1. Consider the following statements about DRDO and ISRO:
   1. Both DRDO and ISRO come under the Ministry of Defence.
   2. The Motto of DRDO is "Balasya Mulam Vigyanam".
   3. DRDO was formed in 1958.
   4. ISRO is the premier defence agency of India.

   Which of the above statements is/are False?

   (A) Only 1 & 2
   (B) Only 2, 3 & 4
   (C) Only 1 & 4
   (D) Only 2 & 4
   (E) Question not attempted

**Answer: (C)**

**Explanation:**

| Parameter | DRDO | ISRO |
|---|---|---|
| Type of Institution | Defence R&D wing | Space agency |
| Dept./Ministry | Ministry of Defence | Dept. of Space (under PMO ) |
| Establishment | 1958 (merger of Technical Development Establishment ( TDE - Indian Army ) and Directorate of Technical Development & Production ( DTDP - Defence Science Organisation ) | 15 August, 1969 in place of INCOSPAR ( which was set up in 1962 ) |
| Motto | Balasya Mulam Vigyanam | Space technology in the service of mankind. |
| HQ | New Delhi | Bangalore |

**Institutes related to ISRO**

| | |
|---|---|
| Indian Institute of Space Science and Technology (IIST) | Thiruvananthapuram, Kerala |
| Physical Research Laboratory (PRL) | Ahmedabad, Gujarat |
| Indian Institute of Remote Sensing (IIRS) | Dehradun, Uttarakhand |
| Space Applications Centre (SAC) | Ahmedabad, Gujarat |
| Liquid Propulsion Systems Centre (LPSC) | Valiamala, Thiruvananthapuram |
| Vikram Sarabhai Space Centre (VSSC) | Thiruvananthapuram |
| Satish Dhawan Space Centre (SDSC) | Sriharikota, Andhra Pradesh |
| Centre for Space Science and Technology Education in Asia-Pacific (CSSTEAP) | Dehradun, Uttarakhand |
| ISRO Propulsion Complex | Mahendra Giri, Tamil Nadu |
| North-Eastern Space Applications Centre (NE-SAC) | Umiam, Meghalaya |
| UR Rao satellite centre (URSC) | Bengaluru |

**ISRO related centers in Rajasthan**

| | |
|---|---|
| Western RRSC – Regional Remote Sensing Center | Jodhpur |
| Solar Observatory | Udaipur |
| Infrared Observatory | Mount Abu |

2. Which of the following statements is false about the Integrated Guided Missile Development Programme?
   A. It was started in 1983.
   B. This programme was headed by Dr. APJ Abdul Kalam.
   C. Five ballistic missiles were developed under this programme.
   D. Agni, Prithvi, Shaurya, Akash and Nag are five missiles.
   E. Question not attempted

**Answer : ( D )**

**Explanation:**

**Integrated Guided Missile Development Programme**

- It was conceived by renowned scientist **Dr APJ Abdul Kalam** to enable India **attain self-sufficiency in the field of missile technology.**
- It got the approval from GoI on July 26, **1983**.
- The missiles developed under the programme were:
  - **Prithvi** (Short range surface to surface ballistic missile)
  - **Agni** ( Intermediate-range surface to surface ballistic missile )
  - **Trishul** ( Short range low level surface to air missile )
  - **Akash** ( Medium range surface to air missile )
  - **Nag** ( Third generation anti tank guided missile )
- After achieving the goal of making India self-reliant in missile technology, DRDO on January 8, **2008**, formally announced successful **completion of IGMDP**.

3. Which one of the following missiles is India's first anti-radiation missile?
   (A) Astra
   (B) Dhruvastra
   (C) Nag
   (D) RudraM
   (E) Question not attempted

**Answer : (D)**

**Explanation :** India's first indigenously developed New Generation Anti Radiation Missile (**NGARM/ RudraM-I**) was successfully flight tested on 02 May 2024 in Chandan Range, Rajasthan.

**RudraM Missile**

- India's **first** indigenously developed New Generation **Anti Radiation Missile**.
- **Developed** by - **DRDO**
  - Defence Research & Development Laboratory (DRDL), Hyderabad
- It is an anti-radiation missile with the role of Suppression of Enemy Air Defenses (**SEAD**) missions. It neutralizes many types of enemy assets.
- **Air to Surface** Missile ( Solid propelled air launched from Sukhoi-30 MKI fighter aircraft).
- Range - **150 Km**

- DRDO successfully flight-tested the **RudraM-II** off the Coast of Odisha on 29 May 2024.
  - Range - **350 Km**

**AGM-88 HARM**

- USA's Air to Surface High-Speed Anti Radiation missile.

**Anti - Radiation Missile**

- These are designed to detect, track and neutralize the adversary's radar, communication assets and other radio frequency sources, which are generally part of their air defence systems.


4. With reference to the 'National Space Day 2024', consider the following statements:
   1. It is the second National Space Day, which was celebrated on August 23, 2024.
   2. The theme for the day this year was "Touching lives while touching the Moon: India's Space Saga".
   3. The day is celebrated to honor Vikram Sarabhai on his birth anniversary.

   Which of the following statements given above is/are correct?
   (A) Only 1 and 3
   (B) Only 2
   (C) Only 2 and 3
   (D) 1, 2 and 3
   (E) Question not attempted

**Answer: (B)**

**Explanation:**

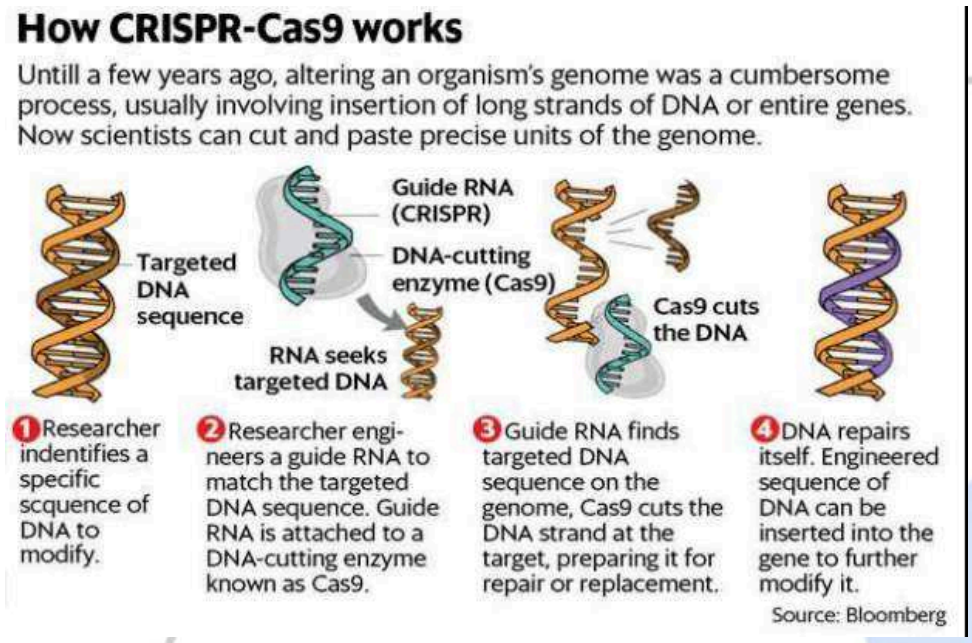
**National Space Day 2024**

- India is celebrating its **maiden** National Space Day [NSpD-2024] on **August 23, 2024.**
- **Theme** : "**Touching Lives while Touching the Moon: India's Space Saga.**"
- India became the **fourth country to land on the moon** and the **first to reach its southern polar region** on August 23, 2023. To honour this landmark achievement, Hon'ble Prime Minister Shri Narendra Modi announced August 23 as "National Space Day".
- The day is celebrated **to honor India's achievements in space exploration** and to look forward to the future of space exploration.

**Dr. Vikram Sarabhai**

- Father of Indian Space Program.
- Founder of ISRO.

- CRISPR is a powerful **tool for editing genomes**, allowing researchers to easily alter DNA sequences and modify gene function.
- **Protein Cas9** is an **enzyme** that acts like a pair of **molecular scissors**, capable of cutting strands of DNA.




22. What are "Arka Udaya, Arka Ambika, Arka Arunika" that have been in the news recently?
    (A) Hybrid crop variety of mango
    (B) Submarines
    (C) Galaxies
    (D) Hybrid crop of sunflower
    (E) Question not attempted

**Answer: (A)**

**Explanation:**

**Arka Ambika - climate resilient hybrid mango**

**Arka Arunika - dwarf hybrid mango**

**Arka Udaya - hybrid mango**

**Details of 109 varieties of Field and Horticultural crops which was released by Prime Minister Shri Narendra Modi on 11th August 2024**

**Other important crop varieties**

| | |
|---|---|
| **Pusa Vivek QPM 9** | • First high vitamin-A maize hybrid |
| **DMRH 1308** | • A high yielding maize hybrid for wider adaptability |
| **Girnar 5** | • Rich in oleic acid hybrid groundnut |
| **Virat (IPM 205-7)** | • The world's first extra early synchronous variety of mungbean |
| **IPL 220** | • Biofortified Lentil Variety |
| **JRO 524** | • Jute variety exported to Bangladesh |
| **PSL-17** | • Lentil |

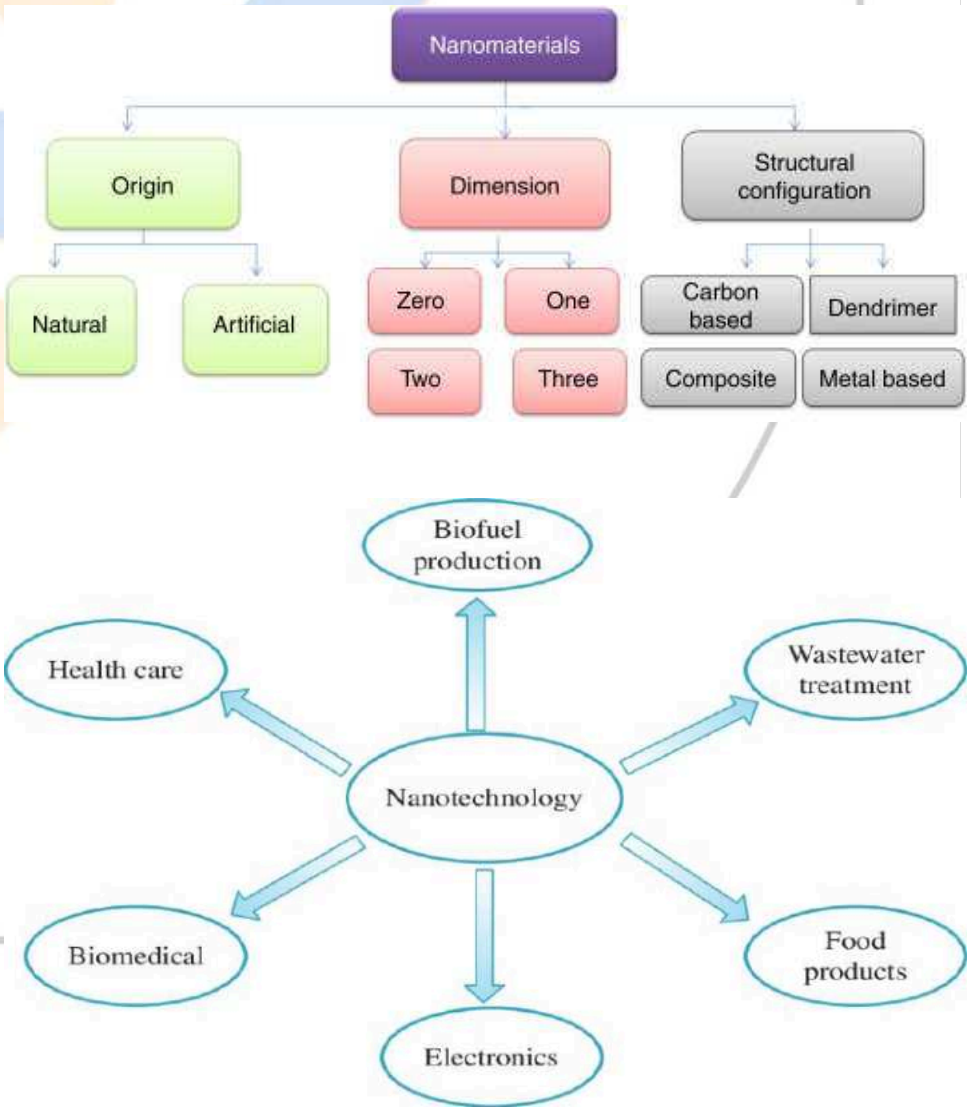
23. What is the range of nanoscale?
    (A) 10^-9-10^-7 m
    (B) 10-100 nm
    (C) 100-1000 nm
    (D) 1-1000 nm
    (E) Question not attempted

**Answer: (A)**

**Explanation:**

**Nanotechnology**

- Nanotechnology involves the manipulation and control of matter at the nanoscale, typically in the **range of 1 to 100 nanometers**. **(1 nm = 10^-9 metres**)
- The **properties** of nanomaterials are **different** from those of micromaterials or bulk materials **due to their size and surface effects**.
- Concept behind nanotechnology is a research paper "**There's Plenty of Room at the Bottom**" by physicist **Richard Feynman** in **1959**.
- The **term** nanotechnology was **coined** by Professor **Norio Taniguchi**.




**Nano Plastic**

- Plastic particles < 5 mm (microplastics) < 100 mm (nanoplastics)
- Found in cosmetics, synthetic clothing, plastic bags and bottles

❖ **JAXA** will provide the **rover and launch vehicle**, while **ISRO** will provide the **lander**.

**India and Japan have also collaborated on other space missions, including:**
**Chandrayaan-2**: Guided Japan's SLIM mission to land on the Moon.
**SLIM**: Japan's robotic instrument that landed on the Moon with the help of Chandrayaan-2.

**Chandrayaan 4**

❖ **ISRO's proposed mission to collect lunar samples** from the lunar south pole and **bring back the same to the Earth**.
❖ **Components:** Ascender Module (AM), Descender Module (DM), Re-entry Module (RM), Transfer Module (TM), and Propulsion Module (PM)
❖ Launch vehicle**: Two separate LVM3**

**Smart Lander for Investigating Moon (SLIM) or "Moon Sniper"**

❖ **Japan's** Moon landing mission launched in January **2024**.
❖ The aim of the mission is **to examine a part of the Moon's mantle**. The SLIM lander landed near the **Shioli Crate.**. The landing was a historic achievement for **Japan**, making it the **fifth country to soft-land a spacecraft on the moon**, after the **United States, the Soviet Union, China and India**.
❖ Japan's Lunar Exploration Program also includes other missions, such as the **uncrewed lunar orbiter SELENE (Kaguya)** and the canceled SELENE-2 mission.

32. Qubit refers to a two valued quantity used in
(A) Classical computers
(B) Classical cryptography
(C) Quantum computers
(D) Lasers
(E) Question not attempted

**Answer: (C)**

**Explanation:**

**Quantum Computing**

❖ Quantum computing is a new technology that uses quantum mechanics to solve complex problems faster than traditional computers.
❖ Quantum computers **use qubits as the basic unit of information**, **instead of bits**.

**Terms related to Quantum Computing**

| | |
|---|---|
| **Quantum Superposition** | • Qubits can simultaneously exist in more than one location or quantum state at one time while remaining as a single entity.<br>• Thus, superposition enables qubits to perform multiple operations simultaneously. |
| **Quantum Entanglement** | • State of one particle becomes linked with the state of the other, regardless of the distance between them.<br>• **Changes to the state of one particle affects the state of the other**. |
| **Quantum Coherence** | • Quantum mechanics allows qubits to exist in a superposition state, where they can be **0 and 1 simultaneously**. |
| **Quantum Supremacy** | • It is the point at which a quantum computer can complete a mathematical calculation that is beyond the reach of even the most powerful supercomputer.<br>• In 2019, **Sycamore (Google's quantum computer)** claimed 'supremacy'. |
| **Quantum Key Distribution** | • QKD is a technology that uses the laws of quantum physics **to distribute secure keys between two parties** which prevent the decryption of data, and thus, ensure secure communication. |
| **Majorana Zero Modes** | • **Exotic quasiparticles** (not fundamental particles like electrons) that arise in certain types of topological superconductors.<br>• They exhibit unique behaviour and possess topological degeneracy (inherent stability i.e, even if disturbed slightly, their overall quantum state remains unchanged, making them **robust qubits for quantum computers**). |

33. Which of the following statements best describes the deployment plans for the Light Combat Helicopter (LCH)?
A. It will be deployed in the desert regions for anti-armor warfare.
B. It will be used for air defense missions in low-altitude regions.
C. It is primarily used for maritime operations.
D. It will be deployed in high-altitude areas like Ladakh.
E. Question not attempted

**Answer: (D)**

**Explanation:** The LCH is specifically designed for **high-altitude conditions** and will be deployed in areas like Ladakh, making it **suitable for mountain warfare**.

**LCH Prachand**

❖ **India's first indigenous multi-role combat helicopter**.

**Digiantra Research and Technology**

- A **space tech startup** founded by Lovely Professional University alumni (Anirudh Sharma & Rahul Rawat) in 2018.
- It has developed **India's first In-orbit Space Debris Monitoring and tracking system**, which is based on LIDAR (Light Detection and Ranging) technology.
- It will provide global real-time earth coverage by deploying a constellation of cost-efficient nanosatellites in LEO (Low Earth Orbit) and a space-based air surveillance payload for accurate tracking of both aircraft and space objects.
- **India's first commercial Space Situational Awareness (SSA) Observatory** will be set up in the **Garhwal region of Uttarakhand**.

**OKAPI Orbits**

- Creating a Space Situational Awareness Platform providing services for safe satellite operations in an increasingly crowded space environment.

**Agnibaan SubOrbital Technology Demonstrator (SOrTeD)**

- Launched by IIT Madras based start-up **Agnikul Cosmos**
- **World's first rocket powered by a fully 3D-printed engine**.

**Vikram-S**

- **India's first privately built rocket** was launched on 18 November 2022 by **Skyroot Aerospace** from Sriharikota l
- The first **mission** of the rocket launch has been designated as **'Prarambh'**.

60. The terms "AWaRe, GLASS" often seen in the news are related to which of the following?
(A) Antimicrobial resistance
(B) Awareness programs to quit tobacco
(C) Trans fatty acids
(D) Consumer awareness campaign
(E) Question not attempted

**Answer: (A)**

**Explanation:**

**Antimicrobial Resistance (AMR)**

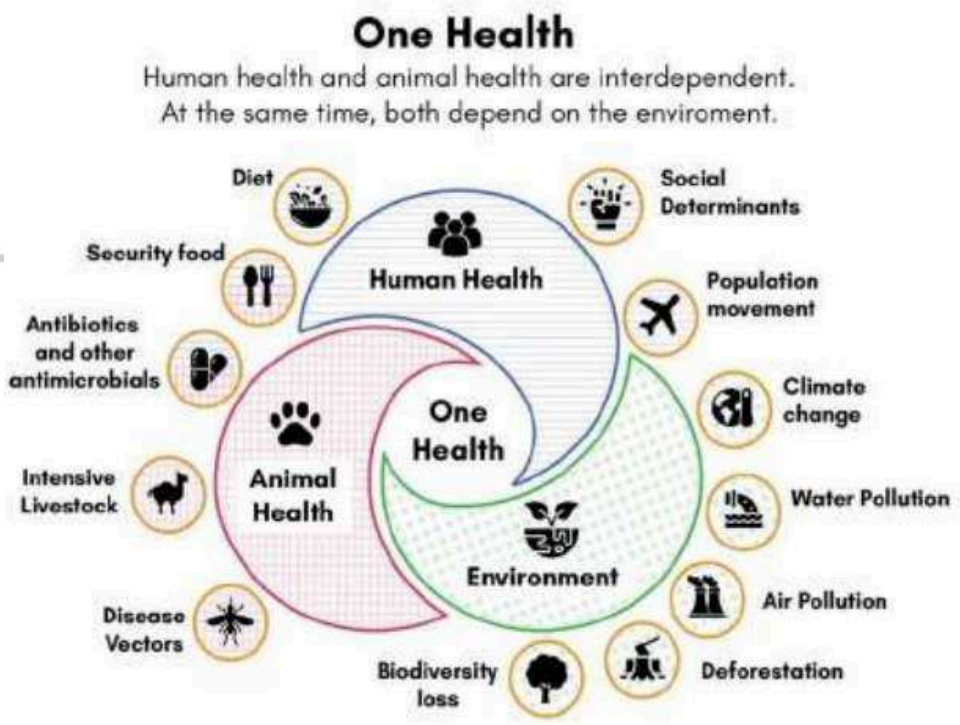
- AMR occurs when **bacteria, viruses, fungi** and **parasites** evolve over time and **no longer respond** to antimicrobials (such as antibiotics, antivirals and antimalarials).
- **WHO** has declared **AMR** as one of the **top 10 global public health threats** facing humanity.
- **Causes of AMR :**
  - Over prescription, unregulated use of antibiotics
  - Adding excessive antibiotics to agricultural feed
  - Poor hygiene etc.

**Efforts to control AMR**

| Steps by WHO against AMR | Steps by India |
|---|---|
| Global Action Plan on Antimicrobial Resistance (GAPAR) | National Action Plan on containment of Antimicrobial Resistance (NAP-AMR), 2017 |
| **AWaRe** (Access, Watch, Reserve) Tool : To monitor and manage the use of antibiotics | **Delhi** and **Chenna**i Declaration on AMR |
| Global Antimicrobial Resistance and Use Surveillance System **(GLASS)** | **Red Line Campaign** on Antibiotics. (MoH&FW) |
| | **Schedule H1** to the Drugs and Cosmetics Act 1940. |
| | **The National One Health Mission**<br>• Prime Minister's Science, Technology, and Innovation Advisory Council (**PM-STIAC**) in **2022**.<br>• **Aim** : coordinate across ministries in achieving overall pandemic preparedness and integrated disease control against priority diseases of both human and animal sectors. |

**Concept of One Health**

- One Health is an approach that recognises that the health of people is closely connected to the health of animals and our shared environment.



**Answer : (D)**

**Explanation :**

**Barak - 8 Missile**

- Barak-8 is an **Indo-Israeli** jointly developed **surface to air missile (SAM) system**.
- Designed to defend against any type of airborne threat including aircraft, helicopters, anti-ship missiles, UAVs, ballistic missiles, cruise missiles and combat jets.
- Barak means 'Lightning' in Hebrew.
- Developed by - **DRDO** and **Israel Aerospace Industries.**
- Range : **70-100 Km**
- **Versions**
  - LR-SAM - Ship launch version
  - MR-SAM - Land launch version

**QRSAM (Quick Range Surface to Air Missile)**

- Short-range surface-to-air missile (SAM)
- Inducted into the Army and has a range of 25 to 30 km.
- Consists of two radars – Active Array Battery Surveillance Radar and Active Array Battery Multifunction Radar – with one launcher.

**National Advanced Surface-to Air Missile System (NASAMS)**

- Ground-based air defense system developed by Kongsberg Defence & Aerospace (KDA) and Raytheon.

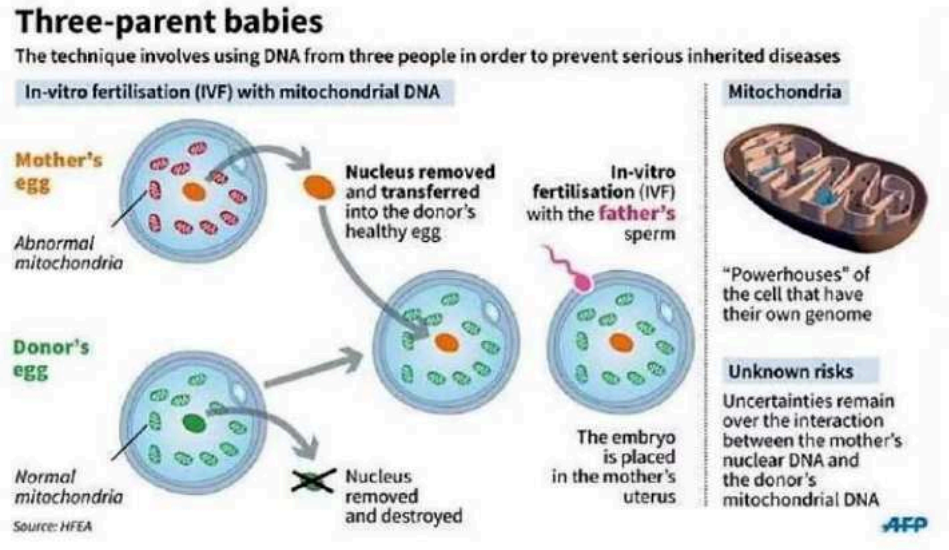
76. Mitochondrial Donation Treatment is related to
(A) Three parents baby
(B) Mitochondrial diseases from parent to child
(C) Only (A)
(D) Both (A) and (B)
(E) Question not attempted

**Answer: (D)**

**Explanation:**

**Mitochondrial Donation Treatment (three parent baby)**

- A baby has been born using three people's DNA in the **UK** with help of Mitochondrial Donation Treatment (MDT) procedure.(**World's first**)
- Involves conceiving a child from IVF (in vitro fertilization) using the genetic material of the parents and the mitochondrial material of a donor.
- Diseased mitochondria are replaced by healthy mitochondria in order to avoid transfer of mitochondrial diseases from the mother to the offspring. (**Either before or after in vitro fertilization of egg.**)
- **2 methods – pronuclear transfer, spindle transfer.**




**Mitochondrial DNA (Mt DNA)**

- Mt DNA comes Only from the **mother.**
- Mitochondrial DNA is **more prone to mutations** compared to nuclear DNA. This is because mitochondria are exposed to free radicals generated during energy production, which can damage DNA.

**Enzyme Replacement Therapy**

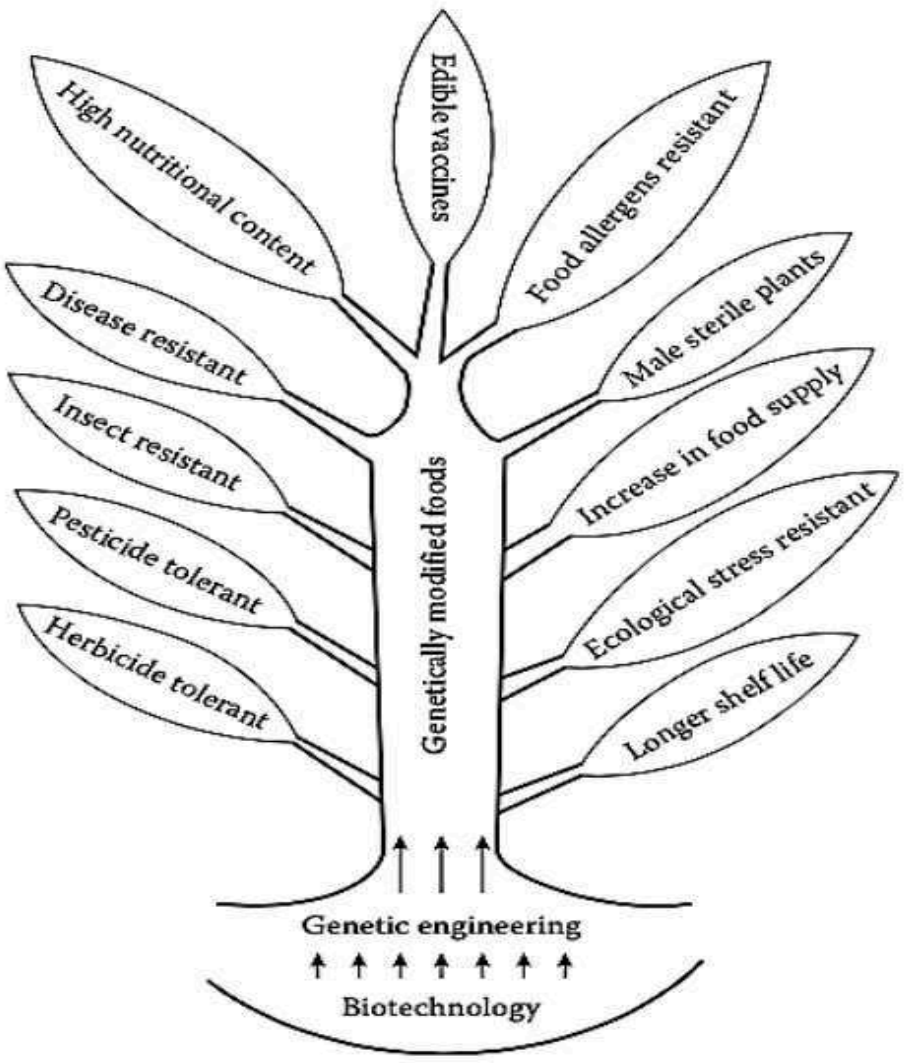
- U.S. Food and Drug Administration (USFDA) recently gave nod to **world's first enzyme replacement therapy (ERT)**.
  - **Adzynma** - the first genetically engineered protein product for ERT.
  - For treating congenital thrombotic thrombocytopenic purpura (cTTP), a rare blood clotting disorder.

**Cell-free DNA (cfDNA)**

- Small fragments of nucleic acids that are released from cells and found outside the cell in body fluids as plasma, urine, and cerebrospinal fluid (CSF).
- cfDNA quantity in the blood increases under pathological conditions such as auto-immune diseases, cancer etc.
- **Applications**
  - Detect genetic abnormalities in foetuses.
  - Early detection, diagnosis, and treatment of cancers.
  - Monitor immune response after organ transplantation and can be used as a biomarker.

**Designer Baby**

- A designer baby refers to a human embryo that has been genetically modified, typically using techniques like CRISPR-Cas9, to influence traits




94. With reference to the 'Maya OS', consider the following statements:
1. It is an operating system developed by IIT Madras.
2. It is an open-source Ubuntu-based operating system.
3. It is powered by an endpoint detection and protection system called "Chakravyuh".

Which of the following statements given above is/are correct?

(A) Only 1 and 2
(B) Only 1 and 3
(C) Only 2 and 3
(D) 1, 2 and 3
(E) Question not attempted

**Answer: (C)**

**Explanation:**

**Maya OS**

- Maya OS is an **operating system.**
- **Developed by** experts from
  - Defence Research and Development Organisation (**DRDO**)
  - Centre for Development of Advanced Computing (**C-DAC**)
  - National Informatics Centre (**NIC**).
- The Indian **Defence Ministry** has decided to replace Microsoft's Windows with Maya OS on all its computers.
- It is an **open-source Ubuntu-based** operating system launched to prevent malware attacks by cybercriminals increasingly targeting critical infrastructure and government agencies.
- It is powered by an endpoint detection and protection system called **"Chakravyuh".**
  - Chakravyuh is an endpoint **anti-malware and antivirus software** that creates a virtual layer between the user and the internet, preventing hackers from accessing sensitive data

**BharOS**

- It is an **indigenous mobile operating system**.
- Developed by IIT Madras.
- It is a government funded AOSP (**Android Open-Source Project**) based operating system with no Google Apps or services.
- It comes with No Default Apps (NDA) and offers 'Native Over The Air' (NOTA) updates.

95. Consider the following statements regarding India's Ballistic Missile Defence System
1. Prithvi Air Defence System is designed to tackle shorter-range ballistic missiles above 15-30 Km in endo-atmospheric space.
2. Pradyumna Missile is used in PAD system.

Which of the statements above given is/are correct?

(A) Only 1
(B) Only 2
(C) Both 1 and 2
(D) Neither 1 nor 2
(E) Unanswered question

**Answer: (B)**

**Explanation:**

**India's Ballistic Missile Defence System**

- India's BMD shield has two interceptor missile systems - Prithvi Air Defence (PAD) and Advanced Air Defence (AAD).

| High Altitude PAD Interceptors | Lower Altitude AAD Interceptors |
|---|---|
| • The **Prithvi interceptors** are designed to tackle **longer-range** ballistic missiles above (50-80 Km) altitudes in **exo-atmospheric space**.<br>• **Pradyumna Missile** is used in PAD System. | • The **Advanced Air Defence** missiles provide an additional interception layer engaging enemy missiles **endo-atmospherically** in the **15-30 Km** altitude range.<br>• **Ashwin Interceptors** are used in AAD. |

(A) 1-ii, 2-iii, 3-i, 4-iv
(B) 1-i, 2-ii, 3-iii, 4-iv
(C) 1-iv, 2-ii, 3-i, 4-iii
(D) 1-i, 2-iii, 3-ii, 4-iv
(E) Question not attempted

**Answer: (D)**

**Explanation:**

| Generation | Period | Hardware | Example |
|---|---|---|---|
| **1st** | 1940-50s | Vacuum tube | ENIAC, UNIVAC1, IBM 650 |
| **2nd** | 1950-60s | Transistor | IBM 1401, IBM 7090 |
| **3rd** | 1960-70s | Integrated circuit | IBM 360, IBM 370, PDP-11 |
| **4th** | 1970s-present | Microprocessor | STAR 1000, APPLE II |
| **5th** | Present and future | Artificial intelligence | Aurora, Frontier |

108. Consider the following aircraft:
1. Rafale
2. Mig-29
3. Tejas Mk-1
4. Sukhoi-30 MKI

How many of the above are considered fifth generation fighter aircraft?

(A) Only one
(B) Only two
(C) Only three
(D) None
(E) Question not attempted

**Answer: (D)**

**Explanation:**

**Fifth generation fighter aircrafts**

- These are equipped with stealth technology.
- Examples:
  - India - AMCA
  - USA - Raptor or F-22, Lighting-II or F-35
  - Russia - Sukhoi Su-57
  - China - Chengdu J-20, Shenyang FC-31

109. INSACOG is a
(A) A Vaccine
(B) Consortium of national labs
(C) A coalition of Govts on Biofuel
(D) Environmental group of BRICS countries
(E) Question not attempted

**Answer: (B)**

**Explanation:**

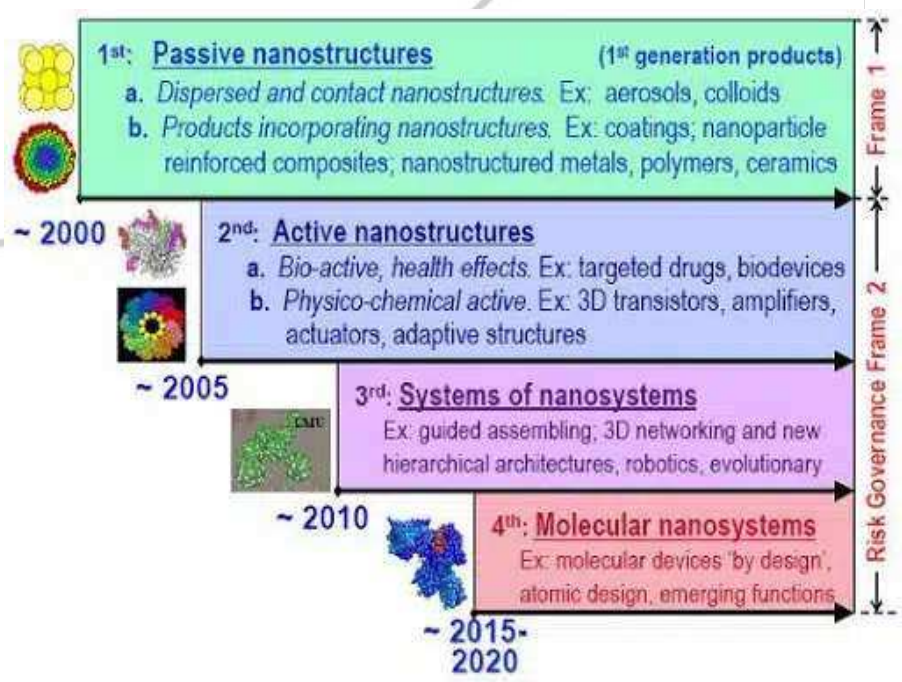
| | |
|---|---|
| **INSACOG** | • By Deptt of Biotechnology (M/o S&T) + MoH&FW<br>• **Consortium of national labs** to monitor genomic variations of SARS-Cov2 |
| **GAVI Alliance** | • Global partnership with the goal of increasing **access to immunization in poor countries** |
| **Coalition for Epidemic Preparedness Innovations (CEPI)** | • Global partnership launched in **2017 to develop vaccines to stop future epidemics**<br>• India – **founding member** |
| **Indian Biological Data Centre (IBDC)** | • **India's first national repository for life science data**<br>• At **Faridabad, Haryana**<br>• Department of Biotechnology (DBT)<br>• Storage at **'Brahm'** High-Performance Computing (HPC) facility ( 4 Petabytes) |
| **Bio-Grid** | • **National Repository for biological knowledge**, information and data.<br>• Under **Biotech-PRIDE Guideline** |

110. Arrange the following products/examples of nanotechnology in ascending order of the four generations of nanotechnology [I —» IV] and select the correct answer using the codes given below :
1. Colloids
2. 3D transistors
3. Robotics
4. Molecular manufacturing

Codes :
(A) 1,2,3,4
(B) 4,1,2,3
(C) 1,4,2,3
(D) 4,1,3,2
(E) Question Not Attempted

**Answer: (A)**

**Explanation:**



| | | | |
|---|---|---|---|
| Solid | Solid | Solid Sol | Coloured gemstone, milky glass |

❖ **Suspension**

- Heterogeneous mixture
- Particles can be seen with naked eye
- particles of suspension scatter a beam of light passing through it and make its path visible

❖ **Solution**

❖ Homogeneous mixture of two or more substance

❖ Eg soda water , lemonade ,Air , alloys , Iodine in alcohol (tincture of iodine), sugar in water

❖ Solution = solvent( larger amount) + solute( lesser quantity)

141. Consider the following disorders.

1. Turner syndrome 2. Patau syndrome
3. Klinefelter syndrome 4. Down syndrome
5. Edward syndrome

Which of the following diseases is caused due to change in the number of autosomes ?

(A) 1, 2 , 4 and 5
(B) 2,3,4 and 5
(C) 2,4 and 5
(D) 1,3,4 and 5
(E) Question not attempted

**Answer - C**

**Explanation**

❖ **Autosomal abnormalities**

❖ **Mongolism or Down-syndrome** -. Scientists found that a person suffering from Mongolism or Down-Syndrome has 47 chromosomes which are due to one additional chromosome in 21 pair (Trisomy of 21 st chromosome).

❖ symptoms- Broad cranium of child, short neck, flat hands, and stubby fingers, always opened mouth, lower lip budging below, tongue also sticks out of mouth, and less developed intellectual ability.

❖ **Edward-syndrome** - This abnormality is due to addition of one additional chromosome in the 18th pair.

❖ Different structural abnormalities- comparing with 45 chromosomes due to deletion of smaller arm of chromosome number 5, **cri-du-chat syndrome** is caused.

❖ **Patau syndrome** - trisomy in 13 th pair of chromosome

❖ **Abnormalities related to sex chromosomes**

❖ **Turner-Syndrome** - This person is always female. This female has Only one x chromosome instead of two. Their chromosome number is 45 (44+XO). It is called Turner's syndrome. Main symptoms of this are- Mentally retarded, weblike skin on neck, imperfectly developed breast

❖ **Klinefelter-syndrome**- This disease is caused in males. Their cells may have 47,48 or 49 chromosomes rather than 46. This additional number may be of X or Y chromosome.

142. Match the following and select the best match from the codes given below

**List -1(Deficiency of Vitamin,mineral,protein)**

1. Protein
2. Vitamin C
3. Iodine
4. Vitamin B3

**List - 2(disease caused)**

A. Goiter
B. Pellagra
C. Kwashiorkor
D. Scurvy

**Codes**

(a) 1-C, 2-D, 3-A, 4-B
(b) 1-C, 2-D, 3-B, 4-A
(c) 1-D, 2-B, 3-D, 4-A
(d) 1-A, 2-D, 3-B, 4-C
(e) Question not attempted

**Answer =A**

**Explanation**

| Vitamin | Chemical name | Disease caused by their deficiency |
|---|---|---|
| A | Retinol | Night blindness xerophthalmia(dry eye) |
| D | Calciferol | Rickets disease |
| E | Tocopherol | Infertility, paralysis |
| K | Naphthoquinone Phylloquinone | Bleeding, No formation of blood clot. |
| B | Thiamine | Beriberi disease |
| B2 | Riboflavin | Cracking in corners of mouth (Cheilosis) |
| B3 | Nicotinic acid | Pellagra disease |
| B5 | Pantothenic acid | Burning feet syndrome |
| B6 | Pyridoxine | Dermatitis (Skin disease) |
| B12 | Cyanocobalamin | Pernicious anaemia |