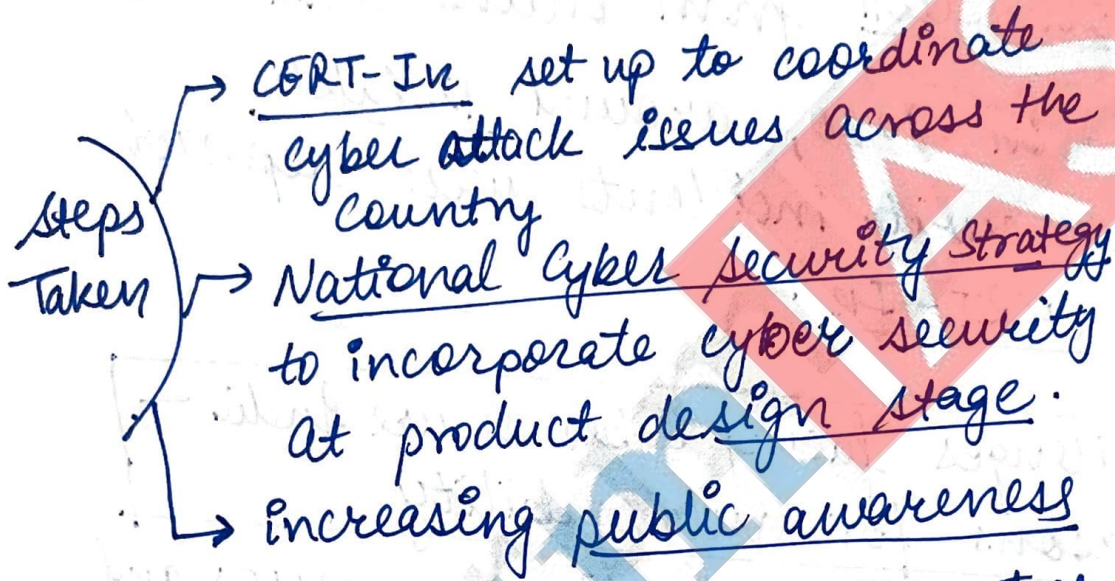
Cybersecurity is the practice of protecting computer systems and information from online attacks.

In 2020, around 12 lakh cybersecurity incidents were reported to CERT-IN.

Challenges facing Cyber secure India —
Reasons for vulnerability

- ① Increasing digitisation of processes and services increases vulnerability.
⇒ health records being saved online
- ② Cyber security is neglected to save costs, especially by businesses.
- ③ limited expertise in the domain
- ④ Lack of dedicated teams for cybersecurity at institution/company level.

- ⑤ Cross-border cyber attacks make it difficult to take action.
- ⑥ Lack of proper data protection and cyber crime framework.



But as the data suggests, more steps need to be taken to be cyber secure.

Way forward:

- ① Capacity building by training ~~per~~ in software developers, police personnel, defence.
- ② Robust data protection regime.
- ③ International coordination ~~per~~ Budapest convention.

Overall Grading (✓)

| Poor | | | Average | | | Good | | |
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Q.4)

Metaverse is a shared online space which merges physical and virtual reality to create an immersive real life-like experience.

The concept created a lot of hype due to scope of widespread applications.

① Communication which can happen remotely, but still feel like face-to-face real interaction.

↳ business meetings in a work from home era.

② Education — immersive learning experience due to graphics, virtual tours, etc.

↳ virtual tour to the bottom of the sea is possible.

③ Improvements in products via

virtual simulations-

ex) BMW changed 30% of its EV design only through virtual simulation feedback.

④ Healthcare

ex) virtual surgery trainings.

However, the hype does not seem to have manifested into tangible global interest because —

- ① concerns around data security and privacy
- ② Apprehensions of psychological issues like dual personality syndrome
- ③ Technology is still evolving and does not yet give absolute real life experience
- ④ Businesses need to buy the technology and assistant devices.

Like any technology, metaverse is also a doubled edged sword — needs to be adopted with caution.

Overall Grading (✓)

| Poor | | | Average | | | Good | | |
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Q.5)

Chat GPT is an artificial intelligence based language model that is capable of understanding, and responding to, human queries.

G → Generative : takes input and generates a new output

P → Pretrained : the model is trained on large amount of text data.

T → Transformer : model uses a transformer based neural network architecture to process input and generate output.

Generative AI

Chat GPT is currently being used for many purposes such as —

① Content writing Ex - writing

job application emails,
students using it to write essays,
etc.

② Professional domain

↳ auto completing codes

[ex] Microsoft backed GitHub Copilot
which can autocomplete ~ 40%
of developer's code.

↳ proof-reading of articles,
autofilling information & data.

Generative AI technology may seem to
have wide-ranging applications,
but it comes with risks associated
with AI such as —

① Risks to society by generation of,
and spreading of fake content.

② Since AI is trained on human data,
it inherits human biases embedded
in that data.

[ex] chatbots likely to discriminate against

women, blacks, etc.

- ③ Disruptions in labour market
 - ↳ many jobs may become redundant.
 - ↳ "skill premium" may widen, leading to inequalities.
- ④ Governance issues as virtual technologies' jurisdiction is hard to define.
- ⑤ Privacy and data security issues as these models scrape datasets available online.

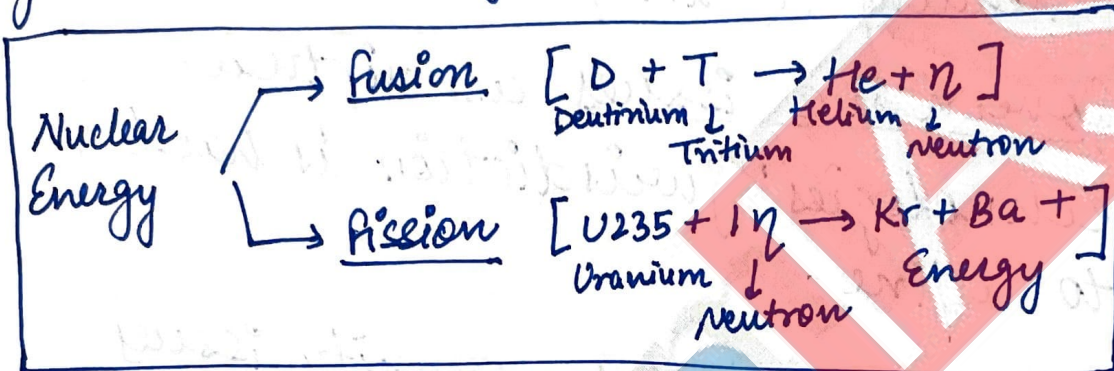
While AI is a game changer in many areas, there is a need to govern these models and their impacts on society and economy.

Overall Grading (✓)

| Poor | | | Average | | | | Good | | |
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Q.6)

Nuclear energy refers to the use of nuclear reactions (fission or fusion) to generate electricity.



POTENTIAL of NUCLEAR ENERGY

- ① high energy density — A small amount of fuel capable of producing large amount of energy.
- ② Land efficiency — requires 75 times less land than solar parks,
(given India faces land resource constraints due to high population)
- ③ Decentralised off grid power generation can help electrify remote areas.

- ④ Low operating costs
→ France, which relies on nuclear power for 75% of energy requirements gets it for USD 0.2 per unit (electricity).
- ⑤ Reliable continuous energy supply
as nuclear plants run 24x7 for many years — solves renewables intermittency issue.

However, we continue to rely on thermal systems for energy because—

- ① International hurdles in procuring nuclear fuel and technology as India is not a member of NSG (Nuclear Suppliers Group)
- ② Domestic opposition by environmentalists and local population — apprehensive of environment contamination.
- ③ High cost of initial set-up of nuclear power plants makes energy sources like coal, oil look cheap.

(4) Technological bottlenecks - we are yet to explore an economically viable way to exploit vast Thorium reserves without dependence on nuclear fuel imports.

India's energy needs will continue to grow rapidly and Energy security needs to be ensured by -

* Diplomatic efforts to gain more concessions on civil nuclear front.

* Investment in R&D for:
 ↳ overcoming renewables challenges like energy storage
 ↳ efficient energy transmission.

* Exploring alternative "transition" fuels like hydrogen as fuel.

* Reduced dependence on imports by
 ↳ ethanol blending
 ↳ exploration in Exclusive Economic Zone.

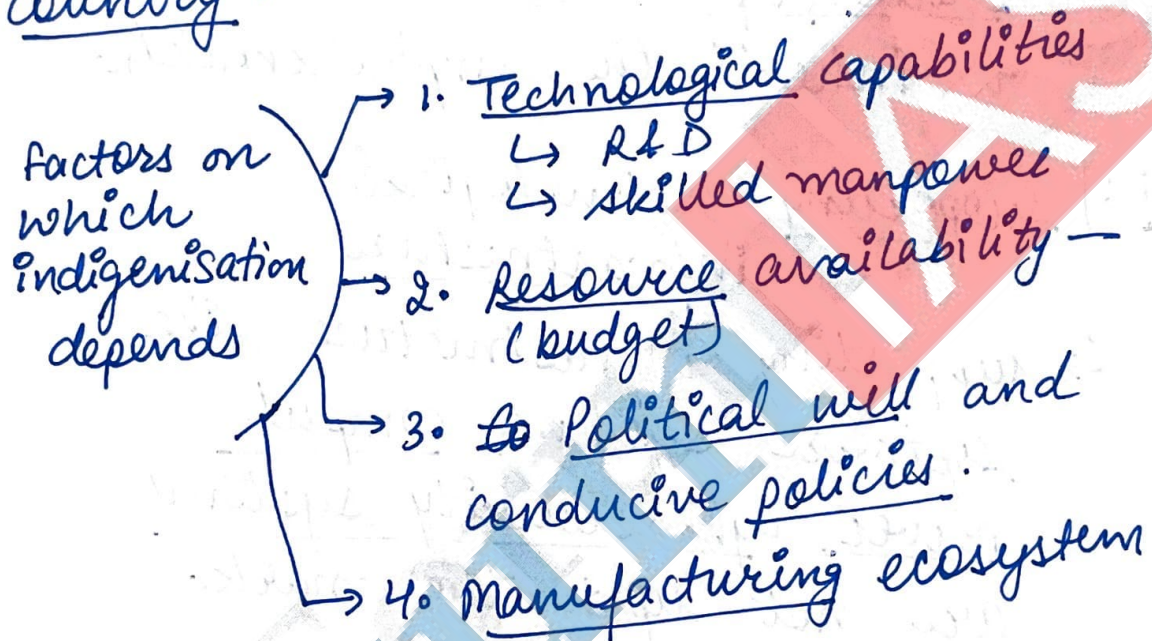
Energy security would be critical in realising the dream of "Viksit Bharat" by 2047.

Overall Grading (✓)

| Poor | | | Average | | | Good | | |
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Q.7)

Defence indigenisation is the capability to produce equipments within the country.



India's technological challenges in defence indigenisation —

- [A] Technology Transfer issues
- ↳ foreign players reluctant to transfer technology
 - ↳ need big incentives like

high value contracts, bulk purchase

[B] Technology Absorption

↳ sometimes, transfer becomes difficult as there is lack of skilled, up-to-date engineers to inherit the complex knowledge.

[C] Supporting technological infrastructure

↳ supporting infrastructure like software systems, compute power, cybersecurity systems are not up to the mark.

↳ This makes the transferred technology incomplete and vulnerable to attack/theft, etc.

However, given India's political will and human capital, India can

revamp defence indigenisation by

① More human and financial

resources to defence research
like DRDO.

② Creating a robust defence manufacturing ecosystem by setting up defence corridors.

↳ UP defence corridor model.

③ Foreign collaborations to train engineers in latest defence technologies.

④ India can have early mover advantage in new emerging forms of warfare like hybrid warfare, cybersecurity.

With steps like new Defence Acquisition Procedure, positive indigenisation list and increased budget, create the conducive policy and economic environment to give impetus to indigenisation.

Overall Grading (✓)

| Poor | | | Average | | | Good | | |
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