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**PRESTORMING<sup>TM</sup>**

**TEST BOOKLET**

**Test Booklet Series**

**T.B.C : P-SIA-A-GS**

**Serial : P-GSI-252605**

**GENERAL STUDIES - PAPER - I**

**SCIENCE & TECHNOLOGY I**

**TEST - 05**



**Time Allowed : Two Hours**

**Maximum Marks : 200**

**I N S T R U C T I O N S**

1. IMMEDIATELY AFTER THE COMMENCEMENT OF THE EXAMINATION, YOU SHOULD CHECK THAT THIS TEST BOOKLET DOES **NOT** HAVE ANY UNPRINTED OR TORN OR MISSING PAGES OR ITEMS, ETC. IF SO, GET IT REPLACED BY A COMPLETE TEST BOOKLET.
2. ENCODE CLEARLY THE TEST BOOK SERIES **A, B, C** OR **D** AS THE CASE MAY BE IN THE APPROPRIATE PLACE IN THE ANSWER SHEET.
3. You have to enter your Roll Number on the Test Booklet in the Box provided alongside. **DO NOT** write **anything else** on the Test Booklet.
4. This Test Booklet contains **100 items** (questions). Each item is printed in **English**. Each item comprises four responses (answers). You will select the response which you want to mark on the Answer Sheet. In case you feel that there is more than one correct response, mark the response which you consider the best. In any case, choose **ONLY ONE** response for each item.
5. You have to mark all your responses **ONLY** on the separate Answer Sheet provided. See directions in the Answer Sheet.
6. All items carry equal marks.
7. Sooner than you proceed to mark in the Answer Sheet the response to various items in the Test Booklet, you have to fill in some particulars in the Answer Sheet as per instructions sent to you with your Admission Certificate.
8. After you have completed filling in all your responses on the Answer Sheet and the examination has concluded, you should hand over to the Invigilator *only the Answer Sheet*. You are permitted to take away with you the Test Booklet.
9. Sheets for rough work are appended in the Test Booklet at the end.

**10. Penalty for Wrong answers :**

**THERE WILL BE A PENALTY FOR WRONG ANSWERS MARKED BY A CANDIDATE IN THE OBJECTIVE TYPE QUESTION PAPERS.**

- (i) There are four alternatives for the answer to every question. For each question for which a wrong answer has been given by the candidate, **one-third (0.66)** of the marks assigned to that question will be deducted as a penalty.
- (ii) If a candidate gives more than one answer, it will be treated as a **wrong answer** even if one of the given answers happens to be correct and there will be the same penalty as above to that question.
- (iii) If a question is left blank, i.e., no answer is given by the candidate, there will be **no penalty** for that question.

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**(1-A)**

**SIA-A-GS I**



1. A system has done no work if:
  - (a) The force and displacement are perpendicular
  - (b) A large force acts on it, but causes no displacement
  - (c) The force is zero, but it undergoes displacement due to zero friction
  - (d) All the above

2. Consider the following statements:

1. Blue light scatters more than red light, as blue light has a shorter wavelength.
2. Water droplets present in clouds scatter light and cause them to appear white.
3. Sky will appear red for an astronaut when observed outside the Karman line.

How many of the above statements is/are correct?

- (a) Only one
- (b) Only two
- (c) All three
- (d) None

3. Consider the following statements regarding Aditya-L1 Mission:

1. It is India's first dedicated space-based solar mission, aimed at studying the Sun.
2. The satellite is placed in a Halo orbit around the L1 Lagrange Point.
3. L1 is a point in space where the gravitational forces of the Sun and Earth balance each other.
4. A spacecraft placed at the L1 point requires minimal energy to remain in orbit.

Which of the statements given above are correct?

- (a) 1, 3 and 4 only
- (b) 2, 3 and 4 only
- (c) 1 and 2 only
- (d) 1, 2, 3 and 4

4. Consider the following statements about black holes:

1. Not all black holes are formed from supernova explosions.
2. Black holes can be observed using visible light telescopes.
3. Black holes can spin, and their spin affects the gravitational waves they emit.

How many of the statements given above is/are correct?

- (a) Only One
- (b) Only two
- (c) All three
- (d) None

5. Consider the following statements:

1. Buoyant force exerted by a liquid is directly proportional to its liquid density.
2. If the gravitational force acting on an object is higher than the buoyant force acting on it, it floats.

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

6. Consider the following statements:

**Statement I:**

Communication through sound waves isn't possible on the moon.

**Statement II:**

Mechanical waves cannot propagate in vacuum.

**Statement III:**

Sound travels faster through solids than liquids.

Which of the following is correct with respect to the above statements?

- (a) Both Statement II and Statement III are correct, and both of them explain Statement I.
- (b) Both Statement II and Statement III are correct, but only one of them explains Statement I.
- (c) Only one of Statements II and III is correct, and that explains Statement I.
- (d) Neither Statement II nor Statement III is correct.

7. With reference to properties of electric charge, which one of the following statements is **not** correct?

- (a) Charge can be positive or negative
- (b) Charge can be quantised
- (c) Charge can be conserved
- (d) None of the above

8. With reference to atomic clocks, consider the following statements:

- 1. They are more stable than quartz crystal clocks.
- 2. They are used in Global Navigation Satellite Systems.
- 3. Caesium and Rubidium are used in atomic clocks

Which of the statements given above is/are correct?

- (a) 1 and 2 only
- (b) 2 only
- (c) 1 and 3 only
- (d) 1, 2 and 3

9. Consider the following:

- 1. Resource for lunar exploration missions
- 2. Supply of oxygen
- 3. Supply of drinking water
- 4. Hydrogen fuel for rockets

How many of the above is/are potential uses of lunar water?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

10. With reference to the Navigation with Indian Constellation (NavIC), consider the following statements:

- 1. It provides position, velocity and timing services to users.
- 2. It can be used for navigation and as a disaster alert system.
- 3. Its range is limited to the Indian landmass.

Which of the statements given above are correct?

- (a) 1 and 2 only
- (b) 2 and 3 only
- (c) 1 and 3 only
- (d) 1, 2 and 3

11. Consider the following statements:

1. Meteoroids are meteors that enter the Earth's atmosphere.
2. Meteorites are meteors that enter the atmosphere and hit the ground.

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

12. Which one of the following best describes the term "AI washing"?

- (a) Companies exaggerating the level of AI technologies used in their products
- (b) Unauthorised use of AI to access the sensitive information of users
- (c) Manipulation of data used to train AI models, leading to biased outcomes
- (d) Creation of highly realistic AI fake content to manipulate public opinion

13. Consider the following statements:

1. Hypersonic missiles can achieve speeds higher than the speed of sound.
2. Ramjet engines are more efficient than Scramjet engines at hypersonic speeds.
3. Every hypersonic weapon must be launched by a rocket.

How many of the above statements is/are correct?

- (a) Only one
- (b) Only two
- (c) All three
- (d) None

14. Consider the following statements:

1. It is an indigenously developed intercontinental ballistic missile.
2. It is a solid-fueled, three-stage and canister-launched missile.
3. The missile can be equipped with Multiple Independently Targetable Re-entry Vehicle technology.

Which of the following types of missiles is described above?

- (a) BrahMos
- (b) Prithvi-II
- (c) Agni-V
- (d) Astra

15. Which of the following best describes "Cobots" in the field of robotics?

- (a) Robots that collaborate with other robots to complete high-precision industrial tasks.
- (b) Robots designed to work collaboratively with human beings in a shared workspace.
- (c) Robots connected through cloud-based systems for collective data analysis and automation.
- (d) Robots capable of cognitive learning through continuous observation of human behaviour.

16. In the context of robotics in healthcare, consider the following statements:

1. Robots assist in minimally invasive surgeries and rehabilitation therapy.
2. Robotic applications can enhance telemedicine and healthcare delivery in rural areas.
3. Ethical concerns have led to a prohibition on medical robots in India.

Which of the statements given above is/are correct?

- (a) 1 and 2 only
- (b) 2 and 3 only
- (c) 1 only
- (d) 1, 2 and 3

17. Consider the following pairs:

| S. no | Made in India Robot |   | Description                                           |
|-------|---------------------|---|-------------------------------------------------------|
| 1.    | DAKSHA              | - | India's first 3D-printed humanoid robot.              |
| 2.    | Vyommitra           | - | Spacefaring humanoid robot                            |
| 3.    | MANAV               | - | Automated mobile platform for multi-purpose payloads. |

How many of the above pairs is/are correct?

- (a) Only one
- (b) Only two
- (c) All three
- (d) None

18. Particles in steam at 100°C have more energy than those in boiling water at the same temperature because:

- (a) Steam particles are lighter than water molecules.
- (b) Steam particles possess additional energy in the form of latent heat of vaporisation.
- (c) Water loses energy during boiling, making its molecules slower
- (d) Steam has a higher specific heat capacity than water.

19. Consider the following statements:

**Statement I:**

Manufacturers usually flush bags of chips with nitrogen gas.

**Statement-II:**

Nitrogen prevents the oxidation of fats and oils, which otherwise leads to rancidity and a change in taste and smell.

Which of the following is correct with respect to the above statements?

- (a) Both Statement-I and Statement-II are correct, and Statement-II is the correct explanation for Statement-I
- (b) Both Statement-I and Statement-II are correct, and Statement-II is not the correct explanation for Statement-I
- (c) Statement I is correct, but Statement II is incorrect
- (d) Statement I is incorrect, but Statement II is correct

20. Consider the following purposes:

1. Manufacture of borax
2. Removal of permanent hardness of water
3. Ingredients in the glass and soap industries

Washing soda can be used in the production of how many of the above-mentioned purposes?

- (a) Only one
- (b) Only two
- (c) All three
- (d) None

21. Consider the following phenomena:

1. Twinkling of stars
2. Advanced sunrise and delayed sunset
3. Apparent flattening of the Sun's disc at sunrise and sunset
4. The formation of a rainbow

Which of the above phenomena can be explained by atmospheric refraction?

- (a) 1 and 2 only
- (b) 2 and 3 only
- (c) 1, 2 and 3 only
- (d) 1, 2, 3 and 4 only

22. Consider the following statements about Linear Induction Motors (LIMs):

1. It is a specialised type of induction motor engineered to produce linear motion instead of rotational motion.
2. A linear induction motor works on the same principle as a conventional induction motor.
3. LIMs are used in futuristic transport systems like Hyperloop pods.

Which of the statements given above is/ are correct?

- (a) 1 and 2 only
- (b) 1 and 3 only
- (c) 2 only
- (d) 1, 2 and 3

23. Consider the following statements:

1. Mesh networking is a network topology in which all devices are connected to a central hub, which acts as the main point for data transmission.
2. In a mesh network, data can travel between any devices, enabling multiple communications.
3. The majority of home Wi-Fi networks and office LANs rely on mesh networking.

Which of the following statements is/are correct?

- (a) 1 only
- (b) 2 only
- (c) 1 and 3 only
- (d) 1, 2 and 3

24. Consider the following:

**Statement I:**

White hydrogen is naturally tapped in the Earth's porous rocks and cracks.

**Statement II:**

White hydrogen is formed when underground water reacts with iron-rich rocks in a process called serpentinisation.

Which one of the following is correct with respect to the above statements?

- (a) Both Statement I and Statement II are correct, and Statement II explains Statement I
- (b) Both Statement I and Statement II are correct, but Statement II does not explain Statement I
- (c) Statement I is correct, but Statement II is incorrect
- (d) Statement I is incorrect, but Statement II is correct

25. With reference to the lunar surface, consider the following statements:

- 1. Pragyan rover of the Chandrayaan-3 collects data on lunar regolith.
- 2. The lunar surface comprises both low flat plains and highlands.
- 3. There is a presence of molten lava beneath the lunar surface.

How many of the above statements is/are correct?

- (a) Only one
- (b) Only two
- (c) All three
- (d) None

26. Neurological diseases can paralyse muscles that assist humans in speech. In this context, which one of the following is an Artificial Intelligence-assisted technology that converts brain activity into audible words on a computer in real time?

- (a) Brain-computer interface
- (b) Transcranial magnetic stimulation
- (c) Brain stimulation devices
- (d) Neurofeedback

27. With reference to the NASA ISRO Synthetic Aperture Radar Mission (NISAR), consider the following statements:

- 1. It will be placed in the sun-synchronous polar orbit.
- 2. It will carry out imaging of the entire Earth every 30 days.
- 3. It will aid in natural disaster monitoring.

How many of the above statements is/are correct?

- (a) Only one
- (b) Only two
- (c) All three
- (d) None

28. With reference to supersolids, consider the following statements:

- 1. It is a state of matter that exhibits properties of a solid as well as a liquid.
- 2. It tends to show zero viscosity.
- 3. It forms at extremely high temperatures.

How many of the above statements is/are correct?

- (a) Only one
- (b) Only two
- (c) All three
- (d) None

29. With reference to the Axiom-4 mission, consider the following:

- 1. Effects of cosmic radiation on the growth of edible microalgae
- 2. Muscle cell regeneration
- 3. Ageing patterns of tardigrades
- 4. Cyanobacteria growth in space

Which of the experiments given above was conducted successfully during the mission?

- (a) 1, 2 and 4 only
- (b) 2, 3 and 4 only
- (c) 1, 3 and 4 only
- (d) 1, 2, 3 and 4

30. Which of the following correctly describes the purpose of the Integrated Air Drop Test for Gaganyaan?

- (a) To test the Gaganyaan crew module life support system in orbit
- (b) To check the Crew Escape System during launch
- (c) To validate safe descent and landing of the crew module.
- (d) To deploy communication satellites from the Gaganyaan module

31. Consider the following statements:

**Statement I:**

According to Bohr's model of the hydrogen atom, electrons revolve around the nucleus only in certain permitted circular orbits.

**Statement II:**

Each permitted orbit in Bohr's model has a definite energy and corresponds to a stationary state of the electron.

**Statement III:**

According to Bohr's model, the energy of an electron is maximum when it is in the orbit closest to the nucleus.

Which one of the following is correct in respect of the above statements?

- (a) Both Statement II and Statement III are correct, and both explain Statement I
- (b) Both Statement II and Statement III are correct but only one of them explains Statement I
- (c) Only one of the Statements II and III is correct and that explains Statement I
- (d) Neither Statement II nor Statement III is correct

32. 3I/ATLAS recently seen in the news is a:

- (a) Interstellar object
- (b) Black hole
- (c) Gravitational telescope
- (d) Protostar

33. Consider the following statements regarding the Major Atmospheric Cherenkov Experiment (MACE) that was in the news:

- 1. It is one of the highest observatory sites in the world, located at Hanle in Ladakh.
- 2. It is designed to study Cherenkov radiation and gamma rays.
- 3. It has been developed jointly by ISRO and DRDO.

Which of the statements given above are correct?

- (a) 1 and 2 only
- (b) 2 and 3 only
- (c) 1 and 3 only
- (d) 1, 2 and 3

34. Consider the following statements:

1. No planets move in circular orbits with the sun.
2. Planets appear to move faster when they are farther from the sun than when they are nearer.
3. All planets revolve around the Sun in the same counterclockwise direction when viewed from above the Sun's north pole.

How many of the statements given above is/are **not** correct?

- (a) Only one
- (b) Only two
- (c) All three
- (d) None

35. With reference to black boxes in flights, consider the following statements:

1. They consist of a Cockpit Voice Recorder and a Digital Flight Data Recorder.
2. They are made of stainless steel and are resistant to explosions.

Which of the above statements is/are correct?

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

36. With reference to the SPARC therapy for tumours, consider the following statements:

1. It helps in targeted treatment of tumour cells, minimising damage to other tissues.
2. It is less expensive compared to conventional therapies for cancer.

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

37. Consider the following statements:

1. Conventional computing chips rely on sequential processing, whereas quantum computing chips allow parallel and asynchronous processing.
2. Conventional computing chips use 0 or 1 bits, whereas quantum computing chips use "qubits," which can exist in superposition states.

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

38. With reference to the India Semiconductor Mission (ISM), consider the following statements:

1. It functions under the Ministry of Commerce and Industry.
2. It aims to provide financial support to companies investing in semiconductors.
3. Recently, India and Taiwan inked a pact to set up a semiconductor fab for national security.

Which of the statements given above is/are correct?

- (a) 1 and 3 only
- (b) 2 only
- (c) 2 and 3 only
- (d) 1, 2 and 3

39. Recently, Bharat Sanchar Nigam Limited (BSNL) conducted the soft launch of BSNL Quantum 5G fixed-wireless-access (FWA). With reference to the Quantum 5G FWA, consider the following statements:

1. It is a SIM-less technology.
2. It delivers high-speed internet over 4G radio.
3. The service is based on BSNL's Direct-to-Device platform

How many of the above statements is/are correct?

- (a) Only one
- (b) Only two
- (c) All three
- (d) None

40. Consider the following information:

| S. no | Processing Unit          | Description                                     |
|-------|--------------------------|-------------------------------------------------|
| 1.    | Central Processing Unit  | A core can only handle one task at a time       |
| 2.    | Graphics Processing Unit | Carries out parallel processing of tasks        |
| 3.    | Tensor Processing Unit   | Google application-specific integrated circuits |

Which of the rows given above are correctly matched?

- (a) 1 and 2 only
- (b) 2 and 3 only
- (c) 1 and 3 only
- (d) 1, 2 and 3

41. Which of the following correctly describes high-band 5G?

1. It offers extremely high internet speeds, tested up to 20 Gbps.
2. It has minimal coverage and is not suitable for wide-area connectivity.
3. The signal penetration is weak, making it less effective at passing through obstacles.

Select the correct code using the options given below:

- (a) 1 and 2 only
- (b) 2 and 3 only
- (c) 1 and 3 only
- (d) 1, 2, and 3

42. How many of the following applications can be effectively implemented using Blockchain technology?

1. Land title registration
2. Photosynthesis rate enhancement in crops
3. Peer-to-peer energy trading
4. Detection of blood pressure in a patient
5. Cryptocurrency payments
6. Real-time traffic light control based on vehicle count

Select the correct answer using the code given below:

- (a) Only three
- (b) Only four
- (c) Only five
- (d) All six

43. Consider the following statements regarding GI Cloud (MeghRaj):

1. It is a Government of India initiative to provide a cloud computing platform for all central and state government departments.
2. The platform accelerates the deployment of identity verification and consent-based data sharing in e-Gov applications.

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

44. Which of the following is **not** correct regarding Common Service Centres (CSCs)?

- (a) They provide access to e-Governance, financial, and social sector services in rural areas.
- (b) It aims to strengthen digital infrastructure in Tier-1 and Tier-2 cities, while rural outreach was added only under CSC 2.0
- (c) They are managed by the Common Services Centres Special Purpose Vehicle under the Ministry of Electronics and Information Technology.
- (d) They were introduced as part of the National e-Governance Plan approved in 2006.

45. SSI Mantra, recently seen in the news, in the context of:

- (a) Quantum computer
- (b) Earth observation satellite
- (c) Refractor telescope
- (d) Surgical robotic system

46. Which one of the following countries recently conducted a 'Robot Olympics'?

- (a) India
- (b) China
- (c) USA
- (d) Germany

47. With reference to the defence sector, consider the following:

1. Artificial Intelligence-based warfare
2. Proxy warfare
3. Electro-magnetic warfare
4. Space warfare
5. Cyber attacks

How many of the above is/are frontier technologies used in new-age warfare?

- (a) Only two
- (b) Only three
- (c) Only four
- (d) All five

48. Consider the following:

1. Rustom -1
2. Heron
3. TAPAS-BH-201
4. Nag astra
5. Warmate

Which of the above are surveillance and reconnaissance drones?

- (a) 1, 2, 3 and 5 only
- (b) 2, 3 and 4 only
- (c) 1, 2, 3 and 4 only
- (d) 1, 2, 3, 4 and 5

49. With reference to the Gandiva missile, consider the following statements:

1. It is part of the Astra series of missiles.
2. It has a range of over 500 kilometres.
3. It doesn't need an onboard oxidiser.

How many of the above statements is/are correct?

- (a) Only one
- (b) Only two**
- (c) All three
- (d) None

50. Consider the following information:

| S. no | Defence technology in the news | Description                                                               |
|-------|--------------------------------|---------------------------------------------------------------------------|
| 1.    | Multi-Influence Ground Mine    | It is an underwater mine that could improve naval warfare capabilities    |
| 2.    | Akashteer                      | It is an automated Air Defence Control and Reporting System               |
| 3.    | Barak-8 Missile System         | It is a surface-to-air missile system that offers all-weather protection. |

Which of the above pairs are correctly matched?

- (a) 1 and 2 only
- (b) 2 and 3 only
- (c) 1 and 3 only
- (d) 1, 2 and 3**

51. Which of the following is related to 'India's Analogue Space Mission' that was recently in the news?

- (a) A field testing of lunar rover prototypes in desert-like environments on Earth.
- (b) A ground-based simulation of extraterrestrial conditions to train astronauts and test technologies.**
- (c) To Conduct microgravity experiments aboard stratospheric balloons.
- (d) To test cryogenic propulsion systems for deep-space exploration.

52. Consider the following Pairs

| S. no | Missions          | Details                                                      |
|-------|-------------------|--------------------------------------------------------------|
| I     | XPoSat            | Indigenous in-space docking demonstration by ISRO            |
| II    | INSAT-3DS         | Meteorological satellite mission for weather forecast        |
| III   | Chang'e-6         | World's first far-side lunar sample return mission           |
| IV    | Nova-C (Odysseus) | First U.S. Moon landing in decades using methalox propulsion |

How many of the pairs given above is/are correctly matched?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

53. Which of the following measures was implemented by the Indian government to enhance border security against drone threats?

- (a) Deployment of anti-drone systems along the Pakistan border.
- (b) Implementation of mandatory drone pilot licensing for all recreational users.
- (c) Establishment of a centralised drone control centre in Delhi.
- (d) Mandatory drone registration for all foreign-made drones.

54. Consider the following statements regarding AdFalcivax Vaccine:

- 1. It is India's first indigenous malaria vaccine.
- 2. The vaccine maintains its potency at normal temperatures.
- 3. The vaccine prevents parasite development inside mosquitoes during the mating stage.

Which of the statements given above are correct?

- (a) 1 and 2 only
- (b) 1 and 3 only
- (c) 2 and 3 only
- (d) 1, 2 and 3

55. Consider the following statements about Free-Space Quantum Communication:

- 1. It sends quantum signals through the air using laser light, without optical fibre.
- 2. It allows Quantum Key Distribution that can catch any attempt at eavesdropping.
- 3. It has been successfully demonstrated over a distance of more than one kilometre.

Which of the statements given above are correct?

- (a) 1 and 2 only
- (b) 2 and 3 only
- (c) 1 and 3 only
- (d) 1, 2 and 3

56. Consider the following space missions:

- 1. Axiom -4
- 2. SpaDeX
- 3. Gaganyaan

How many of the above missions use docking technology to connect with the International Space Station?

- (a) Only one
- (b) Only two
- (c) All three
- (d) None

57. Which one of the following is **not** the objective of the SpaDeX Mission?

- (a) Demonstration of the transfer of electric power between the docked spacecraft
- (b) Rendezvous of two small spacecraft in low-Earth orbit
- (c) Docking and undocking of the two spacecraft in low-Earth orbit
- (d) Conduct biological experiments aboard the docked spacecraft

58. Consider the following:

- 1. HANSA - 3 (NG)
- 2. Chinook Helicopter
- 3. Boeing 787
- 4. Advanced Light Helicopter Rudra

How many of the listed above aircraft/helicopters can be used for Combat operations?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

59. Consider the following reactions:

- 1. Respiration
- 2. Evaporation of water
- 3. Decomposition of calcium carbonate
- 4. Photosynthesis
- 5. Condensation of steam into water
- 6. Combustion of Fuels

How many of the reactions given above absorb heat or energy from the surroundings?

- (a) Only three
- (b) Only four
- (c) Only five
- (d) All six

60. Which among the following are the benefits of placing satellites in Polar Orbit?

- 1. Useful for remote sensing, meteorology and environmental studies of the earth.
- 2. These satellites can view polar and equatorial regions at close distances with good resolution.
- 3. A constellation of satellites over this orbit provides telecommunication services.

Select the correct code using the options given below :

- (a) 1 and 2 only
- (b) 2 and 3 only
- (c) 1 and 3 only
- (d) 1, 2 and 3

61. Consider the following missile types:

- 1. Intercontinental Ballistic Missile (ICBM)
- 2. Hypersonic Glide Missile (HGV)
- 3. Fractional Orbital Bombardment System (FOBS)

Which of the missile types uses low Earth orbit in its journey?

- (a) 1 only
- (b) 3 only
- (c) 2 and 3 only
- (d) 1, 2 and 3

62. Which one of the following missile systems works on a Scramjet propulsion system?

- (a) Agni-V
- (b) Agni Prime
- (c) BrahMos
- (d) Akash

63. Consider the following statements regarding *Naegleria fowleri*:

1. It is a single-cell organism known as a brain-eating amoeba.
2. The amoeba enters the body through the roof of the nasal cavity, leading to a severe, fatal brain infection.
3. The organism can survive in saline conditions and is not found in freshwater bodies.

How many of the statements given above is/are correct?

- (a) Only one
- (b) Only two
- (c) All three
- (d) None

64. Recently, which country launched the Global Observing Satellite for Greenhouse gases and the Water cycle (GOSAT-GW)?

- (a) Russia
- (b) India
- (c) China
- (d) Japan

65. Consider the following statements about Amoeba:

1. No Amoeba remains in a fixed shape.
2. No Amoeba can survive in a dry environment.
3. No Amoeba is multicelled.

How many of the statements given above is/are correct?

- (a) Only one
- (b) Only two
- (c) All three
- (d) None

66. Which of the following statements about catenation is/are correct?

1. Catenation is the ability of an element to form chains or networks through bonding with itself.
2. Carbon exhibits the maximum degree of catenation among all elements.
3. Silicon, despite being in the same group as carbon, shows significantly less catenation due to its larger atomic size and weaker Si-Si bonds

Select the correct answer using the codes given below:

- (a) 1 only
- (b) 2 and 3 only
- (c) 1 and 3 only
- (d) 1, 2 and 3

67. Consider the following statements regarding the CEREBRO device:

1. It is a portable and non-invasive brain injury diagnostic tool.
2. It is safe for infants and pregnant women.
3. It was developed using advanced near-infrared spectroscopy technology.

How many of the statements given above is/are correct?

- (a) Only one
- (b) Only two
- (c) All three
- (d) None

68. With reference to a solenoid, consider the following statements:

1. It can be used to make electromagnets.
2. The magnetic field inside a solenoid is highest at its midpoint.

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

69. Consider the following information:

| S. no | Type of thermometer           | Use                                                                               |
|-------|-------------------------------|-----------------------------------------------------------------------------------|
| 1.    | Maximum – minimum thermometer | In meteorology, to find the diurnal range of temperature                          |
| 2.    | Laboratory thermometer        | To find temperatures in science experiments                                       |
| 3.    | Thermocouple thermometer      | In processes that require measuring temperatures as low as $-200^{\circ}\text{C}$ |

How many of the above statements is/are correctly matched?

- (a) Only one
- (b) Only two
- (c) All three
- (d) None

70. Consider the following:

- 1. Ultrasound sonography
- 2. Monitor tornadoes
- 3. Communication between satellites and ground stations
- 4. Tsunami detection

How many of the above is/are applications of the Doppler effect?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

71. With reference to periscopes, consider the following statements:

- 1. They use plain mirrors.
- 2. They are used by soldiers in bunkers.
- 3. They can be used during the maintenance of nuclear reactors.

Which of the statements given above are correct?

- (a) 1 and 2 only
- (b) 2 and 3 only
- (c) 1 and 3 only
- (d) 1, 2 and 3

72. Consider the following statements:

**Statement-I:**

Solid carbon dioxide can be directly converted into a gaseous state at high pressure.

**Statement II:**

The level of pressure applied to a substance can influence its state of matter.

Which of the following is correct with respect to the above statements?

- (a) Both Statement-I and Statement-II are correct and Statement-II is the correct Explanation for Statement-I.
- (b) Both Statement-I and Statement-II are correct and Statement-II is not the correct Explanation for Statement-I
- (c) Statement I is correct, but Statement II is incorrect
- (d) Statement I is incorrect, but Statement II is correct

73. Consider the following statements:

1. The echo of a sound occurs only if multiple surfaces reflect a sound.
2. The rolling of thunder is caused by successive reflections.

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

74. With reference to properties of a colloid, consider the following statements:

1. Its particles are uniformly spread.
2. It is a homogeneous mixture.
3. It can cause the Tyndall effect.
4. It is a stable solution.

Which of the statements given above are correct?

- (a) 1, 2 and 3 only
- (b) 2, 3 and 4 only
- (c) 1, 3 and 4 only
- (d) 1, 2, 3 and 4

75. Consider the following statements:

1. They can harvest water from the air.
2. They can remove polyfluoroalkyl substances from water.
3. They can facilitate safe storage of hydrogen.

How many of the above statements is/are applications of Metal-Organic Frameworks?

- (a) Only one
- (b) Only two
- (c) All three
- (d) None

76. Consider the following statements regarding the Hyperspectral Imaging Satellite:

1. It can provide information on which nutrients are missing from the soil.
2. It can also distinguish between different species and subspecies of crops.
3. It can be used to detect invisible leaks of compounds such as methane in oil and gas.

How many of these are actually possible through Hyperspectral Imaging Satellites?

- (a) Only one
- (b) Only two
- (c) All three
- (d) None

77. Which among the Launch vehicles uses the Cryogenic upper stage for its launch?

- (a) Launch Vehicle Mark-3
- (b) Polar Satellite Launch Vehicle
- (c) Reusable Launch Vehicle – Technology Demonstrator
- (d) Small Satellite Launch Vehicle

78. Consider the following statements:

**Statement I:**

Alkanes are hydrocarbons used as fuels.

**Statement II:**

On complete combustion, alkanes produce carbon dioxide and water along with the release of heat.

**Statement III:**

During incomplete combustion of alkanes with a lack of air, carbon black is formed.

Which one of the following is correct with respect to the above statements?

- (a) Both Statement II and Statement III are correct, and both explain Statement I
- (b) Both Statement II and Statement III are correct, but only one of them explains Statement I
- (c) Only one of the Statements II and III is correct, and that explains Statement I
- (d) Neither Statement II nor Statement III is correct

79. Consider the following statements:

- 1. The total linear momentum of a system of particles is constant if the total external force acting on the system is zero.
- 2. The internal force of particles does not affect the velocity of the centre of mass of the system if the external force on the system is zero.

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

80. Consider the following statements regarding Guillain-Barré Syndrome (GBS):

- I. It is an autoimmune disorder in which the body's immune system attacks the peripheral nervous system.
- II. Intravenous immunoglobulin (IVIG) therapy is one of the standard treatments for this syndrome.
- III. It spreads rapidly from person to person through respiratory droplets.

Which of the statements given above are correct?

- (a) I and II only
- (b) II and III only
- (c) I and III only
- (d) I, II and III

81. Which of the following best illustrates the role of friction?

- (a) A cyclist pedalling continuously to keep the cycle moving.
- (b) A swimmer floating on still water.
- (c) A magnet attracting iron filings.
- (d) An apple falling from a tree.

82. Consider the following statements regarding the PARAS-2 Spectrograph:

- I. It is an advanced astronomical instrument to detect and study exoplanets.
- II. It is primarily used for detecting gravitational waves from distant galaxies.
- III. It has been jointly developed by ISRO and the European Southern Observatory (ESO).

Which of the statements given above is/are correct?

- (a) I and III only
- (b) I only
- (c) II and III only
- (d) I, II and III

83. Consider the following statements:

**Statement I:**

The human eye can focus on objects at varying distances by adjusting the curvature of its lens.

**Statement II:**

The curvature of the cornea changes during this process to alter the focal length.

**Statement III:**

This process of changing the focal length of the lens is called accommodation.

Which of the following is correct with respect to the above statements?

- (a) Both Statement II and Statement III are correct, and both of them explain Statement I.
- (b) Both Statement II and Statement III are correct, but only one of them explains Statement I.
- (c) Only one of Statements II and III is correct, and that explains Statement I.
- (d) Neither Statement II nor Statement III is correct.

84. With reference to simple microscopes, consider the following statements:

- 1. It has a lens that acts as both the objective and the eyepiece.
- 2. It always uses a concave lens.
- 3. The magnifying power is higher when the focal length is shorter.

How many of the above statements is/are correct?

- (a) Only one
- (b) Only two
- (c) All three
- (d) None

85. Consider the following statements:

- 1. Gravitation is a strong force when the masses involved are small.
- 2. Gravitational force increases with altitude.
- 3. Gravitational force is stronger at the equator than at the poles.

How many of the above statements is/are correct?

- (a) Only one
- (b) Only two
- (c) All three
- (d) None

86. Hypo used in photography is chemically known as:

- (a) Silver bromide
- (b) Sodium phosphate
- (c) Sodium thiosulphate
- (d) Silver nitrate

87. With reference to deepfakes, consider the following statements:

- 1. It employs deep learning techniques.
- 2. It uses face-swapping technologies.
- 3. It is always created in the format of videos.
- 4. It can alter medical scans.

How many of the above statements is/are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

88. Consider the following statements:

1. Mission Fram2 is a geostationary orbit human spaceflight mission by the European Space Agency.
2. Geostationary satellites move around the Earth from west to east.
3. Telecommunication satellites are generally placed in geostationary orbit.

How many of the above statements is/are correct?

- (a) Only one
- (b) Only two
- (c) All three
- (d) None

89. With reference to Vyommitra, consider the following statements:

1. It is a humanoid robot developed by the Defence Research and Development Organisation.
2. It assists astronauts in microgravity experiments during space missions.
3. Its primary objective is to carry out autonomous lunar exploration in ISRO's upcoming space missions

Which of the statements given above is/are **not** correct?

- (a) 2 only
- (b) 1 and 3 only
- (c) 3 only
- (d) 1, 2 and 3

90. Consider the following statements about the 'Fibre optic drone' that was recently in the news:

1. It is a type of Unmanned Aerial Vehicle that operates while connected to the ground through a fibre optic tether.
2. The use of fibre optic cable makes it extremely difficult to detect and target such drones with some counter-unmanned aircraft systems (c-UAS).
3. Although connected by an optical cable, the fibre optic drone can operate independently without ground control.

Which of the statements given above are correct?

- (a) 1 and 2 only
- (b) 2 and 3 only
- (c) 1 and 3 only
- (d) 1, 2, and 3

91. Consider the following statements:

1. Satellite Internet Services delivers wireless internet connectivity through communication satellites deployed in both Low and Medium Earth Orbit.
2. India has traditionally relied on Geostationary Satellites (GSAT) of ISRO for satellite communication.
3. In India, the Department of Space regulates the provision of satellite-based communication.

How many of the statements given above is/are correct?

- (a) Only one
- (b) Only two
- (c) All three
- (d) None

92. Consider the following statements with reference to the Gaganyaan mission:

1. It aims to send a three-member crew to an orbit of about 400 km for three days.
2. The first uncrewed mission will not have the environmental control and life support systems, and will ensure an earth-like environment inside the module.
3. The Crew Escape System is designed to protect the crew in case of an emergency during launch, but it cannot be used during re-entry.

Which of the statements given above are correct?

- (a) 1 and 2 only
- (b) 2 and 3 only
- (c) 1 and 3 only
- (d) 1, 2 and 3

93. The voices of men, women and children differ because:

- (a) The shape of their lungs differs
- (b) Their vocal cords differ in length and thickness
- (c) Their eardrums vibrate differently under the same conditions
- (d) Their throats are of different sizes

94. Consider the following:

1. Solution
2. Colloids
3. Suspension

How many of the above mixtures can be seen with the naked eye?

- (a) Only one
- (b) Only two
- (c) All three
- (d) None

95. Match List-I with List-II and select the correct answer using the code given below the Lists:

|     | <b>List-I<br/>(Naturally<br/>occurring acid)</b> |    | <b>List-II<br/>(Main source)</b> |
|-----|--------------------------------------------------|----|----------------------------------|
| (A) | Methanoic acid                                   | 1. | Orange                           |
| (B) | Citric acid                                      | 2. | Tomato                           |
| (C) | Lactic acid                                      | 3. | Nettle sting                     |
| (D) | Oxalic acid                                      | 4. | Sour milk                        |

**Codes :**

- (a) A-3 B-1 C-4 D-2
- (b) A-2 B-4 C-1 D-3
- (c) A-3 B-4 C-1 D-2
- (d) A-2 B-1 C-4 D-3

96. Which one among the following statements about the Aqua regia is correct?

- (a) It's a mixture of concentrated Hydrochloric acid and concentrated nitric acid in the ratio of 3:1.
- (b) It is a reagent to dissolve gold and platinum.
- (c) It is a highly corrosive and fuming liquid
- (d) All the above statements are correct.

97. With reference to Chandrayaan-3 and Chandrayaan-2, consider the following statements:

- Both were placed in the lunar orbit using the Polar Satellite Launch Vehicle.
- Other than India, the USA and China are the only countries to have landed a spacecraft on the moon.
- Chandrayaan-3 made India the first country to land a spacecraft on the south pole region of the Moon.

How many of the above statements is/are correct?

- Only one
- Only two
- All three
- None

98. With reference to Mangalyaan (Mars Orbiter Mission), consider the following statements:

- It was India's first deep-space mission.
- It carried only three payloads, namely the Mars Colour Camera, the Thermal Infrared Imaging Spectrometer, and the Mars Exospheric Neutral Composition Analyser.

Which of the statements given above is/are correct?

- 1 only
- 2 only
- Both 1 and 2
- Neither 1 nor 2

99. Consider the following statements:

**Statement-I:**

The density of liquids is nearly constant at all pressures.

**Statement II:**

Liquids are incompressible.

Which of the following is correct in respect of the above statements?

- Both Statement-I and Statement-II are correct, and Statement-II is the correct Explanation for Statement-I.
- Both Statement-I and Statement-II are correct and Statement-II is not the correct Explanation for Statement-I
- Statement-I is correct but Statement-II is incorrect
- Statement-I is incorrect but Statement-II is correct

100. Consider the following pairs regarding Newton's Laws of Motion :

| S. no | Law        | Principle                                                           | Application                                              |
|-------|------------|---------------------------------------------------------------------|----------------------------------------------------------|
| 1.    | First law  | Law of inertia                                                      | Catching a fast-moving cricket ball                      |
| 2.    | Second law | The rate of change of momentum is proportional to the applied force | A passenger jerks backwards when the bus starts suddenly |
| 3.    | Third law  | Action and Reaction are equal and opposite                          | Recoil of a gun                                          |

How many of the rows given above is/are **not** correctly matched?

- Only one
- Only two
- All three
- None

**Science and Technology-I UPSC PYQ- Practice Questions**

1. GPS-Aided Geo Augmented Navigation (GAGAN) uses a system of ground stations to provide necessary augmentation. Which of the following statements is/are correct in respect of GAGAN? (2025)

- It is designed to provide additional accuracy and integrity.
- It will allow more uniform and high quality air traffic management.
- It will provide benefits only in aviation but not in other modes of transportation.

Select the correct answer using the code given below:

- I, II and III
- II and III only
- I only
- I and II only

2. Consider the following statements: (2025)

**Statement I** : Some rare earth elements are using in the manufacture of flat television, screens and computer monitors.

**Statement II** : Some rare earth elements have phosphorescent properties.

Which one of the following is correct in respect of the above statements?

- Both Statement I and Statement II are correct and Statement II explains Statement I
- Both Statement I and Statement II are correct but Statement II does not explain Statement I
- Statement I is correct but Statement II is not correct
- Statement I is not correct but Statement II is correct

3. With reference to "water vapour", which of the following statements is/are correct? (2024)

- It is a gas, the amount of which decreases with altitude.
- Its percentage is maximum at the poles.

Select the answer using the code given below:

- 1 only
- 2 only
- Both 1 and 2
- Neither 1 nor 2

4. With reference to perfluoroalkyl and polyfluoroalkyl substances (PFAS) that are used in making many consumer products, consider the following statements : (2024)

- PFAS are found to be widespread in drinking water, food and food packaging material.
- PFAS are not easily degraded in the environment.
- Persistent exposure to PFAS can lead to bioaccumulation in animal bodies.

Which of the statements given above are correct?

- 1 and 2 only
- 2 and 3 only
- 1 and 3 only
- 1, 2 and 3

5. Consider the following pairs: (2023)

| Objects in space |   | Description                                                                   |
|------------------|---|-------------------------------------------------------------------------------|
| 1. Cepheids      | - | Giant clouds of dust and gas in space                                         |
| 2. Nebulae       | - | Stars which brighten and dim periodically                                     |
| 3. Pulsars       | - | Neutron stars that are formed when massive stars run out of fuel and collapse |

How many of the above pairs are correctly matched?

- Only one
- Only two
- All three
- None

6. Consider the following statements: (2023)

- Ballistic missiles are jet-propelled at subsonic speeds throughout their fights, which cruise missiles are rocket-powered only in the initial phase of flight.
- Agni-V is a medium-range supersonic cruise missile, while Brahmos is a solid-fuelled intercontinental ballistic missile.

Which of the statements given above is/ are correct?

- 1 only
- 2 only
- Both 1 and 2
- Neither 1 nor 2

7. With reference to polyethylene terephthalate, the use of which is so widespread in our daily lives, consider the following statements: (2022)

- Its fibres can be blended with wool and cotton fibres to reinforce their properties.
- Containers made of it can be used to store any alcoholic beverage.
- Bottles made of it can be recycled into other products.
- Articles made of it can be easily disposed of by incineration without causing greenhouse gas emissions.

Which of the statements given above are correct?

- 1 and 3
- 2 and 4
- 1 and 4
- 2 and 3

8. Which one of the following is the context in which the term "qubit" is mentioned? (2022)

- Cloud Services
- Quantum Computing
- Visible Light Communication Technologies
- Wireless Communication Technologies

9. In a pressure cooker, the temperature at which the food is cooked depends mainly upon which of the following? (2021)

- Area of the hole in the lid
- Temperature of the flame
- Weight of the lid

Select the correct answer using the code given below:

- 1 and 2 only
- 2 and 3 only
- 1 and 3 only
- 1, 2 and 3

10. Water can dissolve more substances than any other liquid because: (2021)

- It is dipolar in nature
- It is a good conductor of heat
- It has high value of specific heat
- It is an oxide of hydrogen