1. Match the following Indian interplanetary missions with their target celestial bodies:  
   List–I — List–II  
   a. Chandrayaan-1 — 1. Moon  
   b. Mangalyaan (Mars Orbiter Mission) — 2. Mars  
   c. Aditya-L1 — 3. Sun  
   d. Shukrayaan (proposed) — 4. Venus  
   Select the correct answer using the codes given below.  
   (A) abcd → 1234  
   (B) abcd → 1243  
   (C) abcd → 1324  
   (D) abcd → 1342

Answer 51. (A) abcd → 1234

Explanation:

* Chandrayaan-1 was India’s first lunar mission; its target body was the Moon.
* Mangalyaan (MOM) targeted Mars to demonstrate interplanetary capability and study the Martian atmosphere.
* Aditya-L1 is India’s solar mission placed around L1 to study the Sun and space weather.
* Shukrayaan is the proposed Venus orbiter to study Venusian atmosphere and surface interactions.

1. Consider the following statements about nanotechnology regulation worldwide:  
   (i) There is a global uniform framework for nanomaterial safety standards.  
   (ii) Different countries follow varying standards and assessment protocols for nanomaterial safety.  
   (iii) Public awareness about nanotechnology risks and benefits is increasing globally.  
   (iv) India has drafted specific guidelines for nanomaterial safety and testing.  
   Which of the above are correct?  
   (A) (ii), (iii), and (iv) only  
   (B) (i) and (ii) only  
   (C) (i) and (iii) only  
   (D) All the statements are correct

Answer 52. (A) (ii), (iii), and (iv) only

Explanation:

* No single, globally uniform regulatory framework exists for nanomaterial safety; standards vary across jurisdictions.
* Many countries and blocs have their own assessment protocols, and public discourse on nano-risks/benefits has grown with wider applications.
* India has issued draft safety guidelines and best-practice documents for handling and testing nanomaterials under its Nano Mission initiatives.

1. The term "ITER" is derived from Latin meaning:  
   (A) Energy path  
   (B) The way or the path  
   (C) Nuclear experiment  
   (D) Fusion future

Answer 53. (B) The way or the path

Explanation:

* “Iter” in Latin denotes a journey, way, or path, which was adopted for the international fusion project’s acronym to reflect a pathway to fusion power.
* While ITER also stands as International Thermonuclear Experimental Reactor, its Latin sense is “the way/the path,” not “energy path” as a literal translation.

1. Consider the following about the biotechnological potentials of miRNA:  
   (i) miRNAs can be engineered to silence disease-causing genes.  
   (ii) miRNA-based therapeutics are currently widely approved for clinical use.  
   (iii) miRNAs can be delivered using viral and non-viral vectors as therapies.  
   (iv) miRNAs show potential for use in agricultural genetic improvements.  
   Which of the above statements are correct?  
   (A) (i), (iii), and (iv) only  
   (B) (ii) and (iii) only  
   (C) (i) and (ii) only  
   (D) All of the above

Answer 54. (A) (i), (iii), and (iv) only

Explanation:

* Engineered miRNAs or miRNA mimics/inhibitors can downregulate specific targets for disease intervention.
* Delivery platforms include viral vectors (e.g., AAV, lentiviral) and non-viral systems (lipid nanoparticles, polymers), enabling therapeutic applications.
* In crops, miRNA modulation is explored to enhance stress tolerance, yield, and disease resistance.
* Widespread clinical approvals are not yet in place; the field is advancing with trials but is not “widely approved.”

1. Which of the following prestigious awards did Satyendra Nath Bose NOT receive during his lifetime?  
   (A) Padma Vibhushan  
   (B) Bharat Ratna  
   (C) Fellow of the Royal Society  
   (D) None of the above

Answer 55. (B) Bharat Ratna

Explanation:

* S. N. Bose received the Padma Vibhushan and was elected a Fellow of the Royal Society during his lifetime.
* He was not awarded the Bharat Ratna.

1. Consider the following statements regarding the James Webb Space Telescope (JWST):  
   (i) JWST is a space observatory launched to study the early universe.  
   (ii) It operates primarily in infrared wavelengths.  
   (iii) JWST’s primary mirror is smaller than that of the Hubble Space Telescope.  
   (iv) It was launched in the early 2020s.  
   Which of the above statements are correct?  
   (A) (i), (ii), and (iv) only  
   (B) (ii) and (iii) only  
   (C) (i) and (iii) only  
   (D) All the statements are correct

Answer 56. (A) (i), (ii), and (iv) only

Explanation:

* JWST’s science goals include probing the early universe and formation of first galaxies/stars.
* It observes primarily in the infrared spectrum using a large segmented mirror and sunshield.
* Its primary mirror (6.5 m) is larger, not smaller, than Hubble’s 2.4 m mirror.
* It was launched in late 2021, i.e., early 2020s.

1. In relative motion, if a person walks inside a moving train in the direction opposite to the train’s motion, the person’s velocity relative to the ground will be:  
   (A) Sum of the velocity of train and person  
   (B) Difference of the velocity of train and person  
   (C) Equal to the velocity of the train  
   (D) Negative of the velocity of the train

Answer 57. (B) Difference of the velocity of train and person

Explanation:

* Taking the train’s velocity as v and the person’s walking speed as u opposite to the train’s motion, ground-frame velocity is v − u in the train’s forward direction.
* If the person walks fast enough, the resultant could reduce to zero or even reverse direction; generically it is the vector difference.

1. The property of a liquid that causes it to resist external force and regain its original shape is:  
   (A) Cohesion  
   (B) Adhesion  
   (C) Surface tension  
   (D) Elasticity

Answer 58. (C) Surface tension

Explanation:

* Surface tension arises from cohesive forces at the liquid surface, leading to resistance to external deformation and a tendency to minimize surface area.
* Cohesion is molecular attraction within the liquid; adhesion is attraction to other materials; elasticity, in strict terms, applies to solids.

1. Match the following Assamese critics/literary historians with their contributions:  
   a. Hiren Gohain | 1. Marxist literary criticism in Assam  
   b. Birendra Kumar Bhattacharyya | 2. Mrityunjay and Sahitya Akademi Award  
   c. Satyendranath Sarma | 3. Assamese literary historiography (A History of Assamese Literature)  
   d. Bhabendra Nath Saikia | 4. Influential short stories and films  
   (A) abcd → 1 2 3 4  
   (B) abcd → 2 1 3 4  
   (C) abcd → 1 3 4 2  
   (D) abcd → 4 3 2 1

Answer 59. (A) abcd → 1 2 3 4

Explanation:

* Hiren Gohain is renowned for Marxist-inflected literary criticism and cultural analysis in Assam.
* Birendra Kumar Bhattacharyya authored Mrityunjay and received the Sahitya Akademi Award.
* Satyendranath Sarma produced key Assamese literary histories, including an authoritative history of Assamese literature.
* Bhabendra Nath Saikia is celebrated for enduring short stories and award-winning films.

1. The concept of ‘Leave No One Behind’ in the context of SDGs means:  
   (A) Prioritizing vulnerable and marginalized groups in development policies  
   (B) Ensuring universal access to education and healthcare  
   (C) Reducing inequalities within and among countries  
   (D) All of the above

Answer 60. (D) All of the above

Explanation:

* “Leave No One Behind” commits to targeting the poorest and most excluded first in development strategies.
* It implies universal access to essential services and opportunities.
* It encompasses equity-driven policies to reduce inequalities within countries and globally.