SCIENCE AND TECHNOLOGY

Q1. Which of the following agency regulates Drones in India?
a) Ministry of Defence
b) Ministry of Home Affairs
c) Ministry of Civil Aviation
d) Ministry of External Affairs

Q2. Consider the following statements about 'The India Science, Technology and Innovation Portal (ISTI)':
1. It has been developed by Vigyan Prasar, Ministry of Science and Technology.
2. It is a one stop window for information about developments in India on science, technology and innovation.
3. A major thrust of the portal is to reach out to students, researchers, scholars, scientists both from India and abroad, so that they can choose from the mine of fellowships, scholarships and funding and startup opportunities that India puts on their plate.
Select the correct answer using the codes given below:
a) 2 and 3 only
b) 1 only
c) 1 and 3 only
d) All of the above

Q3. Consider the following statements about 'GSLV Mk-III':
1. It is a three-stage heavy lift launch vehicle developed by ISRO.
2. It is designed to carry 4 ton class of satellites into Geosynchronous transfer Orbit (GTO) or about 10 tons to Low Earth Orbit (LEO).
3. The vehicle has two solid strap-ons, a core liquid booster and a cryogenic upper stage.
Which of the above statements is/are correct?
a) 1 only
b) 1 and 2 only
c) 1 and 3 only
d) All of the above

Q4. Consider the following statements:
1. National Payments Corporation of India (NPCI) helps in promoting the financial inclusion in the country.
2. It is an initiative of Reserve Bank of India (RBI) and Indian Banks' Association (IBA) under the provisions of the Payment and Settlement Systems Act, 2007
3. NPCI has launched Visa, a card payment scheme.
Which of the statements given above is/are correct?
a) 1 only
b) 1 and 2 only
c) 1 and 3 only
d) All of the above

Q5. Consider the following statements regarding 'Digital North East: Vision 2022':
1. It emphasises leveraging digital technologies to transform lives of people of the northeastern states and enhance the ease of living.
2. A major thrust has been provided to the BPO sector under the document.
3. It has been launched by NITI Aayog.
Which of the statements given above is/are correct?
a) 1 and 3 only
b) 1 and 2 only
c) 3 only
d) All of the above

Q6. Recently Government has launched 'Innovation Cell', consider the following:
1. It is an initiative of Ministry of Information and Technology.
2. The primary mandate of Innovation Cell is to encourage, inspire and nurture young students by exposing them to new ideas.
Choose the correct Answer using the code given below:
a) 1 only
b) 2 only
c) Both 1 and 2
d) Neither 1 nor 2

Q7. Consider the following statements about 'Prime Minister's Science Technology and Innovation Council' (MS STIAC):
1. The committee will advise the Prime Minister on all matters related to S&T, innovation and monitor the implementation of PM's vision on the same.
2. PM-STIAC will effectively supersede the Scientific Advisory Committee to the Cabinet (SAC-Cabinet) and SAC-PM, which will now stand dissolved.

Which of the statements given above is/are correct?
a) 1 only
b) 2 only
d) Both 1 and 2
d) Neither 1 nor 2

Q8 Consider the following regarding
1. 'IMPRINT IMPacting Research, INnovation and Technology':
IMPRINT is a first-of-its-kind Pan-IIT and IISc joint initiative to develop a (a) New Education Policy, and (b) Roadmap for Research to solve major engineering and technology challenges in selected domains needed by the country.

2. It is an initiative of The Ministry of Science and Technology.
Which of the statements given above is/are correct?
a) 1 only
b) 2 only
c) Both 1 and 2
d) Neither 1 nor 2

Q9.Consider the following about 'Repurpose Used Cooking Oil':
1. It is an initiative of FSSAI.
2. It is an ecosystem that will enable the collection and conversion of UCO to biodiesel.
Which of the statements given above is/are correct?
a) 1 only
b) 1 and 2 only
c) 1 and 3 only
d) All of the above

Q10. Recently Indian Government has given 'In-Principle' approval for Construction and Operation of Laser Interferometer Gravitational Wave Laboratory- India (LIGO) in India. In which state this Laboratory will be established?
a) Tamil Nadu
b) Uttarakhand
c) Himachal Pradesh
d) Maharashtra

Q11. Identify the following:
1. It helps in determining the chemical composition of stars and gases far far away, and even calculate their temperature and density.
2. It is used to detect leaks.
3. It is very unreactive.
Choose the correct Answer:
a) Helium
b) Nitrogen
c) Oxygen
d) Neon

Q12. Consider the following about 'Thermal Battery':
1. It is based on the system of charging/discharging cycles that are driven by electricity.
2. The energy transfer in thermal batteries helps store heat when heat travels from one part of the battery setup to the other.
3. A thermal battery consists of two parts: a cool zone known as sink, and a hot source called source.
Which of the statements given above is/are correct?
a) 1 only
b) 1 and 2 only
c) 2 and 3 only
d) All of the above

Q13. 'Wolbachia' recently seen in news is
a) Japan's new satellite launch to remove space debris
b) A tiny bacterium
c) New vaccine to treat chikungunya
d) An invasive alien species

Q14. Consider the following about 'New Influenza Research Programme':
1. It is a collaboration of India and European Union.
2. It aims at further advancing the next generation influenza vaccine.
Which of the statements given above is/are correct?
a) 1 only
b) 2 only
c) Both 1 and 2
d) Neither 1 nor 2

Q15. Consider the following about 'Cryogenic Engine':
1. A cryogenic engine/ cryogenic stage is the first stage of space launch vehicles which makes use of Cryogenics.
2. Cryogenics is the study of the production and behaviour of materials at extremely low temperatures (below -150 degree Centigrade) to lift and place the heavier objects in space.
3. Cryogenic engine makes use of Solid Oxygen (LOX) and Solid Hydrogen (LH2) as propellants which liquefy at -183 deg C and -253 deg C respectively.
Which of the statements given above is/are incorrect?
a) 1 and 3 only
b) 2 only
c) 1 and 2 only
d) All of the above

Q16. 'India's Academia Alliance Program' has been launched to
a) Provide a unique mentorship opportunity between academic scholars and startups working in similar domains.
b) Attract international professors to teach at Indian Universities
c) To call Person's of Indian origin to India for Research and Development
d) Provide smart solutions for improvement of India's Higher Education

Q17. Consider the following statements regarding '5G Technology':
1. Fifth generation focus on (Voice over IP)

VOIP-enabled devices that user will experience a high level of call volume and data transmission.
2. The main features in 5G mobile network is that users can simultaneously connect to multiple wireless technologies and can switch between them.
Which of the statements given above is/are correct?
a) 1 only
b) 2 only
c) Both 1 and 2
d) Neither 1 nor 2

Q18. Consider the following pairs:
1. First Generation (1G): It contains Analog System and popularly known as cell phones.
2. Second Generation (2G): It uses Wide Brand Wireless Network with which clarity is increased. The data is sent through a technology called Packet Switching.
3. Third Generation (3G): It uses digital signals for voice transmission and has speed of 64 kbps
4. Fourth Generation (4G): It offers a downloading speed of 100Mbps.LTE (Long Term Evolution) is considered as 4G technology.
Which of the above pairs is/are correctly matched?
a) All of the above
b) 1 and 2 only
c) 1 and 3 only
d) 1 and 4 only

Q19. Which of the best describes 'Crew Escape System', recently seen in news:
a) It is an emergency escape measure designed to quickly pull the crew module along with the astronauts to a safe distance.
b) It is an emergency escape measure designed by Indian Railways to quickly pull the passengers along with crew in case of a train accident.
c) It is an emergency escape measure designed to help firefighters to pull the people along in case of a fire accident.
d) None of the above

Q20. Consider the following statements about 'Directorate General of Civil Aviation':
1. Directorate General of Civil Aviation is the regulatory body governing the safety aspects of civil aviation in India.
2. Registration of civil aircraft in India is done by DGCA.
3. Directorate General of Civil Aviation is an attached office of the Ministry of Civil Aviation.
Which of the statements given above is/are correct?
a) 1 and 3 only
b) 2 only
c) 1 and 2 only
d) All of the above

Q21. 'Science Based Targets initiative', sometimes seen in the news, is related to
a) It is an initiative to drive corporate climate actions globally
b) It is an initiative to stop the illegal trade of endangered species globally.
c) It is an initiative to promote science education in school children.
d) None of the above

Q22. Consider the following statement about 'Exo-Planet'
1. Planets of our solar system are also called as exoplanets.
2. EPIC (K2-236b) is the first exoplanet discovered by the Indian Space Agency.
Which of the statements given above is/are correct?
a) 1 only
b) 2 only
c) Both 1 and 2
d) Neither 1 nor 2

Q23. Which one of the following is the best description of 'Goldilocks zone '?
a) It is those zones of the earth where Gold is found in ample amount.
b) It is the new gold extraction technique
c) It is a habitable zone around a star where the temperature is just correct- not too hot and not too cold - for liquid water to exist on a planet.
d) It is an inhabitable zone around a star where the temperature is too high or too low for life to exist on a planet.

Q24.Which one of the following is the best description of 'RemoveDEBRIS'?
a) It is an initiative under Swachh Bharat Mission to remove garbage from the urban area.
b) It is an initiative of the Rural Development Ministry to remove garbage from rural area.
c) It is a satellite research project intending to demonstrate various space debris removal technologies.
d) None of the above

Q25. With reference to 'long-range artillery gun "Dhanush"', which of the following statements is/are correct?
1. It is India's first indigenous and long-range

artillery gun system.
2. It has a strike range of 200 kilometers.
3. It is an upgraded version of Swedish Bofors gun procured by India in the mid-1980s.
Select the correct answer using the code given below:
(a) 1 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3

Q26. Consider the following missile systems of India
1. Agni
2. Barak- 8
3. Trishul
Which of the above is /are examples of Surface to Air Missile system?
(a) 1 and 2 only
(b) 3 only
(c) 2 and 3 only
(d) 1, 2 and 3

Q27. With reference to 'Lithium-ion batteries (LIB)', which of the following statements is/are correct?
1. It is an example of non-rechargeable batteries with low energy density.
2. LIBs are highly sensitive to higher temperatures. Higher temperature leads to a much faster degradation rate than normal.
3. It is cheaper than the Nickel - Cadmium battery.
Which of the above statements is /are correct?
(a) 1 and 2 only
(b) 2 only
(c) 2 and 3 only
(d) 1, 2 and 3

Q28. Consider the following pairs:
Navigation System : Country
1. GLONASS : Russia
2. Beidou : Israel
3. European Union: Galileo
Which of the above pairs is /are correctly matched?
(a) 1 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3

Q29 'GROWTH-India', sometimes seen in the news, is related to
a) It is India's first robotic telescope to study about different events of astronomy.
b) It is an initiative to promote the green economy in India.
c) It is an initiative to promote science education in school children.
d) It is an initiative to promote girl education in India.

Q30 'KATRIN Project', recently in the news, is related to:
a) To detect and measure the neutrino's mass
b) To study about gravitational waves.
c) To study about the SuperNova Experiment.
d) None of the above.

Q31. With reference to 'India-based Neutrino Observatory (INO) Project', consider the following statements:
1. The INO project will be constructed at Bodi West hills of Theni District of Tamil Nadu.
2. The INO project faces many environmental hurdles due to its location near to Mathikettan Shola National Park.
Which of the statements given above is/are correct?
a) 1 only
b) 2 only
c) Both 1 and 2
d) Neither 1 nor 2

Q32. With reference to 'Neutrino Particle', which of the following statements is/are correct?
1. It is considered as the most abundant elementary particle in the universe.
2. Neutrino Particle has very little interaction with matter and they pass different matters easily.
3. Neutrinos are electrically neutral and Neutrinos are almost massless.
Select the correct answer using the code given below:
(a) 1 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3

Q33. With reference to 'Dry Sorbent Injection (DSI) system', consider the following statements:
1. It is a water desalination technique.
2. Sorbents are those materials which can collect molecules of another substance by the process of absorption
Which of the statements given above is/are correct?
a) 1 only
b) 2 only
c) Both 1 and 2
d) Neither 1 nor 2

Q34. Consider the following pairs:

Spacecraft : Planet
1. Cassini–Huygens: Saturn
2. Insights : Mars
3. Juno : Jupiter
Which of the above pairs is /are correctly matched?
(a) 1 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3

Q35. Consider the following statements about the Chandrayaan 2 Mission:
1. It is the first ever extraterrestrial soft landing mission carried by Indian Space Research Organisation.
2. Mining and extraction of Helium 3 from the lunar surface is part of the mission.
Which of the above statement is/are correct?
a) 1 only
b) 2 only
c) Both 1 and 2
d) Neither 1 nor 2

Q36.'NATRiP' often seen in the news is related to
a. Automobile Industry
b. Micro-Irrigation project
c. Railway cleanliness
d. Intellectual property depository

Q37. Consider the following statements about Light Detection and Ranging (LIDAR):
1. LIDAR uses pulsed LASER in sensing and it is more accurate than RADAR technology.
2. Its senses objects at a longer distance that RADAR fails to sense.
3. It is relatively less expensive than RADAR based sensors.
Which of the above statement is/are correct?
a. 1 only
b. 1 and 2 only
c. 2 and 3 only
d. 3 only

Q38. Consider the following statements about Neutrino:
1. It is a rare and elusive particle to get detected.
2. They are not affected by electromagnetic forces and it travels a very long distance across the universe.
Which of the above statements is/are correct?
a. 1 only
b. 2 only
c. Both 1 and 2
d. Neither 1 nor 2

Q39. 'P Null' recently seen in the news is related to
a) Rare blood group
b) Plastic degrading microbes
c) Chinese space mission
d) Cyber protection

Q40. 'Bhartiya Niredeshak Dravyas' often seen in the news is related to
a) Petroleum Products
b) Pharmaceuticals
c) Gold and Jewelry
d) Handicrafts

Q41. Consider the following statements about the Hubble Telescope:
1. It was a joint project of NASA and the European Space Agency.
2. It was the first ever space telescope to be repaired by astronauts in space.
Which of the above statements is/are correct?
a. 1 only
b. 2 only
c. Both 1 and 2
d. Neither 1 nor 2

Q42. 'MeerKAT' often seen in the news is related to
a. Radio Telescope
b. 5G communication Technology
c. Artificial Intelligence
d. A space mission to Mercury

Q43. Consider the following statements about the Brahmos Missile:
1. It is a single stage supersonic cruise missile with a range of 290 Km.
2. It can carry both conventional and nuclear warheads.
3. It cannot be intercepted by any known weapon system in the world.
Which of the above statement is/are correct?
a. 3 only
b. 1 and 2 only
c. 2 and 3 only
d. 1, 2, and 3

Q44.'GRACE-FO' of NASA seen in the news is related to
a. Climatic study
b. Future Space Colony
c. Interstellar space mission
d. Search for Extraterrestrial life

Q45.'Oumuamua' that puzzled the scientific community is related to
a. Protozoa
b. Subatomic particle
c. Extraterrestrial intelligence
d. Comet

Q46. According to B.N. Srikrishna committee, which of the following forms the part of sensitive personal data of a person?
1. Financial Data
2. Biometric Data
3. Caste
Codes:
a. 2 only
b. 1 and 2 only
c. 2 and 3 only
d. 1, 2 and 3

Q47. Which of the following statements is incorrect about the Quantum Leaf?
a. It has been developed by the Indian Institute of Science, Bangalore.
b. It is composed of completely biocompatible, earth-abundant, inexpensive elements.
c. It exhibits lower solar to chemical energy conversion efficiencies compared to natural plants photosynthesis.
d. It can be used as both as an energy source and carbon sink.

Q48. 'Dry Sorbent Injection', recently seen in the news, is related to
a. Malaria vaccination
b. Air Pollution
c. Drug addiction
d. Genetic manipulation.

Q49. 'PARAS', recently appeared in the news, is related to
a. Supercomputer
b. Telescope
c. Space Mission
d. e-Governance Portal

Q1.
Answer: C
Explanation

Drones are a technology platform which has wide-ranging applications from photography to agriculture, from infrastructure asset maintenance to insurance. Drones range in size from very small and those that can carry multiple kilograms of payload.

The Directorate General of Civil Aviation has issued the Civil Aviation Requirements (CAR) for civil use of Remotely Piloted Aircraft System (RPAS) commonly known as drones. The regulation was developed after extensive consultations among various stakeholders, and will be effective from 1st December, 2018.

Instead of simply digitizing a paper-based process for registering and operating drones, India has formulated an all-digital process. The Digital Sky Platform is the first-of-its-kind national unmanned traffic management (UTM) platform that implements "no permission, no takeoff" (NPNT). Users will be required to do a one-time registration of their drones, pilots and owners. For every flight (exempted for the nano category), users will be required to ask for permission to fly on a mobile app and an automated process permits or denies the request instantly. To prevent unauthorized flights and to ensure public safety, any drone without a digital permit to fly will simply not be able to takeoff. The UTM operates as a traffic regulator in the drone airspace and coordinates closely with the defense and civilian air traffic controllers (ATCs) to ensure that drones remain on the approved flight paths.

Air space has been partitioned into Red Zone (flying not permitted), Yellow Zone (controlled airspace), and Green Zone (automatic permission).

Approach: The drone market in India is new and very quickly growing. Also it has many applications which possesses many benefits as well as challenges. This makes this topic a must read.

Related Topics: Applications of Drones

Q2.
Answer: D
Explanation

The India Science, Technology and Innovation Portal (ISTI)'

STATEMENT 1 is correct: The Union Science Ministry's communication wing , Vigyan Parisar, has launched the The India Science, Technology and Innovation Portal (ISTI) that can help individuals in areas of career prospects in mathematics and to know about other domains of research.

STATEMENT 2 is correct :The India Science, Technology and Innovation Portal (ISTI) is a one stop window for information about developments in India on science, technology and innovation.
STATEMENT 3 is correct: A major thrust of the portal is to reach out to students, researchers, scholars, scientists both from India and abroad, so that they can choose from the mine of fellowships, scholarships and funding and startup opportunities that India puts on their plate.

The portal is a veritable repository of India's scientific research activities in every field.

It also hosts information about the organisations carrying out the research, those funding them, international collaborations, the scientists involved in the research, the states in which they are being carried out, their achievements & impacts.

It can help funding agencies & science administrators takes decisions about project funding, policy makers make science policy decisions & researchers study trends & trace policy movements.

The web-portal also acts as a platform which brings together scientists and researchers, so that

they can pool expertise and skills required for their research, translation, technology transfer & escalation. It reaches out to a wide range of audience through public engagement garnering their support in the celebration of science.

Approach: A new portal in the field of science and technology makes it a potential question from the exam's perspective

Q3.
Answer: D
Explanation

STATEMENT 1 and 3 are correct: GSLV Mk III is a three-stage heavy lift launch vehicle developed by ISRO. The vehicle has two solid strap-ons, a core liquid booster and a cryogenic upper stage.

STATEMENT 2 is correct: GSLV Mk III is designed to carry 4 ton class of satellites into Geosynchronous Transfer Orbit (GTO) or about 10 tons to Low Earth Orbit (LEO), which is about twice the capability of GSLV Mk II.

TECHNICAL SPECIFICATIONS

Payload to GTO: 4,000 kg
GSLV Mk III will be capable of placing the 4 tonne class satellites of the GSAT series into Geosynchronous Transfer Orbit.

Payload to LEO: 8,000 kg
The powerful cryogenic stage of GSLV Mk III enables it to place heavy payloads into Low Earth Orbits of 600 km altitude.

Cryogenic Upper Stage : C25
The C25 is powered by CE-20, India's largest cryogenic engine, designed and developed by the Liquid Propulsion Systems Centre.

Solid Rocket Boosters : S200
GSLV Mk III uses two S200 solid rocket boosters to provide the huge amount of thrust required for lift off. The S200 was developed at Vikram Sarabhai Space Centre.

Core Stage : L110 Liquid Stage
The L110 liquid stage is powered by two Vikas engines designed and developed at the Liquid Propulsion Systems Centre.

Approach: GSLV Mk III is a very important topic in science and technology. Recently on Independence Day speech Prime Minister announced that ISRO will be sending first manned space mission. This mission will use GSLV Mk III and that is why it becomes a potential question from the exam's perspective.

Related Topics: SRE 2007, Crew Escape System

Q4.
Answer: B
Explanation

NATIONAL PAYMENTS CORPORATION OF INDIA

- STATEMENT 2 is correct : National Payments Corporation of India (NPCI), an umbrella organisation for operating retail payments and settlement systems in India, is an initiative of Reserve Bank of India (RBI) and Indian Banks' Association (IBA) under the provisions of the Payment and Settlement Systems Act, 2007, for creating a robust Payment & Settlement Infrastructure in India.
- STATEMENT 1 is correct: The Company is focused on bringing innovations in the retail payment systems through the use of technology for achieving greater efficiency in operations and widening the reach of payment systems and hence promotes financial inclusion Needless to mention, National Financial Switch (NFS) and Cheque Truncation

System (CTS) continues to be the flagship products of NPCI.
- STATEMENT 3 is incorrect: Unified Payments Interface (UPI) has been termed as the revolutionary product in payment system and Bharat Bill Payment System (BBPS) has also been launched in pilot mode. The other products include RuPay Credit Card, National Common Mobility Card (NCMC) and National Electronic Toll Collection (NETC). It has launched RuPay and not Visa.

Approach: This is one of the most important organizations in recent times due to government push for digital payments. A question has already been asked about it. This question is a modified version of the same question.

Context: Digital Payments to Be $1tn Industry by 2023

Related Topics: Google Pay, QR code

Q5.
Answer: B
Explanation

DIGITAL NORTH EAST: VISION 2022
- Union minister Ravi Shankar Prasad released a vision document for a digital northeast that aims to improve people's lives by capacity building of government staff and doubling BPO strength in the region.
- STATEMENT 3 is incorrect: It has been launched by The Ministry of Information and Technology.
- STATEMENT 1 is correct: It emphasises leveraging digital technologies to transform lives of people of the northeastern states and enhance the ease of living.
- STATEMENT 2 is correct: The number of seats planned for BPOs in the northeastern states will be doubled to 10,000 while the network of common service centres will be expanded to cover all villages.
- A cloud hub for the northeast will be set up in Guwahati and capacity building for 50,000 government staff will be taken up using digital technologies.
- State-wise roadmaps have been developed for implementing digital initiatives.
- High-speed broadband connectivity will be provided in all the uncovered villages in the northeastern region.

Approach: North East India has been the focus of development of Government in the recent past. The initiatives taken in this regard are very important.

Q6.
Answer: B
Explanation

INNOVATION CELL
- STATEMENT 1 is incorrect: Innovation cell is Ministry of Human Resource Development's initiative and has been established at AICTE premises with a purpose to systematically foster a culture of Innovation in all Higher Education Institutions (HEIs) across the country.
- STATEMENT 2 is correct: The primary mandate of Innovation Cell is to encourage, inspire and nurture young students by exposing them to new ideas and processes resulting in innovative activities in their formative years fostered through Network of Innovation clubs in Higher Educational Institutions
- Major Programs

1. Network of Innovation Clubs (NIC)

NIC will prescribe basic framework for the structure, formation, structure and smooth running of ICs and will soon share list of different activities which ICs need to undertake for the entire academic year.

2. Atal Ranking of Institutions on Innovation Achievements (ARIIA)

It will systematically rank education institutions and universities primarily on innovation related indicators. ARIIA considers all major indicators which are commonly used globally to rank most innovative education institutions/ universities in the world.

3. Smart India Hackathon (SIH) 2019

Smart India Hackathon 2019 is a nationwide initiative to provide students a platform to solve some of the pressing problems we face in our daily lives, and thus inculcate a culture of product innovation and a mindset of problem solving.

4. National Student Startup Policy (NSSP)

AICTE's Student Start up policy intends to guide AICTE approved institutions to promote student driven innovations and start-ups.The policy aims at identifying the innovative and entrepreneurial potential of students and transforming them into start-up entrepreneurs. This can be done by developing an ideal entrepreneurial ecosystem and promoting strong inter-institutional partnerships among technical institutions, other ecosystem enablers, different stakeholders, programs, market and society.

Context: Innovation Cell and Atal Ranking of Institutions on Innovation Achievements (ARIIA) launched by M/o HRD to foster a culture of innovation in Higher Education Institutions

Related Topics: Network of Innovation Clubs (NIC), Atal Ranking of Institutions on Innovation Achievements (ARIIA), Smart India Hackathon (SIH) 2019, National Student Startup Policy (NSSP).

Q7.
Answer: C
Explanation

PM STIAC

- STATEMENT 1 is correct: The committee will advise the Prime Minister on all matters related to S&T, innovation and monitor the implementation of PM's vision on the same.
- STATEMENT 2 is correct: PM-STIAC will effectively supersede the SAC-Cabinet and SAC-PM.
- The Narendra Modi Government has constituted a high power committee to advise it on policy matters related to science, technology and innovation.
- Named as PM-STIAC (Science, Technology, Innovation Advisory Committee), the 21-member committee, including a dozen special invitees, will be chaired by K Vijay Raghavan, Principal Scientific Advisor to the Government.
- According to an official notification, secretaries of all science & technology related ministries are part of the special invitees.
- It will facilitate the formulation and implementation of policies and decisions, provide action-oriented and future preparedness advise and assist in directing S&T to solve the socio economic problems in the country.

Q8
Answer: A
Explanation

IMPRINT- IMPacting Research, INnovation and Technology

- STATEMENT 2 is incorrect: Adopting engineering and technology as the vehicle to address societal needs and achieving national prosperity, Ministry of Human Resource Development has drafted a new and catalytic scheme called IMPacting Research INnovation and Technology or IMPRINT.
- STATEMENT 1 is correct: IMPRINT is a first-of-its-kind Pan-IIT and IISc joint initiative to develop a (a) New Education Policy, and (b) Roadmap for Research to solve major engineering and technology challenges in selected domains needed by the country. The ten domains represent the most important areas relevant to our country in order to enable, empower and embolden the nation for inclusive growth and self-reliance.
- The first phase of IMPRINT is dedicated to creating a policy document defining the scope, strategy and mandate for pursuing engineering challenges in the country and not

developing a specific technological product or process.

- IMPRINT is a national programme, initially steered by the IITs and IISc, ultimately the entire engineering fraternity of the nation including IITs, NITs, national academies, governmental ministries and departments, research organizations, strategic sectors, policy agencies and industry must join hands and own the collective responsibility.It is now open to private institutions also.

Approach: It is one of the most important schemes in the field of S&T.

Context:122 New Research Project proposals at a cost of Rs 112 Crore selected for funding under IMPRINT-2 : HRD Minister PrakashJavadekar .

Related Topics: Surya Jyoti, Biotech KISAN, National Initiative for Development and Harnessing 52 Innovations(NIDHI)

Q9.
Answer: C
Explanation

REPURPOSE USED COOKING OIL

- BOTH STATEMENTS ARE TRUE: The Food Safety and Standards Authority of India (FSSAI) launched RUCO (Repurpose Used Cooking Oil), an initiative that will enable collection and conversion of used cooking oil to biodiesel.
- Under this initiative, 64 companies at 101 locations have been identified to enable collection of used cooking oil.
- The regulator believes India has the potential to recover 220 crore litres of used cooking oil for the production of biodiesel by 2022 through a co-ordinated action.
- According to FSSAI regulations, the maximum permissible limits for Total Polar Compounds (TPC) have been set at 25 per cent, beyond which the cooking oil is unsafe for consumption.
- FSSAI is also working in partnership with Biodiesel Association of India and the food industry to ensure effective compliance of used cooking oil regulations

Related Topics: +F logo, Food fortification

Q10.
Answer: D
Explanation

GRAVITATIONAL WAVES : Gravitational waves are 'ripples' in the fabric of space-time caused by some of the most violent and energetic processes in the Universe. Albert Einstein predicted the existence of gravitational waves in 1916 in his general theory of relativity. Einstein's mathematics showed that massive accelerating objects (such as neutron stars or black holes orbiting each other) would disrupt space-time in such a way that 'waves' of distorted space would radiate from the source (like the movement of waves away from a stone thrown into a pond). Furthermore, these ripples would travel at the speed of light through the Universe, carrying with them information about their cataclysmic origins, as well as invaluable clues to the nature of gravity itself.

Laser Interferometer Gravitational Wave Laboratory- India (LIGO)

- LIGO-India is planned as a collaborative project between a consortium of Indian research institutions and the LIGO Laboratory in the USA, along with its international partners Australia, Germany and the UK.
- Hingoli district of Maharashtra has been selected as the primary site and the process of acquiring land for the project is in advanced stage.
- The Laser Interferometer Gravitational-wave Observatory (LIGO) project operates three gravitational-wave (GW) detectors. Two are at Hanford in the state of Washington, north-western USA, and one is at Livingston in Louisiana, south-eastern USA.
- The proposed LIGO-India project aims to move one Advanced LIGO detector from Hanford to India.
- LIGO-India project is envisaged as an international collaboration between the LIGO Laboratory and three lead institutions in the IndIGO consortium: Institute of Plasma

Research (IPR) Gandhinagar, Inter University Centre for Astronomy and Astrophysics (IUCAA), Pune and Raja Ramanna Centre for Advanced Technology (RRCAT), Indore.

Q11.
Answer: A
Explanation

HELIUM : On Aug 18, in 1868 , helium was discovered by astronomers studying the sun during a total solar eclipse. It is the only element to have been seen in the sun before it was to exit on earth.

- It helps in determining the chemical composition of stars and gases far away, and even calculate their temperature and density.
- It is used to detect leaks such as in car air-conditioning systems.
- Because it is very unreactive, helium is used to provide an inert protective atmosphere for making fibre optics and semiconductors , and for arc welding.

Approach: Recently there was a news "HELIUM turn 150". So we should here focus on some basic properties and uses of some of gases. Also helium is important for future energy needs , even 'Chandrayaan 2' will search for helium on moon.

Related Topics: Basic knowledge of related gases like oxygen, hydrogen etc.

Q12.
Answer: C
Explanation

CONVENTIONAL BATTERY:

- STATEMENT 1 is incorrect: Conventional battery (and not thermal battery) is based on the system of charging/discharging cycles that are driven by electricity. For example, the Lithium-ion battery, a staple of many electronic devices, consists of electric charges being transferred from electrodes. Energy is derived from this battery, when lithium atoms turn into lithium ions (Li+), and get stored when this reaction reverses. Therefore, Li-ion batteries work on the basis of electrical energy.

THERMAL BATTERY

- Thermal batteries, use thermal energy to operate, i.e., the energy created by temperature differences.
- STATEMENT 3 is correct: Energy transfer in thermal batteries helps store heat when heat travels from one part of the battery setup to the other.
- STATEMENT 2 is correct: For that to happen, a thermal battery consists of two parts: a cool zone known as sink, and a hot source called source. Both these sides consist of compounds known as phase-changing materials (PCMs), which can change their state of matter on the basis of a physical/chemical reaction.

BENEFITS OF THERMAL BATTERY

- Low carbon footprint
- Less expensive
- Its integration with power grids, can help meet industrial demand.
- This could help solve power issues in remote areas.
- It can offer support to public transport systems and telecom grids.
- E-vehicles can also get charging power from stations running on thermal batteries

Approach: New technologies are important from the exam's perspective

Q13.
Answer: B
Explanation

Wolbachia is a genus of gram-negative bacteria that infects arthropod species, including a high proportion of insects, and also some nematodes.

Approach: Recently there was a news 'Govt. relies on Wolbachia to control dengue (Hindu). In this

type of question either you know the answer or you don't know the answer. You can't guess this. So make sure to go through the newspaper carefully.

Q14.
Answer: C
Explanation

NEW INFLUENZA RESEARCH PROGRAMME

- STATEMENT 1 is correct: It is a collaboration of India and European Union.
- STATEMENT 2 is correct: It aims at further advancing the next generation influenza vaccine with improved efficacy and safety, duration of immunity, and reactivity against an increased breadth of influenza strains.
- The programme will get fund of EUR 15 million under EU funding programme for research and innovation called 'Horizon 2020'

Approach: The news becomes important as it related to health and is an international collaboration

Q15.
Answer: A
Explanation

CRYOGENIC ENGINE

- STATEMENT 1 is incorrect: A cryogenic engine/ cryogenic stage is the last stage of space launch vehicles which makes use of Cryogenics.
- STATEMENT 2 is correct: Cryogenics is the study of the production and behaviour of materials at extremely low temperatures (below -150 degree Centigrade) to lift and place the heavier objects in space.
- STATEMENT 3 is incorrect: Cryogenic engine makes use of Liquid Oxygen (LOX) and Liquid Hydrogen (LH2) as propellants which liquefy at -183 deg C and -253 deg C respectively. Cryogenic stage is technically a much more complex system with respect to solid or liquid propellant (stored on earth) stages due to the usage of propellants at extremely low temperatures.
- A cryogenic engine provides more force with each kilogram of cryogenic propellant it uses compared to other propellants, such as solid and liquid propellant rocket engines and is more efficient.
- They are pumped in to turbo pump by individual booster pumps to ensure a high flow rate of propellants inside the combustion/thrust chamber.
- The major components of a cryogenic rocket engines are combustion/thrust chamber, igniter, fuel injector, fuel cryo pumps, oxidizer cryo pumps, gas turbine, cryo valves, regulators, the fuel tanks and a rocket engine nozzle.

Approach: This is a very important development in the field of S&T and is very crucial for the country. An important topic from the exam's perspective

Related Topics: PSLV AND GSLV

Q16.
Answer: A
Explanation

INDIA ACADEMIA ALLIANCE PROGRAM

- To fulfill the Government of India's mission to promote the spirit of entrepreneurship in the country, Startup India launched the Startup Academia Alliance programme, a unique mentorship opportunity between academic scholars and startups working in similar domains.
- The Startup Academia Alliance aims to reduce the gap between scientific research and its industrial applications in order to increase the efficacy of these technologies and to widen their impact.
- By creating a bridge between academia and industry, the Alliance strives to create lasting connections between the stakeholders of the startup ecosystem and implement the third

pillar on which the Startup India Action Plan is based - Industry Academia Partnerships and Incubation.
- The first phase of Startup Academia Alliance was kick started through partnering with Regional Centre for Biotechnology, The Energy and Resources Institute (TERI), Council on Energy, Environment and Water, and TERI School of Advanced Studies.
- The applications for Startup Academia Alliance were hosted on the Startup India Hub, a one-stop destination for startups to apply for opportunities such as incubator and accelerator programmes as well as challenges organized by corporate stakeholders, with a user base of more than 2 lakh entrepreneurs and aspiring entrepreneurs from over 433 districts in India.

Approach: Start up India program is a flagship program of Government of India. Developments related to it is important.

Related Topics: Stand-Up India

Q17.
Answer: C
Explanation

5G TECHNOLOGY
- 5G Technology stands for 5th Generation Mobile technology.
- STATEMENT 1 is correct: Fifth generation focus on (Voice Over IP) VOIP-enabled devices that user will experience a high level of call volume and data transmission.
- STATEMENT 2 is correct: The main features in 5G mobile network is that users can simultaneously connect to multiple wireless technologies and can switch between them.
- Fifth generation network provide affordable broadband wireless connectivity (very high speed).
- In fifth generation researches are being made on the development of World Wide Wireless Web (WWWW), Dynamic Ad-hoc Wireless Networks (DAWN) and Real Wireless World.
- This forthcoming mobile technology will support IPv6 and flat IP. Fifth generation technology will offer the services like Documentation, supporting electronic transactions (e-Payments, e-transactions) etc.

Context: Government is focusing on how to introduce 5g in India

Related Topics: 2G,3G AND 4G

Q18.
Answer: D
Explanation

FIRST GENERATION (1G)
1G emerged in the 1980s. It contains Analog System and popularly known as cell phones. It introduces mobile technologies such as Mobile Telephone System (MTS), Advanced Mobile Telephone System (AMTS), Improved Mobile Telephone Service (IMTS), and Push to Talk (PTT). It uses analog radio signal which have frequency 150 MHz, voice call modulation is done using a technique called Frequency-Division Multiple Access (FDMA).It has low capacity, unreliable handoff, poor voice links, and no security at all since voice calls were played back in radio towers, making these calls susceptible to unwanted eavesdropping by third parties.

SECOND GENERATION (2G)
2G emerged in the late 1980s. It uses digital signals for voice transmission and has the speed of 64 kbps. It provides facility of SMS (Short Message Service) and use the bandwidth of 30 to 200 KHz. Next to 2G, 2.5G system uses packet switched and circuit switched domain and provide data rate up to 144 kbps. E.g. GPRS, CDMA and EDGE.

THIRD GENERATION (3G)
It uses Wide Brand Wireless Network with which clarity is increased. The data is sent through a technology called Packet Switching. Voice calls are interpreted through Circuit Switching. Along with verbal communication it includes data services, access to television/video, new services like

Global Roaming. It operates at a range of 2100MHz and has a bandwidth of 15-20MHz used for High-speed internet service, video chatting.3G uses Wide Band Voice Channel.

FOURTH GENERATION (4G)
4G offers a downloading speed of 100Mbps.4G provides same features as 3G and additional services like Multi-Media Newspapers, to watch T.V programs with more clarity and send Data much faster than previous generations. LTE (Long Term Evolution) is considered as 4G technology. 4G is being developed to accommodate the QoS and rate requirements set by forthcoming applications like wireless broadband access, Multimedia Messaging Service (MMS), video chat, mobile TV, HDTV content, Digital Video Broadcasting (DVB), minimal services like voice and data, and other services that utilize bandwidth.

Q19.
Answer: A
Explanation

CREW ESCAPE SYSTEM

- ISRO carried out a major technology demonstration (July 05, 2018), the first in a series of tests to qualify a Crew Escape System, which is a critical technology relevant for human spaceflight. (GAGANYAAN)
- The Crew Escape System is an emergency escape measure designed to quickly pull the crew module along with the astronauts to a safe distance from the launch vehicle in the event of a launch abort.
- The first test (Pad Abort Test) demonstrated the safe recovery of the crew module in case of any exigency at the launch pad.

Approach: GAGANYAAN was announced by Prime Minister recently.

Related Topics: Mars Orbiter Mission

Q20
Answer: D
Explanation

DIRECTORATE GENERAL OF CIVIL AVIATION

- STATEMENT 3 is correct: Directorate General of Civil Aviation is an attached office of the Ministry of Civil Aviation.
- STATEMENT 2 is correct: Registration of civil aircraft in India is done by DGCA.
- STATEMENT 1 is correct: The Directorate General of Civil Aviation is the regulatory body in the field of Civil Aviation primarily dealing with safety issues.
- It is responsible for regulation of air transport services to/from/within India and for enforcement of civil air regulations, air safety and airworthiness standards.
- It also co-ordinates all regulatory functions with International Civil Aviation Organisation.
- The headquarters are located in New Delhi with regional offices in the various parts of India.

Context: Ministry of Civil Aviation (DGCA) has for the first time released a set of rules regulating the civil use of drones in India which will be effective from 1st December, 2018.

Q21
Answer: A
Explanation:

Science-Based Targets initiative is to drive corporate climate actions globally. The transition to a low-carbon economy also has the potential to revolutionize the world. However, the private sector needs to take the lead by bringing in innovations to cut emissions significantly. Science-Based Targets initiative has given companies a clear roadmap for how much they need to shrink their carbon footprint to realize the Paris Agreement goals.

Approach: There was news regarding Science-Based Targets initiative. It is also an innovative step

to promote green initiatives in the private sector. So we should learn about such an initiative.

Related Topics: Paris climate deal, United national development Programme and Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC AR5).

Q22
Answer: B
Explanation:

STATEMENT 1 is incorrect as Planet outside our solar system is called exoplanets. Most of these are part of different star systems. There are some "rogue" exoplanets, which are not attached to any star system.

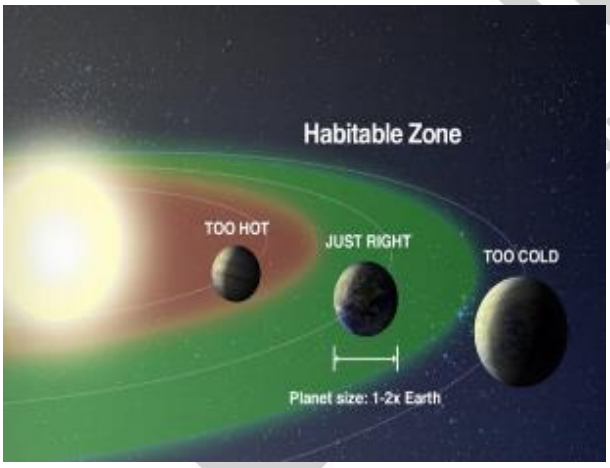
STATEMENT 2 is correct as EPIC(K2-236b) is the first exoplanet discovered by the Indian Space Agency. In an epic Indian discovery, a team from the Physical Research Laboratory, Ahmedabad, has spotted for the first time a distant planet six times bigger than Earth and revolving around a Sun-like star about 600 light years away. Both the planet and the star have been named EPIC.

Context: Discovery of the exoplanet by Indian Space agency arm Physical Research Laboratory, Ahmedabad

Related Topics: Goldilocks zone and Dwarf planet

Q23.
Answer: C
Explanation:

The Goldilocks Zone refers to the habitable zone around a star where the temperature is just correct- not too hot and not too cold - for liquid water to exist on a planet. Looking for planets in the Goldilocks Zone is a way that allows scientists to hone in their search for Earth-like planets that could contain life.



Related Topics: Kuiper belt, dwarf planet, and exoplanet

Q24
Answer: C
Explanation:

Remove debris is a satellite research project intending to demonstrate various space debris removal technologies. So option (c) is correct. Other options are not correct. The satellite's platform was manufactured by Surrey Satellite Technology Ltd (SSTL) and is a variant of the SSTL X50 series. Partners on the project include Airbus, ArianeGroup, Swiss Center for Electronics and Microtechnology, Inria, Innovative Solutions In Space, Surrey Space Centre, and Stellenbosch University.

Rather than engaging in active debris removal (ADR) of real space debris, the Remove DEBRIS

mission plan is to test the efficacy of several ADR technologies on mock targets in low Earth orbit.

Context: Remove DEBRIS for using space technology for the removal of space debris.

Q25
Answer: C
Explanation:

STATEMENT 1 is correct. As it is India's first indigenous and long-range artillery gun system. Dhanush, as an artillery system, has proved to be one of the best amongst its class. It is capable of targeting at long ranges incorporating autonomous laying features and having one of the most sophisticated suites of electronic and computing systems in the world.

STATEMENT 2 is incorrect as it has a strike range of 38 kilometers and not 200 kilometers

STATEMENT 3 is correct. As Dhanush is a 155mm x 45mm caliber artillery gun and is also called the "desi Bofors". It is an upgraded version of Swedish Bofors gun procured by India in the mid-1980s.
Approach: There was news regarding the successful testing of Dhanush. So we should learn about important features like range and types of Dhanush.

Related Topics: Agni, Prithvi

Q26
Answer: C
Explanation:

The Agni missile is a family of medium to intercontinental range ballistic missiles developed by India, named after one of the five elements of nature. Agni missiles are long range, nuclear weapons capable surface to surface ballistic missile. The first missile of the series, Agni-I was developed under the Integrated Guided Missile Development Program and tested in 1989. So Agni is not an example of a surface to air missile system.

Barak 8 also known as LR-SAM or as MR-SAM is an Indian-Israeli surface-to-air missile(SAM), designed to defend against any type of airborne threat including aircraft, helicopters, anti-ship missiles, and UAVs as well as ballistic missiles, cruise missiles, and combat jets. Both maritime and land-based versions of the system exist

Trishul is a short-range surface-to-air missile developed in India. It was developed by the Defence Research and Development Organisation as a part of the Integrated Guided Missile Development Program. It can also be used as an anti-sea skimmer from a ship against low flying attacking missiles.

Related Topics: Integrated Guided Missile Development Program

Q27.
Answer: B
Explanation:

STATEMENT 1 is incorrect as Lithium-ion batteries (LIB) is an example of rechargeable batteries with high energy density. Unlike the disposable lithium primary battery, a LIB uses intercalated lithium compound instead of metallic lithium as its electrode.

STATEMENT 2 is correct as LIBs are highly sensitive to higher temperatures. Higher temperature leads to a much faster degradation rate than normal. This is one of the limitations of Lithium-ion batteries (LIB).

STATEMENT 3 is incorrect as it is more expensive than Nickel - Cadmium battery.

Related Topics: LIB and Nickel - Cadmium battery. The advantages and limitations of Lithium-ion batteries (LIB).

Q28.
Answer: C
Explanation:

STATEMENT 1 is correctly matched as GLONASS is Russia's navigation system.
GLONASS is the Russian acronym for Global Navigation Satellite System, which provides real-time positioning data for surface, sea and airborne objects around the globe, at accuracy reportedly at par with US Global Positioning System (GPS).

STATEMENT 2 is incorrectly matched as Beidou is China's navigation system. It is not a navigation system of Israel. China has indicated their plan to complete the entire second generation Beidou Navigation Satellite System (BDS or BeiDou-2, formerly known as COMPASS), by expanding current regional (Asia-Pacific) service into global coverage by 2020.

STATEMENT 3 is correctly matched as Galileo is European Union's navigation system. The European Union and European Space Agency agreed in March 2002 to introduce their own alternative to GPS, called the Galileo positioning system. Galileo became operational on 15 December 2016 (global Early Operational Capability (EOC)) At an estimated cost of €3 billion, the system of 30 MEO satellites was originally scheduled to be operational in 2010.

Related Topics: NAVIC

Q29
Answer: A
Explanation:
The GROWTH-India is India's first robotic telescope located at the Indian Astronomical Observatory (IAO) at Hanle in Ladakh. It is designed to observe dynamic or transient events in the universe. It is part of a multi-country collaborative initiative known as 'Global Relay of Observatories Watching Transients Happen' (GROWTH) to observe transient events in the universe. The primary research objective of the project is time-domain astronomy, which entails the study of explosive transients and variable sources in the universe.

Q30
Answer: A
Explanation:
Karlsruhe Tritium Neutrino experiment or KATRIN

Neutrinos are sometimes called "ghost particles" because they're so difficult to detect. So, to detect them Katrin is designed It is a massive detector based in the town of Karlsruhe, Germany, that has been designed to measure a neutrino's mass with far greater precision than existing experiments.
Some 200 people from 20 institutions in seven countries are part of the project

Neutrinos are probably the most fascinating species of elementary particles. The "ghost particle of the Universe" is a key to open issues in science on many scales, linking the microcosm of elementary particles to the largest structures in the Universe.

Neutrinos are the lightest particles in the Universe. Their tiny mass is a clear indication for physics beyond the standard model of elementary particle physics. On the largest scales, neutrinos act as "cosmic architects" and take part in shaping the visible structures in the Universe, as they influence the formation and the distribution of galaxies.

Q31
Answer: C
Explanation:

STATEMENT 1 is correct. As The INO project will be constructed at Bodi West hills of Theni District of Tamil Nadu.

STATEMENT 2 is correct. As the project was within 5 km of the Mathikettan Shola National Park in Idukki

Approach: There is much research going on Neutrino particles. So we should learn all the projects

related to the neutrino particle.

Q32
Answer: B
Explanation:

STATEMENT 1 is incorrect as photons are the most abundant elementary particle in the universe.

Neutrino is the second most abundant elementary particle in the universe. So statement 1 is wrong. A neutrino is a subatomic particle that is very similar to an electron but has no electrical charge and a very small mass, which might even be zero.

STATEMENT 2 is correct as Neutrino Particle have very little interaction with matter and they pass different matters easily.

STATEMENT 3 is correct Neutrinos are electrically neutral and Neutrinos are almost massless. So

STATEMENT 3 is correct.

Q33.
Answer: B
Explanation:

STATEMENT 1 is incorrect as it is not water desalination technique. It is a pollution control system for the reduction of SOx (SO2, SO3), HCI and heavy metals like mercury. DSI is the practice of injecting a dry alkaline mineral into a flue gas stream to reduce acid gas emission.

STATEMENT 2 is correct as Sorbents are those materials which can collect molecules of another substance by the process of absorption. So statement 2 is correct sodium bicarbonate is sorbent materials

Approach: DSI and activated carbon injection (ACI) are two mature and low capital technologies for acid gas control and vapour-phase Hg reduction, respectively. Both Hg and acid gas control sorbents have proven effective in a variety of industrial plants (i.e. utility, biomass, cement, waste incinerators, etc.).

Q34
Answer: D
Explanation:

Option 1 is correctly matched as The Cassini–Huygens spacecraft, launched in 1997, was in orbit from 2004 to 2017.]On July 1, 2004, the Cassini–Huygens spacecraft performed the SOI (Saturn Orbit Insertion) maneuver and entered into orbit around Saturn. Before the SOI, Cassini had already studied the system extensively. In June 2004, it had conducted a close flyby of Phoebe, sending back high-resolution images and data.

Option 2 is correctly matched as The Interior Exploration using Seismic Investigations, Geodesy and Heat Transport (InSight) mission is a robotic lander designed to study the deep interior of the planet Mars.

Option 3 is correctly matched as Juno's mission is to measure Jupiter's composition, gravity field, magnetic field, and polar magnetosphere. It will also search for clues about how the planet formed, including whether it has a rocky core, the amount of water present within the deep atmosphere, mass distribution, and it's deep winds.

Q35
Answer: A
Explanation:

STATEMENT 2: Mining and extracting Helium-3 deposits is not planned Chandrayaan 2 mission. Hence statement 2 is incorrect.

Chandrayaan-2 is India's second mission to the Moon is a totally indigenous mission comprising of an Orbiter, Lander and Rover. It is the first ever Indian mission to soft land on the surface of an extraterrestrial body.

The instruments on Rover will conduct an in-situ analysis of elements such as Na, Mg, Al, Si, etc; in the vicinity of the landing site. Mining and extracting Helium-3 deposits is not planned. It is incorrect.

Related Topics: Gaganyaan Mission

Q36
Answer: A
Explanation:

National Automotive Testing and R&D Infrastructure Project (NATRiP) is a state of the art Testing, Validation and R&D infrastructure in the country. It is the collaboration of the Government of India, a number of State Governments and Indian Automotive Industry. Hence the option A is correct.

Related Topics: National Electric Mobility Mission Plan (NEMMP) 2020, FAME policy

Q37
Answer: A
Explanation:

STATEMENT 2: It can be used for shorter distance only. Hence statement 2 is incorrect.

STATEMENT 3: LIDAR is expensive than RADAR. Hence the statement 3 is incorrect.

LIDAR is similar to RADAR but uses pulsed laser lights in the place of radio signals. It gives greater accuracy in remote sensing up to certain distances. It is affected by climatic and weather factors. The LIDAR is expensive than RADAR technology. It finds application in the self-driving cars.

Related Topics: Artificial Intelligence, Doppler Radar

Q38
Answer: B
Explanation:

STATEMENT 1: It is the most abundantly available particle in the universe. Hence statement 1 is incorrect.

Neutrinos are subatomic particles present abundantly in the universe. They are electrically neutral and not affected by the electromagnetic forces. They are affected only by weak nuclear forces. These properties make it one of the elusive particles to get detected. It has negligible mass and they oscillate among different flavors of neutrino on their path of travel.

Most of the project around the world try to find the mass and the reason for oscillation in which India based Neutrino (INO) is a part.

Approach: INO is one of the basic physics research that India has started. Such developments can be asked in one form or the other.

Related Topics: Environmental issues of INO, NGT verdict on INO and Neutrino research all over the world

Q39
Answer: A
Explanation:

'P null' is a very rare blood group and anti-PP1Pk antibody in this blood has the potential to cause an acute intravascular hemolytic reaction to incompatible blood transfusion. This makes difficult to

access blood in case of emergencies.

Related Topics: ABO grouping, Rhesus (Rh) factor

Q40
Answer: A
Explanation:

Bhartiya Niredeshak Dravyas (BND™) is the indigenous petroleum certified reference materials (CRMs) developed by the National physical laboratory and Hindustan Petroleum Corporation Limited. This will ensure maintaining highest standard quality ecosystem for petroleum products used by all stakeholders including common man and also will save vital foreign exchange through import substitution for CRMs.

CRMs play a pivotal role in the calibration of laboratory testing equipment for quality assurance. At present, the traceability of these CRMs to SI unit is mostly achieved through foreign National Measurement Institutes.

Related Topics: Indian Standards for Gold.

Q41
Answer: C
Explanation:

Hubble Telescope is the first space-based optical telescope named after American astronomer Edwin P. Hubble Who confirmed that the universe is expanding which provided the foundation for the big-bang theory. It is built on cooperation between NASA and the European Space Agency.

It was found that there was an aberration in the lenses of the telescope which needed repair to increase the clarity of the images. It was serviced in space and was the first project of its kind.

Approach: Hubble Telescope is frequently appearing in the news for its new discoveries. Hence it can be asked in the exam.

Related Topics: James Webb Space Telescope

Q42
Answer: A
Explanation:

MeerKAT is a radio telescope consisting of 64 antennas now being tested and verified in the Northern Cape of South Africa. The telescope will be used for research into cosmic magnetism, galactic evolution, the large-scale structure of the cosmos, dark matter and the nature of transient radio sources. It will also serve as a technology demonstrator for South Africa's bid to host the Square Kilometer Array.

Context: Square Kilometer Array (SKA) is an international project of which India is a part. Hence make sure you are aware of the basic facts related to the SKA.

Related Topics: Square Kilometer Array (SKA)

Q43
Answer: A
Explanation:

STATEMENT 1: It is double-stage cruise missile. Hence statement 1 is incorrect.
STATEMENT 2: It carries conventional warheads. Hence statement 2 is incorrect.

Brahmos developed by India and Russia is the double stage supersonic cruise missile with a range of 290 Km. It operates on the 'Fire and Forget Principle'. It carries a conventional warhead. At present, there is no weapon system that can intercept the Brahmos missile. It comes in many variants of land, air, sea and sub-sea launch.

Related Topics: Effect of MTCR on Brahmos.

Q44
Answer: A
Explanation:

The Gravity Recovery and Climate Experiment Follow-On (GRACE-FO) mission is a partnership between NASA and the German Research Centre for Geosciences. It will help to track Earth's water movement to monitor changes in underground water storage, the amount of water in large lakes and rivers, soil moisture, ice sheets and glaciers, and sea level caused by the addition of water to the ocean. It will provide a unique view of Earth's climate and have far-reaching benefits to society and the world's population.

Approach: Projects of NASA are important from the exam's perspective

Related Topics: Orbiting Carbon Observatory of NASA.

Q45
Answer: D
Explanation:

Oumuamua is the first interstellar object detected passing through the Solar System. First, it was thought as an asteroid as it is devoid of the tail which is common to a comet. But later the scientist confirmed it as a comet and the absence of tail was due to the size of grains found in the object.

Approach: Follow the developments of the space agencies like NASA, ESA, JAXA, and ISRO

Q46
Answer: D
Explanation:

Justice B.N. Srikrishna committee submitted its report on data protection law in India. It defined the following as sensitive personal data:

1. passwords;
2. financial data;
3. health data;
4. official identifier;
5. sex life;
6. sexual orientation;
7. biometric data;
8. genetic data;
9. transgender status;
10. intersex status;
11. caste or tribe;
12. Religious or political belief or affiliation; 13. any other category of data specified by the Authority under section 22.

Related Topics: General Data Protection Regulation of the European Union, Big data

Q47
Answer: C
Explanation:

OPTION C: It exhibits higher conversion efficiency than a natural leaf. Hence the option c is incorrect.

Artificial leaf or Quantum leaf is developed by the Indian Institute of Science, Bangalore. Artificial photosynthesis is a very promising approach since it can directly help capture atmospheric carbon dioxide and convert to fuel or an industrial feedstock. In this manner, this process acts not just as an energy source but also as a carbon dioxide sink.

The quantum dot "leaf" reported by us offers unprecedented advantages:
1. It is composed of completely biocompatible, earth-abundant, inexpensive elements.
2. It exhibits very high solar to chemical energy conversion efficiencies
3. Light harvesting via these materials may be set up to extract the carbon dioxide already present within the earth's atmosphere.

Related Topics: Solar Tree and Biomimicry

Q48
Answer: B
Explanation:

Dry Sorbent Injection (DSI) is the practice of injecting a dry alkaline mineral into a flue gas stream to reduce acid gas emission. DSI offers advantages in comparison to traditional acid gas scrubber technology: lower capital cost, a wide range of favorable operation conditions, and much lesser time for completing installation and commissioning.

Thermal power plants in India are started to adopt this technology to reduce the hazards of their emissions.

Related Topics: Carbon sinks, Acid rain and Thermal power generation in India.

Q49
Answer: B
Explanation:

PRL Advance Radial-velocity Abu-sky Search (PARAS) spectrograph is the indigenously developed by Physical Research Laboratory. It is integrated with 1.2m Telescope at PRL's Gurushikhar Observatory in Mount Abu that helped to discover a new planet called EPIC 211945201b or K2-236b of a size smaller than Saturn revolving around a sun-like star.

Approach: Important indigenous development, you can follow the current affairs magazine to be aware of it.

Related Topics: Saraswati supercluster