

DRDO CEPTAM-10 Memory Based Paper 1 (Held on 13 Nov 2022, Shift 1)

Q1. Select the correct pair from the following options.

- A. Object's resistance to change its state of motion-Gravitation
- B. Object's resistance to change its state of motion-Inertia
- C. Object's resistance to change its state of motion-Momentum
- D. Object's resistance to change its state of motion-Acceleration

Q2. Candela is the SI unit of which of the following base quantities?

- A. Length
- B. Mass
- C. Luminous intensity
- D. Temperature

Q3. The refractive index is related to:

- A. the frequency of light in two different media
- B. the dielectric polarizability of two media
- C. the speed of propagation of light in two different media
- D. the magnetic moment of two different media

Q4. The problem of myopia in human eye can be corrected by using:

- A. a convex lens of suitable power
- B. a convex mirror of suitable focal length
- C. a concave lens of suitable power
- D. a plain glass plate

Q5. An object of height 30 cm is placed in front of a concave lens and an image of height 10 cm is formed. The magnification of the lens is:

- A. 20
- B. $1/3$
- C. -20
- D. 3

Q6. An object is placed in front of a concave mirror at a point between its centre of curvature and focus. The image will be formed at:

- A. the focus
- B. the centre of curvature
- C. a point between the focus and the centre of curvature
- D. a point beyond the centre of curvature

Q7. The pH of human blood is between -

- A. 6.5-7
- B. 7.35-7.45
- C. 8-9
- D. 4.5-5

Q8. Which of the following is not the fungal disease of the plant?

- A. Citrus canker
 - B. Damping off seedling
 - C. Rust of wheat
 - D. Red Rot of sugarcane
-

Q9. Which of the following muscles regulates the exit of food from the stomach into the small intestine?

- A. Gastrocnemius
 - B. Pectoralis
 - C. Rectus
 - D. Sphincter
-

Q10. The *Ficus religiosa* is commonly known as the ____ tree in India.

- A. Babool
 - B. Sal
 - C. Peepal
 - D. Neem
-

Q11. Galvanisation is a method of protecting iron from rusting by coating it with a thin layer of-

- A. Copper
 - B. Zinc
 - C. Silver
 - D. Aluminium
-

Q12. Lactic acid is a:

- A. Two-carbon molecule
 - B. One-carbon molecule
 - C. Four-carbon molecule
 - D. Three-carbon molecule
-

Q13. Match the following:

Natural source Acid

i. Vinegar a. Oxalic acid

ii. Tomato b. Citric acid

iii. Orange c. Acetic acid

- A. i-c, ii-a, iii-b
- B. i-a, ii-b, iii-c
- C. i-c, ii-b, iii-a
- D. i-a, ii-c, iii-b

Q14. Which is a colourless, odourless gas of the alkane series of hydrocarbons with a chemical formula of C_3H_8 ?

- A. Propane
- B. Pentane
- C. Ethane
- D. Butane

Q15. Which of the following groups of metals are so soft that they can be cut with a knife and have low densities and low melting points?

- A. Arsenic, Antimony, Bismuth
- B. Beryllium, Calcium, Magnesium
- C. Germanium, Galium, Indium
- D. Lithium, Sodium, Potassium

Q16. _____ is the property of attracting electrons by the halogen atoms in a molecule.

- A. Electron affinity
- B. Electrophilicity
- C. Electrochemistry
- D. Electronegativity

Q17. Which of the following vessels carries blood away from the heart to various organs of the body, except the lungs?

- A. Pulmonary artery
- B. Aorta
- C. Pulmonary vein
- D. Vena cava

Q18. What is the speed v of an athlete, if the athlete takes t seconds to go once around a circular path of radius r ?

A.

$$v = 2\pi r/t$$

B. $v = 2 \text{ m/s}$

C. $v = 0$

D.

$$v = \pi r^2/t$$

Q19. Which of the following are Mechanical waves?

- A. X rays
- B. Radio waves
- C. Microwaves
- D. Sound waves

Q20. Which one is NOT true with electromagnets?

- A. It is a temporary magnet.

- B. Its strength varies with the air gap between its poles.
 - C. Polarity cannot be changed
 - D. Its strength can be changed.
- o

Q21. Which of the following correctly expresses the relationship between power, force, time and distance?

- A. $P = F/d \times t$
- B. $P = F \times t/d$
- C. $P = F \times d \times t$
- D. $P = F \times d/t$

Q22. What is the position of the image formed by a concave mirror when the object is placed at the centre of curvature of that spherical mirror?

- A. At Infinity
- B. Between Infinity and the centre of curvature
- C. At focus
- D. At the centre of curvature

Q23. Rays of the Sun converge at a point of 30 cm in front of a concave mirror. Where should the object be placed so that the size of the image is equal to the size of the object?

- A. 60 cm in front of the mirror
- B. Between 30 and 60 cm in front of the mirror
- C. More than 30 cm in front of the mirror
- D. 30 cm in front of the mirror

Q24. Two resistors of 2Ω each are connected in series to a battery of 4 V . The current in Ampere flowing through the resistors will be:

- A. $1/2$
- B. 1
- C. 4
- D. 2

Q25. In which country was the '2025 Para Archery Asia Cup' held?

- A. India
- B. South Korea
- C. Thailand
- D. Indonesia

Q26. What critical issue does the Global Forest Vision 2025 highlight regarding global deforestation trends in 2023?

- A. Only 10 governments have pledged to reduce deforestation by 2030
- B. Deforestation was completely halted worldwide in 2023
- C. Despite commitments, 6.37 million hectares of forests were lost in 2023
- D. Forest loss in 2023 was solely due to natural disasters

Q27. Which countries are members of BIMSTEC?

- A. Bangladesh, Bhutan, India, Pakistan, Nepal, Sri Lanka, Thailand
 - B. Bangladesh, Bhutan, India, Myanmar, Maldives, Sri Lanka, Thailand
 - C. Bangladesh, Bhutan, India, Myanmar, Nepal, Sri Lanka, Thailand
 - D. Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, Sri Lanka
-

Q28. What is the new role of Amitabh Kant after stepping down from his position as India's G20 Sherpa?

- A. CEO of NITI Aayog
 - B. Senior Adviser at Fairfax Financial Holdings
 - C. Chief Economic Adviser to the Government of India
 - D. Director at the World Bank
-

Q29. Which is the largest island in the Chagos Archipelago?

- A. Peros Banhos
 - B. Diego Garcia
 - C. Eagle Islands
 - D. Nelson Island
-

Q30. In which naval operation INS Jalashwa and INS Magar participated in May 2020?

- A. Operation Samudra Setu
 - B. Operation Vanilla
 - C. Mission Sagar
 - D. Mission Rahat
-

Q31. Who took the oath as the 23rd Governor of Kerala on January 2, 2025?

- A. Arif Mohammed Khan
 - B. T. Ravi
 - C. Rajendra Vishwanath Arlekar
 - D. Anandiben Patel
-

Q32. Which organisation launched "Project Gaja-Lok: Elephant Lands and their Cultural Symbolism in Asia" in November 2025?

- A. Archaeological Survey of India
 - B. INTACH
 - C. Ministry of Environment, Forest & Climate Change
 - D. WWF-India
-

Q33. Which team won the Laureus World Team of the Year award at the 2025 Laureus World Sports Awards?

- A. Argentina National Football Team
 - B. Manchester City
 - C. Real Madrid
 - D. South Africa Rugby Team
-

Q34. The India-UK Joint Military Exercise 'AJEYA WARRIOR-25' began on which date in 2025?

- A. 15 November 2025
- B. 17 November 2025

-
- C. 20 November 2025
 - D. 30 November 2025
-

Q35. Which facility was virtually inaugurated by Prime Minister Narendra Modi on 26 November 2025 as India's first global aircraft engine MRO centre built by Safran?

- A. Skyroot Infinity Campus
 - B. Vikram-I Launch Complex
 - C. SAESI at GMR Aerospace & Industrial Park
 - D. HAL Engine Overhaul Centre, Bengaluru
-

Q36. Which satellite will be launched by India's first commercially built PSLV (PSLV-N1) in 2026?

- A. Cartosat
 - B. Oceansat
 - C. RISAT
 - D. GSAT-6
-

Q37. The famous Konark Sun Temple is attributed to:

- A. King Rajaraja Chola
 - B. King Raghunath Singha
 - C. King Ashoka
 - D. King Narasimhadeva I
-

Q38. The paintings in the Bagh caves belong to which of the following periods?

- A. Maurya
 - B. Maukhari
 - C. Chola
 - D. Gupta
-

Q39. The ____ were known as amara-nayakas in the Vijayanagar empire.

- A. peasants
 - B. traders
 - C. military commanders
 - D. craft persons
-

Q40. Which of the following is NOT a key role or duty of the Chief Justice of India (CJI)?

- A. Appointing Officers and Servants of the Supreme Court under Article 146
 - B. Acting as Chairperson of the Search-cum-Selection-Committee for statutory bodies
 - C. Exercising the power of 'Master of the Roster' to allocate cases to benches
 - D. Declaring laws unconstitutional directly through an executive order
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Q41. Which of the following statements is correct?

- A. The Speaker of the Lok Sabha presides over a joint sitting of the two Houses of Parliament.
 - B. The Prime Minister presides over a joint sitting of the two Houses of Parliament.
 - C. The Chairman of the Rajya Sabha presides over a joint sitting of the two Houses of Parliament.
 - D. The Home Minister presides over a joint sitting of the two Houses of Parliament.
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Q42. Which of the following articles of the Indian Constitution empowers each House of the Parliament to make rules for regulations, subject to the provisions of this Constitution, its procedure and the conduct of its business?

- A. Article 118(1)
- B. Article 118(2)
- C. Article 118(4)
- D. Article 118(3)

Q43. According to Article 151 of the Indian Constitution, where are the audit reports of the Comptroller and Auditor General (CAG) submitted?

- A. Union audit reports are submitted to the Prime Minister, and State audit reports are submitted to the Chief Minister.
- B. Union audit reports are submitted to the President, and State audit reports are submitted to the Governor.
- C. Union audit reports are submitted to the Speaker, and State audit reports are submitted to the Chief Justice.
- D. Union audit reports are submitted to the Parliament, and State audit reports are submitted to the Legislature.

Q44. Which of the following groups is most hurt by unexpected inflation?

- A. Homeowners
- B. People with large debts to pay for their homes and cars
- C. People with large retirement savings held in savings accounts
- D. Workers with cost-of-living adjustments in their labour contracts

Q45. Direct Tax reforms have been part of India's fiscal consolidation strategy. Which committee recommended the simplification of direct taxes in post-liberalisation India?

- A. Tarapore Committee
- B. Dutt Committee
- C. Narasimham Committee
- D. Kelkar Committee

Q46. _____ is the integrated approach to study soil as a collection of natural bodies.

- A. Pedology
- B. Ecology
- C. Serology
- D. Oenology

Q47. Kumudini Rajnikant Lakhia, awarded the Padma Vibhushan in 2025, belongs to which Indian state?

- A. Tamil Nadu
- B. Karnataka
- C. Haryana
- D. Gujarat

Q48. India signed a Rs 7,995 crore follow-on support deal with the United States in November 2025 for which naval helicopter fleet?

-
- A. Ka-31 Helix
 - B. MH-60R Seahawk
 - C. Sea King Mk-42B
 - D. ALH Dhruv Mk-III
-

Q49. Select the most appropriate option to fill in the blank.

Dushasana is notorious ___ his bad deeds.

- A. of
 - B. for
 - C. about
 - D. over
-

Q50. Select the most appropriate option to fill in the blank.

While his interest in board games began to ____, a passion for badminton developed.

- A. wane
 - B. vein
 - C. wain
 - D. vain
-

Q51. Choose the antonym of 'meticulous':

- A. Negligent
 - B. Thorough
 - C. Precise
 - D. Careful
-

Q52. Choose the antonym of 'imitate':

- A. Replicate
 - B. Copy
 - C. Innovate
 - D. Echo
-

Q53. Select the most appropriate ANTONYM of the given word.

Flexible

- A. Obstinate
 - B. Snobbish
 - C. Hysterical
 - D. Staunch
-

Q54. Which of the following has the correct spelling?

- A. Connisseeur
 - B. Conoisseeur
 - C. Connoisseur
 - D. Connoissur
-

Q55. Select the option that can be used as a one-word substitute for the highlighted group of words.

Manoj wants to learn the analysis of handwriting when he grows up.

-
- A. lithography
 - B. etiology
 - C. calligraphy
 - D. graphology
-

Q56. Select the correct passive voice of the given sentence.
The vendor is selling onions on a cart.

- A. Onions were being sold by the vendor on a cart.
 - B. Onions are sold by the vendor on a cart.
 - C. Onions are being sold by the vendor on a cart.
 - D. Onions are selling by the vendor on a cart.
-

Q57. Select the correct indirect narration of the given sentence.
Sagarika said, "I have passed my examination."

- A. Sagarika said that she have passed her examination.
 - B. Sagarika said that I have passed my examination.
 - C. Sagarika said that I had passed my examination.
 - D. Sagarika said that she had passed her examination.
-

Q58. Select the correct active form of the given sentence.
You are requested to leave your phones at the reception.

- A. Please requesting leave your phones at the reception.
 - B. Please leave your phones at the reception.
 - C. Please left your phones at the reception.
 - D. Please leaving your phones at the reception.
-

Q59. Select the most appropriate meaning of the given idiom.
Old hat

- A. A superstitious person
 - B. A crazy person
 - C. An anxious person
 - D. An outdated person
-

Q60. Select the correctly spelt word.

- A. Assembly
 - B. Asembly
 - C. Asemmbly
 - D. Assemmbly
-

Q61. Select the INCORRECTLY spelt word.

- A. Referred
 - B. Occurrence
 - C. Acknowledgment
 - D. Acomodation
-

Q62. Select the most appropriate phrasal verb to fill in the blank.

The firemen had to _____ the door to get into the burning house.

- A. break out
- B. break in
- C. break down
- D. break away

Q63. Select the correct direct narration of the given sentence.

The doctor said that he would not be able to make any home visits during that week.

- A. The doctor said, "He will not be able to make any home visits during this week."
- B. The doctor said, "I will not be able to make any home visits during that week."
- C. The doctor said, "I would not be able to make any home visits during that week."
- D. The doctor said, "I will not be able to make any home visits during this week."

Q64. Select the correct passive form of the given sentence.

He can afford a new car now.

- A. A new car can be afforded by him now.
- B. A new car is afforded by him now.
- C. A new car will be afforded by him now.
- D. A new car is being afforded by him now.

Q65. Select the synonym of Loathe.

- A. Accept
- B. Like
- C. Hate
- D. Love

Q66. Select the correct indirect narration of the given sentence.

Pallavi said, "I am going to bake a sponge cake tomorrow."

- A. Pallavi said that I will bake a sponge cake the next day.
- B. Pallavi said that she would be baking a sponge cake tomorrow.
- C. Pallavi said that she is going to bake a sponge cake tomorrow.
- D. Pallavi said that she was going to bake a sponge cake the next day.

Q67. Select the most appropriate ANTONYM of the highlighted word in the given sentence.

She is found to pass derogatory remarks to others.

- A. cunning
- B. appreciative
- C. critical
- D. sarcastic

Q68. In the given passage, 'when words fail' means:

Read the given passage and answer the questions that follow.

'War is what happens when words fail' says Margaret Atwood. After war what remains is only unimaginable damage. The innocent lives, livestock and property of citizens will be lost filling every spot with bloodshed and misery. It takes decades to normalise the psychological terrors of the victims of war. The consequences, in one form or the other, will bring bitterness even to the rest of the world. So, it is the responsibility of a nation's leader to protect his/her own people from the bitter wars. Impactful leadership, commitment to provide peace

and comfort to the citizens, diplomatic strength and awareness of happenings around the world and neighbourhood are essential to any nation's leader. Nowadays, one who wins the battlefield is not the winner, in fact he is the first loser. One who endeavours to prevent war is a real hero. The nations of the modern world are in need of real heroes. So, the words 'bravery', 'tactics', and 'generalship' should be used for those who sacrifice anything for protecting his nation, other nations and mother earth from devastating results of war.

- A. when a leader's English skills are not good
- B. when discussions are not fruitful
- C. if a leader failed in a language paper during his education
- D. when severe words are not used in the argument

Q69. Which of the following summarises the passage?

Read the given passage and answer the questions that follow.

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- A. Leadership is proved during war time.
- B. Weaponry should be prioritised.
- C. Physical loss is greater than psychological fears.
- D. A warless world is peaceful.

Q70. Select the ANTONYM of the word 'endeavour'.

Read the given passage and answer the questions that follow.

'War is what happens when words fail' says Margaret Atwood. After war what remains is only unimaginable damage. The innocent lives, livestock and property of citizens will be lost filling every spot with bloodshed and misery. It takes decades to normalise the psychological terrors of the victims of war. The consequences, in one form or the other, will bring bitterness even to the rest of the world. So, it is the responsibility of a nation's leader to protect his/her own people from the bitter wars. Impactful leadership, commitment to provide peace and comfort to the citizens, diplomatic strength and awareness of happenings around the world and neighbourhood are essential to any nation's leader. Nowadays, one who wins the battlefield is not the winner, in fact he is the first loser. One who endeavours to prevent war is a real hero. The nations of the modern world are in need of real heroes. So, the words 'bravery', 'tactics', and 'generalship' should be used for those who sacrifice anything for protecting his nation, other nations and mother earth from devastating results of war.

- A. Idleness
- B. Readiness
- C. Selflessness
- D. Effort

Q71. According to the passage, a nation's hero is one who:

Read the given passage and answer the questions that follow.

'War is what happens when words fail' says Margaret Atwood. After war what remains is only unimaginable damage. The innocent lives, livestock and property of citizens will be lost filling every spot with bloodshed and misery. It takes decades to normalise the psychological terrors of the victims of war. The consequences, in one form or the other, will bring bitterness even to the rest of the world. So, it is the responsibility of a nation's

leader to protect his/her own people from the bitter wars. Impactful leadership, commitment to provide peace and comfort to the citizens, diplomatic strength and awareness of happenings around the world and neighbourhood are essential to any nation's leader. Nowadays, one who wins the battlefield is not the winner, in fact he is the first loser. One who endeavours to prevent war is a real hero. The nations of the modern world are in need of real heroes. So, the words 'bravery', 'tactics', and 'generalship' should be used for those who sacrifice anything for protecting his nation, other nations and mother earth from devastating results of war.

- A. prevents war
- B. uses battlefield tactics
- C. shows warriorship in war
- D. is the winner of war

Q72. Which of the following is NOT expressed by the writer in the passage?

Read the given passage and answer the questions that follow.

'War is what happens when words fail' says Margaret Atwood. After war what remains is only unimaginable damage. The innocent lives, livestock and property of citizens will be lost filling every spot with bloodshed and misery. It takes decades to normalise the psychological terrors of the victims of war. The consequences, in one form or the other, will bring bitterness even to the rest of the world. So, it is the responsibility of a nation's leader to protect his/her own people from the bitter wars. Impactful leadership, commitment to provide peace and comfort to the citizens, diplomatic strength and awareness of happenings around the world and neighbourhood are essential to any nation's leader. Nowadays, one who wins the battlefield is not the winner, in fact he is the first loser. One who endeavours to prevent war is a real hero. The nations of the modern world are in need of real heroes. So, the words 'bravery', 'tactics', and 'generalship' should be used for those who sacrifice anything for protecting his nation, other nations and mother earth from devastating results of war.

- A. People lose lives in war.
- B. The modern world needs heroes.
- C. Sometimes war is essential.
- D. War damages the earth.

Q73. Aryan takes 12 hours to mow a large lawn. He and Arman together can mow it in 7 hours. How long will Arman take to mow the lawn if he works alone?

- A. 16 hours 45 minutes
- B. 16 hours 48 minutes
- C. 16 hours 40 minutes
- D. 16 hours 36 minutes

Q74. If A is an acute angle, then

$$\frac{(1 + \tan^2 A)}{(1 + \cot^2 A)}$$

is equal to:

- A. $\sec^2 A$
- B. $\tan^2 A$
- C. $\sin^2 A$
- D. $\cos^2 A$

Q75. The distance between the points (0, 3) and (-3, 0) is :

- A. 3 units
- B. $3\sqrt{2}$ units
- C. 6 units
- D. $2\sqrt{3}$ units

Q76.

$$\frac{1}{3}$$

of 40% of a number is equal to

$$\frac{1}{5}$$

of 30% of another number. What is the respective ratio of the first number to the second number?

- A. 4 : 9
- B. 4 : 15
- C. 9 : 20
- D. 3 : 5

Q77. The length of each of the two equal sides of an isosceles triangle is 5 cm each and the length of its base is 8 cm. The area (in cm^2) of the triangle is:

- A. 15
- B. 9
- C. 18
- D. 12

Q78. What is the sum of the solutions of the equation $2y^2 - 6y - 7 = 0$?

A.

$$-\frac{7}{2}$$

- B. -3
- C. 3
- D.

$$\frac{7}{2}$$

Q79. Evaluate: $2 \tan^2 45^\circ + \cos^2 30^\circ - \sin^2 60^\circ$

- A. $\frac{1}{2}$
- B. 2
- C. 0
- D. 1

Q80. A card is drawn from the set of 52 cards. Find the probability of getting a queen card.

- A. $\frac{1}{26}$
- B. $\frac{1}{13}$
- C. $\frac{4}{53}$
- D. $\frac{4}{13}$

Q81. Two dice are thrown. The probability of getting the sum more than 10 is –

- A. $\frac{1}{18}$
- B. $\frac{1}{12}$
- C. $\frac{1}{6}$
- D. $\frac{1}{4}$

Q82. ABC is a right-angled triangle. If the lengths of two sides containing the right angle are 4 cm and 3 cm, the radius of its incircle is:

- A. 4 cm
- B. 2 cm
- C. 1 cm
- D. 3 cm

Q83. The ratio of sugar and salt in a mixture is 5 : 6. After addition of 500 grams sugar the ratio changes to 7 : 8. What is the quantity of salt in the new mixture?

- A. 12.5 kg
- B. 10 kg
- C. 10.5 kg
- D. 12 kg

Q84. In a collection of rare coins, there is one gold coin for every four non-gold coins. If 20 more gold coins are added to the collection, the ratio of the number of gold coins to that of non-gold coins will be 2:3. The total number of coins in the collection will now become _____.

- A. 80
- B. 60
- C. 100
- D. 48

Q85. The roots of the equation $9(x + 9)^2 = 441$ are:

- A. 2,16
- B. 12,21
- C. -12,-21
- D. -2,-16

Q86. In a certain time, a sum becomes 4 times of itself on simple interest at the rate of 10% per annum. What is the rate of interest if the same sum becomes 7 times of itself in the same duration?

- A. 20%
- B. 15%
- C. 10%
- D. 5%

Q87. If the sum of the squares of two positive numbers is 2426 and the square root of one number is 7, then the other number is:

- A. 6
- B. 4
- C. 5
- D. 8

Q88. Evaluate: $41 - [21 - \{11 - (16 - 4 \div 2 \times 3)\}]$

- A. 21
- B. 16
- C. 18
- D. 23

Q89. A man sold a pen for Rs 1526 at a loss of 30 percent. If he wants to make a profit of 40 percent, at what price should he sell the pen?

- A. Rs.3052

- B. Rs 3268
- C. Rs 3100
- D. Rs 3066

Q90. The average of the first 10 odd prime numbers is:

- A. 13.8
- B. 17
- C. 12.9
- D. 15.8

Q91. 8 years ago, the age of father was 27 years more than twice his son's age. After how many years, from now, will he be twice his son's age?

- A. 16
- B. 19
- C. 18
- D. 15

Q92. In a school, the number of boys and girls were in the ratio 5 : 7 . Eight more boys were admitted during the session. The new ratio of girls and boys is 1 : 1. In the beginning the difference between the number of boys and that of girls was:

- A. 10
- B. 12
- C. 02
- D. 08

Q93. A 60 m long train travels at a uniform speed of 72 km/hour. It passes non-stop along the 600 m platform of a wayside station. What is the elapsed time for the train to entirely clear the platform ?

- A. 30 seconds
- B. 31 seconds
- C. 32 seconds
- D. 33 seconds

Q94. In a division sum, the divisor is 14 times the quotient and 7 times the remainder. If the remainder is 34, then the dividend is:

- A. 4063
- B. 4080
- C. 4097
- D. 4114

Q95. In which quadrant a point (-4 , -5) is located.

- A. second
- B. fourth
- C. third
- D. first

Q96. A man is walking at a speed of 14 km/h. After every km, he takes rest for 7 minutes. How much time will he take to cover a distance of 7 km?

- A. $1\frac{1}{5}$ hours
- B. $2\frac{1}{3}$ hours

- C. $1\frac{1}{3}$ hours
D. $4\frac{1}{5}$ hours

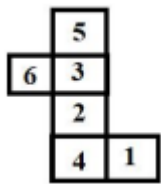
Q97. There are five friends U, V, W, X, and Y, sitting in a row facing North. U is to the left of V and W is to the right of X. X is sitting on the right of Y and he is the second person from the left. Who is the first from the right?

- A. W
B. Y
C. U
D. V

Q98. In a code language, 'TURTLE' is coded as SVUFMU and 'SPIDER' is coded as JQTSFE. How will 'PIGEON' be coded in the same language?

- A. QJQPOF
B. HKROPF
C. HTQPPF
D. HJQOPF

Q99. Which among the following options is a correct possibility if the given figure is folded to form a dice?



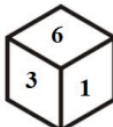
A.



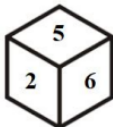
B.



C.



D.



Q100. Find the missing number in the series:

3, 8, 15, 24, __

- A. 30
B. 35
C. 36
D. 34

Q101. In a certain code language,
 $A + B$ means 'A is the daughter of B',
 $A - B$ means 'A is the wife of B',
 $A \times B$ means 'A is the father of B' and
 $A \div B$ means 'A is the brother of B'.
How is A related to S if ' $A + E - F \times N \div S$ '?

- A. Father's sister
- B. Mother's mother
- C. Father's mother
- D. Sister

Q102. What is the next term in the given series?
3, 2, 9, 8, 15, 14, ____

- A. 20
- B. 13
- C. 21
- D. 19

Q103. When seen through a mirror, a clock shows 8:30 as the time. The correct time is _____

- A. 4:30
- B. 1:30
- C. 7:30
- D. 3:30

Q104. Select the set in which the numbers are related in the same way as are the numbers of the following sets.
(NOTE: Operations should be performed on the whole numbers, without breaking down the numbers into its constituent digits. E.g. 13 – Operations on 13 such as adding/deleting/multiplying etc. to 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)

(31, 59, 40)

(56, 83, 39)

- A. (41, 74, 45)
- B. (38, 89, 42)
- C. (45, 90, 47)
- D. (29, 71, 42)

Q105. Find the angle between the hands at 3:30 p.m.

- A. 120°
- B. 90°
- C. 75°
- D. 105°

Q106. If North - East becomes North, then what will East Become?

- A. South - West
- B. South - East
- C. North - East
- D. North - West

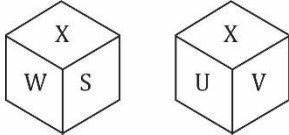
Q107. If the time in the mirror image of a 12-hour clock is 3:25, what is the actual time?

- A. 9:35
- B. 8:35
- C. 8:45
- D. 7:45

Q108. Five students - P, Q, R, S and T - are sitting in a circle facing the center. P is to the immediate right of Q. R is between P and S. Who is sitting to the immediate left of T?

- A. Q
- B. R
- C. S
- D. P

Q109. Six letters S, T, U, V, W and X are written on different faces of a dice. Two positions of this dice are shown in the given figures. Find the letter on the face opposite to V.



- A. W
- B. X
- C. S
- D. U

Q110. Pointing to a photograph, Neel says he is the son of the only daughter of the father of my sister. Whom is he pointing at?

- A. Nephew
- B. Friend
- C. Cousin
- D. Niece

Q111. Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statements.

Statements:

1. All bottles are ludo.
2. All ludo are dancer.

Conclusions:

- I. Some dancers are ludo.
- II. All bottles are dancers.

- A. Both conclusions I and II follow.
- B. Neither conclusion I nor II follows.
- C. Only conclusion II follows.
- D. Only conclusion I follows.

Q112. In this question, three statements are given, followed by two conclusions numbered I and II. Assuming the statements to be true, even if they seem to be at variance with commonly known facts, decide which of the conclusion(s) logically follow(s) from the statements:

Statements:

- All pistons are rubbers.
- Some rubbers are nuts.
- All nuts are callipers.

Conclusions:

- I. Some callipers are rubbers.
- II. All pistons are nuts.

- A. Only conclusion I follows.

- B. Both conclusions I and II follow.
- C. Only conclusion II follows.
- D. Neither conclusion I nor II follows.

Q113. In a system, if west becomes north-west, then what will north become?

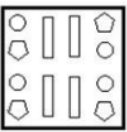
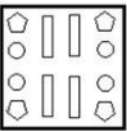
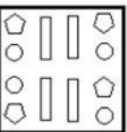
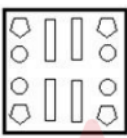
- A. South
- B. North-east
- C. East
- D. North - west

Q114. BEH, DGJ, (?), EJO, GLQ, INS,

- A. FLR
- B. FIS
- C. FKO
- D. FIL

Q115. The sequence of folding a piece of paper and the manner in which the folded paper is cut is shown in the following figures. How would this paper look when unfolded?

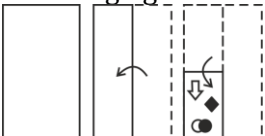


- A. 
- B. 
- C. 
- D. 

Q116. 'Ammeter' is related to 'Current' in the same way as 'Anemometer' is related to....

- A. Wind Speed
- B. Voltage
- C. Light
- D. Blood Pressure

Q117. The sequence of folding a paper and the manner in which the folded paper is cut is shown in the following figures. How would this paper look when unfolded?



- A.
- B.
- C.
- D.

Q118. Which of the following Venn diagram correctly refers to the given statement?
Star, Sun, Moon.

- A.
- B.
- C.
- D.

Q119. Select the option that is related to the third number in the same way as the second number is related to the first number.

5 : 125 :: 8 : ?

- A. 343
B. 612
C. 512
D. 725

Q120. Select the Venn diagram that best represents the relationship between the following classes:
Vegetable , Carrot , Potato

- A.
- B.
- C.
- D.

- A. A
B. B

- C. D
D. C

Solutions

1. Ans.(b)

Sol. Correct Answer: B) Object's resistance to change its state of motion - Inertia

Explanation:

An object's resistance to change its state of motion (whether at rest or in uniform motion) is known as inertia. This property is inherent in all matter due to its mass. The concept of inertia is fundamental to Newton's First Law of Motion, which states that an object will remain at rest or continue to move in a straight line with constant velocity unless acted upon by an external force.

Information Booster:

- Inertia is directly proportional to the mass of an object—the greater the mass, the higher the inertia.
 - Newton's First Law of Motion is also called the Law of Inertia.
 - Gravitation impacts all objects with mass, pulling them towards the Earth or other celestial bodies.
 - Momentum is a vector quantity and depends on both mass and velocity.
 - Acceleration is a result of applied force, as per Newton's Second Law.
- ❑ Gravitation : Refers to the force of attraction between two masses and is unrelated to an object's resistance to motion.
- ❑ Momentum : Refers to the quantity of motion an object possesses, calculated as the product of its mass and velocity, not its resistance to motion.
- ❑ Acceleration : Refers to the rate of change of velocity of an object, not its resistance to motion.

2. Ans.(c)

Sol. The correct answer is (c) Luminous intensity

Explanation:

- Candela (cd) is the SI unit of luminous intensity, which measures the perceived power of light emitted in a particular direction.
- It is one of the seven SI base units and is used in photometry.
- Definition: One candela is the luminous intensity, in a given direction, of a source that emits monochromatic radiation of frequency 540×10^{12} Hz and has a radiant intensity of 1/683 watt per steradian.

Information Booster:

- SI base units include meter (length), kilogram (mass), second (time), ampere (electric current), kelvin (temperature), mole (amount of substance), and candela (luminous intensity).
- Candela helps quantify light sources, bulbs, and LEDs.
- Luminous intensity is different from luminous flux (measured in lumens).
- The concept of candela was standardized in 1979 by the CGPM (General Conference on Weights and Measures).
- It is essential in fields like lighting design, photography, and vision science.

3. Ans.(c)

Sol. The correct answer is (C) the speed of propagation of light in two different media.

Explanation:

The refractive index (n) of a medium is defined as the ratio of the speed of light in vacuum (c) to the speed of light in the medium (v).

$$n = \frac{c}{v}$$

Information Booster:

- ❑ Refractive index determines how much light bends when it enters a new medium.
- ❑ Light travels fastest in vacuum, and its speed reduces in denser media, increasing the refractive index.

- ❑ Refractive index is dimensionless and always ≥ 1 .
- ❑ A higher refractive index means slower light speed in the medium.
- ❑ Common example: Refractive index of water ≈ 1.33 , glass ≈ 1.5 , diamond ≈ 2.42 .

4. Ans.(c)

Sol. The correct answer is (a) A concave lens of suitable power

Explanation:

- ❑ Myopia (Nearsightedness) is a vision defect where a person can see nearby objects clearly but has difficulty seeing distant objects.
- ❑ This occurs because the eyeball is too long, or the cornea is too curved, causing light rays to focus in front of the retina instead of directly on it.
- ❑ A concave lens is used to diverge the light rays before they enter the eye, shifting the focus back onto the retina, thereby correcting the defect.

Information Booster:

Other Common Eye Defects & Their Corrections:

| Eye Defect | Cause | Correction |
|--------------------------------|---|---|
| Myopia (Nearsightedness) | Image forms before the retina | Concave lens |
| Hypermetropia (Farsightedness) | Image forms behind the retina | Convex lens |
| Presbyopia | Age-related loss of flexibility in the eye lens | Bifocal lenses (Convex for reading, Concave for distance) |
| Astigmatism | Uneven corneal curvature | Cylindrical lenses |

5. Ans.(b)

Sol. The correct answer is: (B) $\frac{1}{3}$

Explanation:

The magnification (M) produced by a lens is given by the formula:

$$M = \frac{\text{Height of Image}}{\text{Height of Object}}$$

Given:

- ❑ Height of the object = 30 cm
- ❑ Height of the image = 10 cm

Substitute these values into the magnification formula:

$$M = \frac{10}{30} = \frac{1}{3}$$

Thus, the magnification produced by the concave lens is $\frac{1}{3}$.

Information Booster:

- ❑ A positive magnification means the image is upright, while a negative magnification means the image is inverted.

- ❑ Concave lenses produce virtual, diminished, and upright images.
- ❑ The magnification also relates to the object and image distances via the formula

$$M = \frac{v}{u}$$

, where v is the image distance and u is the object distance.

- ❑ In this case, since the magnification is positive, the image formed by the concave lens is virtual and upright.

6. Ans.(d)

Sol. The correct answer is (d) a point beyond the centre of curvature

Explanation:

- ❑ For a concave mirror:
 - Object at infinity \rightarrow image at focus (real, inverted, diminished).
 - Object at C (centre of curvature) \rightarrow image at C (real, inverted, same size).
 - Object between C and F (focus) \rightarrow image forms beyond C (real, inverted, enlarged).
 - Object at F \rightarrow image at infinity.
 - Object between F and pole (P) \rightarrow image forms behind the mirror (virtual, erect, magnified).

So, when the object is between centre of curvature (C) and focus (F), the image forms beyond C.

Information Booster:

- ❑ Concave mirror uses: shaving mirrors, dentist's mirrors, headlamps, telescopes.
- ❑ Rule of ray diagram (concave mirror):
 - Ray parallel to principal axis \rightarrow passes through focus.
 - Ray through centre of curvature \rightarrow retraces path.
 - Ray through focus \rightarrow emerges parallel to axis.
- ❑ Image nature in this case: real, inverted, magnified.

Concave mirrors can form both real and virtual images, unlike convex mirrors.

7. Ans.(b)

Sol. The correct answer is (b) 7.35–7.45.

The pH of human blood is typically maintained within a narrow range of 7.35 to 7.45, which is slightly basic. Here are some key points about the pH of blood:

- ❑ Blood pH: The normal pH range of human blood is critical for proper bodily functions. The body uses various systems, like the respiratory and urinary systems, to manage and maintain this pH within the optimal range.
- ❑ Importance of pH Balance: Maintaining the pH balance is crucial as it influences enzyme function and the overall metabolic processes in the body.
- ❑ Regulation Mechanisms: The body regulates pH using buffers—substances that help minimize changes in pH. The bicarbonate buffering system in blood is a primary example of how the body maintains pH levels.

8. Ans.(a)

- ❑ Sol:
- ❑ Citrus canker is not a fungal disease; instead, it is caused by bacteria
- Red rot is a fungal disease caused by the fungus *Colletotrichum falcatum*. It affects sugarcane plants, causing characteristic red discoloration of the internal vascular tissues. It can lead to stunted growth, reduced sugar content, and even death of the affected plants.
- Wheat rust is a fungal disease caused by various species of the *Puccinia* genus. It manifests as orange or reddish-brown pustules on the leaves, stems, and spikes of wheat plants, eventually leading to reduced yield and quality.
- Damping off is a fungal disease that affects seedlings, particularly those grown in damp and poorly ventilated conditions. It causes the seedlings to rot at the soil line, leading to their collapse and death.

9. Ans.(d)

Sol. The correct answer is (d) Sphincter.

The sphincter muscle that regulates the exit of food from the stomach into the small intestine is specifically called the pyloric sphincter. This is a ring-shaped muscle located at the junction of the stomach and the duodenum (the first part of the small intestine).

- ❑ After the food is partially digested in the stomach, it is converted into a semi-liquid substance called chyme.
- ❑ The pyloric sphincter controls the release of chyme into the small intestine in a regulated manner to allow for efficient digestion and nutrient absorption.
- ❑ It also prevents the backflow of intestinal contents into the stomach, ensuring a one-way flow of food.

Information Booster

- ❑ **Function of the Pyloric Sphincter:**
 - Regulates the flow of partially digested food from the stomach to the small intestine.
 - Prevents backflow of intestinal contents into the stomach.
- ❑ **Types of Sphincters in the Digestive System:**
 - Lower esophageal sphincter (LES): Prevents acid reflux into the esophagus.
 - Pyloric sphincter: Controls the flow of chyme into the small intestine.
 - Ileocecal valve: Regulates the passage from the small intestine to the large intestine.
 - Anal sphincter: Controls the expulsion of feces.
- ❑ **Disorders related to sphincters:**
 - Gastroesophageal reflux disease (GERD): Dysfunction of the LES, leading to acid reflux.
 - Pyloric stenosis: A condition where the pyloric sphincter becomes too narrow, causing vomiting and difficulty in food passage.

Additional Information

- ❑ **Gastrocnemius:**
 - A calf muscle involved in movements of the leg and foot.
 - Not related to digestion.
- ❑ **Pectoralis:**
 - A chest muscle that assists in movements of the arms.
 - Unrelated to the digestive system.
- ❑ **Rectus:**
 - Refers to rectus abdominis, a muscle in the abdominal region.
 - Plays a role in maintaining posture and flexing the spine but has no role in regulating food movement.

❑ 10. Ans.(c)

❑ Sol:

❑ The correct answer is: (C) Peepal

❑ Explanation:

- Ficus religiosa is commonly known as the Peepal tree in India.
- It is considered a sacred tree in Hinduism, Buddhism, and Jainism.
- The Peepal tree is known for its heart-shaped leaves with a long, tapering tip.
- It releases oxygen even during the night in small amounts due to *Crassulacean Acid Metabolism (CAM)*-like activity.
- The tree is often found near temples, monasteries, and public spaces due to its cultural and religious significance.
- ❑ **Information Booster:**
 - The Peepal tree is also known as the Sacred Fig.
 - Gautama Buddha is believed to have attained enlightenment under a Peepal tree (Bodhi tree) in Bodh Gaya.
 - In Ayurveda, its bark, leaves, and roots are used for treating asthma, diabetes, and skin disorders.
 - Ficus religiosa belongs to the Moraceae (mulberry) family.
 - Other common trees: Babool (*Acacia nilotica*), Sal (*Shorea robusta*), Neem (*Azadirachta indica*)—all distinct from Peepal.

11. Ans.(b)

Q Sol:

Q

Galvanisation is a method of protecting iron from rusting by coating it with a thin layer of Zinc. Zinc is more reactive than iron. This means it corrodes more easily than iron when exposed to oxygen and moisture (the culprits behind rust). The zinc coating acts as a physical barrier between the iron and the environment, preventing oxygen and moisture from reaching the iron surface. Even if the zinc coating gets scratched or damaged, it offers sacrificial protection. Zinc corrodes first, preventing the iron underneath from rusting. This is because zinc acts as a sacrificial anode, giving up electrons to the iron (cathode) and corroding preferentially.

12. Ans.(d)

Q Sol:

Q The correct answer is (d) Three-carbon molecule.

- Lactic acid, more commonly known as lactic acid, is a three-carbon molecule.
- The chemical formula for lactic acid is $C_3H_6O_3$.
- It has a hydroxyl group (OH) and a carboxyl group (COOH) attached to the carbon chain.
- Lactic acid is produced in the body during anaerobic respiration and is commonly found in sour milk products like yogurt and kefir.

Information Booster:

- Two-carbon molecule: Ethanol (C_2H_6O) and acetic acid ($C_2H_4O_2$) are examples of two-carbon molecules.
- One-carbon molecule: Methanol (CH_3OH) and formic acid (CH_2O_2) are examples of one-carbon molecules.
- Four-carbon molecule: Butyric acid ($C_4H_8O_2$) is an example of a four-carbon molecule.

13. Answer:A

Sol. Sol: The correct answer is (a) i-c, ii-a, iii-b

Key points:

- Q Vinegar contains acetic acid, commonly used as a preservative and flavor enhancer, and produced through ethanol fermentation.
- Q Tomato contains oxalic acid, found in small amounts, contributing to tartness and also present in spinach and rhubarb
- Q Orange contains citric acid, responsible for its tangy taste, used as a natural preservative, and essential in energy metabolism via the citric acid cycle, It is a key component in effervescent tablets (e.g., vitamin C supplements).

14. Ans.(a)

Sol. The correct answer is (a) Propane.

- Propane is a colorless, odorless gas that belongs to the alkane series of hydrocarbons.
- Its chemical formula is C_3H_8 , indicating that it consists of three carbon atoms and eight hydrogen atoms.
- It is commonly used as a fuel for heating, cooking, and in vehicles.

Additional Information:

- Propane is part of the family of saturated hydrocarbons known as alkanes, which are characterized by single bonds between carbon atoms. It is often stored and transported in a liquid state under pressure.
- Propane is found in natural gas and can also be produced through the refining of crude oil. It is commonly used in portable stoves, gas grills, and as a fuel for heating.

Other Options:

- Pentane: The chemical formula for pentane is C_5H_{12} , meaning it contains five carbon atoms and twelve hydrogen atoms. It is a liquid at room temperature and is not colorless and odorless in the same way propane is.
- Ethane: Ethane has the chemical formula C_2H_6 , containing two carbon atoms and six hydrogen atoms. While it is also colorless and odorless, it does not match the formula provided in the question.
- Butane: Butane, with the chemical formula C_4H_{10} , consists of four carbon atoms and ten hydrogen atoms. Like propane, it is also colorless and odorless, but it does not correspond to the formula C_3H_8 .

15. Ans.(d)

Sol. The correct answer is: (D) Lithium, Sodium, Potassium

Explanation:

- ❑ Lithium, Sodium, and Potassium are alkali metals found in Group 1 of the periodic table.
- ❑ These metals are extremely soft and can be easily cut with a knife.
- ❑ They have low densities (especially Lithium and Sodium) and low melting points compared to most other metals.

Information Booster:

- ❑ Alkali metals are highly reactive, especially with water.
- ❑ Stored under oil or kerosene to prevent reaction with air or moisture.
- ❑ Reactivity increases from Lithium → Potassium down the group.
- ❑ These metals form strong alkaline hydroxides in water.
- ❑ Commonly used in batteries, photoelectric cells, and heat transfer applications.

Additional Information:

- ❑ Arsenic, Antimony, Bismuth: Metalloids or post-transition metals; hard and brittle.
- ❑ Beryllium, Calcium, Magnesium: Alkaline earth metals (Group 2); harder than alkali metals.

Germanium, Gallium, Indium: Post-transition/metalloids; some are soft but not cuttable with a knife like alkali metals.

16. Ans.(d)

Sol. The correct answer is: (D) Electronegativity

Explanation:

- Electronegativity is the tendency of an atom to attract shared electrons towards itself in a chemical bond.
- Halogens (like Fluorine, Chlorine, Bromine, and Iodine) have high electronegativity due to their high nuclear charge and small atomic size.
- Among halogens, Fluorine is the most electronegative element in the periodic table.

Information Booster:

- Electronegativity is a dimensionless property.
- The most commonly used scale is the Pauling scale.
- Electronegativity generally increases across a period and decreases down a group.
- High electronegativity results in polar covalent bonds.
- Elements with low electronegativity (like metals) tend to lose electrons, while non-metals tend to gain or share electrons.

Additional Knowledge:

- Electron affinity: The energy released when an atom gains an electron.
- Electrophilicity: The tendency of a species to accept electrons (acts as an electron-pair acceptor).
- Electrochemistry: The study of chemical reactions involving the transfer of electrons.

17. Ans.(b)

Sol. The Correct Answer Is: (B) Aorta

Explanation:

The aorta is the largest artery in the human body and is responsible for carrying oxygenated blood away from the heart to various organs of the body, except the lungs.

It arises from the left ventricle of the heart and branches out to supply blood to all parts of the body through systemic circulation.

The aorta ensures that oxygen-rich blood reaches the brain, muscles, and other organs for their proper functioning. However, it does not carry blood to the lungs. Instead, the pulmonary artery carries deoxygenated blood to the lungs for oxygenation.

Information Booster:

- ❑ Arteries carry blood away from the heart, while veins carry blood toward the heart.

- ❑ The aorta originates from the left ventricle and supplies oxygenated blood to the body.
- ❑ The pulmonary artery is the only artery that carries deoxygenated blood, transporting it from the right ventricle to the lungs.
- ❑ The pulmonary vein is the only vein that carries oxygenated blood, bringing it from the lungs to the left atrium.
- ❑ The vena cava (superior and inferior) brings deoxygenated blood from the body back to the heart.

Additional Knowledge:

- ❑ Pulmonary Artery: Unlike other arteries, the pulmonary artery carries deoxygenated blood from the right ventricle to the lungs for oxygenation.
- ❑ Pulmonary Vein : This is the only vein that carries oxygenated blood. It brings oxygen-rich blood from the lungs to the left atrium of the heart.
- ❑ Vena Cava : The vena cava (superior and inferior) is a vein that brings deoxygenated blood from the body to the right atrium of the heart.

18. Ans.(a)

Sol. The correct answer is: (A)

$$v = \frac{2\pi r}{t}$$

Explanation:

To find the speed v of an athlete who takes t seconds to go once around a circular path of radius r , we use the following approach:

The total distance traveled in one complete revolution is the circumference of the circle, which is given by the formula:

$$C = 2\pi r$$

1. The speed v is defined as the distance traveled divided by the time taken. Since the athlete covers the circumference in t seconds, the speed v is:

$$v = \frac{\text{Distance}}{\text{Time}} = \frac{2\pi r}{t}$$

- ❑ The athlete is assumed to be moving with uniform speed along the path.
- ❑ The formula gives the constant speed for uniform circular motion.
- ❑ The unit of speed will be meters per second (m/s) if the radius r is in meters and time t is in seconds.

19. Ans.(d)

Sol. The correct answer is: (D) Sound waves

Explanation:

- Mechanical waves require a material medium (solid, liquid, or gas) for propagation.
- Sound waves are longitudinal mechanical waves that travel by compressions and rarefactions in the medium.
- In contrast, X-rays, radio waves, and microwaves are electromagnetic waves that do not require a medium and can travel through vacuum.

Information Booster:

- Examples of mechanical waves: sound waves, water waves, seismic waves.
- Examples of electromagnetic waves: radio, microwave, infrared, visible light, ultraviolet, X-rays, gamma rays.
- Mechanical waves are classified into:
 - ❑ Longitudinal waves (particles vibrate parallel to wave direction, e.g., sound).
 - ❑ Transverse waves (particles vibrate perpendicular to wave direction, e.g., water waves).

Additional Knowledge:

- Speed of sound in air at $25^\circ\text{C} \approx 343 \text{ m/s}$, while light (EM waves) travels at $\approx 3 \times 10^8 \text{ m/s}$ in vacuum.
- Sound cannot travel in vacuum; hence space is silent.
- Earthquakes produce seismic mechanical waves (P-waves = longitudinal, S-waves = transverse).
- EM waves transfer energy through oscillating electric and magnetic fields, while mechanical waves transfer energy through particle vibrations.

20. Ans.(c)

Sol. The correct answer is (C) Polarity cannot be changed.

Explanation

- ❑ An electromagnet's polarity can be easily changed by reversing the direction of the electric current flowing through its coil.
- ❑ This property makes electromagnets highly versatile and useful in various applications like motors and relays where switching magnetic poles is necessary.

Information Booster

- ❑ The direction of the magnetic field (and thus the poles) of a solenoid can be determined using the Right-Hand Rule: if you curl the fingers of your right hand in the direction of the current flow through the coil, your thumb will point towards the North pole.
- ❑ Reversing the direction of the current reverses the direction of the magnetic field and consequently the polarity.

Additional Knowledge

A. It is a temporary magnet:

- ❑ Electromagnets are indeed temporary magnets because they only produce a magnetic field when an electric current flows through the coil.
- ❑ When the current is switched off, the magnetism largely disappears, although some residual magnetism might remain.

B. Its strength varies with the air gap between its poles:

- ❑ The strength of an electromagnet is affected by the air gap in the magnetic circuit. A smaller air gap generally leads to a stronger magnetic field between the poles.
- ❑ Air has much lower permeability than ferromagnetic cores, so increasing the air gap increases reluctance and can weaken the effective field strength in that region, or delay saturation allowing for higher MMF .

D. Its strength can be changed:

- ❑ The strength of an electromagnet can be controlled and varied by adjusting several factors:
 - Increasing the electric current flowing through the coil.
 - Increasing the number of turns in the coil.

Using a ferromagnetic core (like soft iron) inside the coil, which significantly concentrates the magnetic flux.

21. Ans.(d)

Sol. The correct option is (D) $P = F \times d/t$.

Explanation:

The formula for power (P) is given by the rate at which work is done, which is the work done divided by the time taken. Work done (W) is the product of force (F) and distance (d), so power is:

$$P = \text{Work} / \text{Time} = (F \times d) / t.$$

This matches the equation $P = F \times d / t$.

Information Booster:

- ❑ Power is measured in Watts (W), where 1 Watt = 1 Joule per second.
- ❑ Work is the product of force and distance: $W = F \times d$.
- ❑ The unit of force is Newton (N), and the unit of distance is meter (m).
- ❑ The formula $P = F \times d / t$ represents how much energy is transferred over time.
- ❑ Power is a measure of the rate of doing work or transferring energy.
- ❑ Mechanical power applies to machines, engines, and systems that involve force and motion.

22. Ans.(d)

Sol. Correct Answer: (D) At the centre of curvature

Explanation:

- A concave mirror has a centre of curvature (C) and a focus (F).
- When an object is placed at the centre of curvature (C):

- o The image is formed at the centre of curvature (C) itself.
- o The image is real, inverted, and of the same size as the object.

Information Booster:

- Mirror Formula: $\frac{1}{f} = \frac{1}{v} + \frac{1}{u}$
 - o f = focal length, u = object distance, v = image distance
 - Special Cases:
 - o Object at infinity \rightarrow Image at focus (very small)
 - o Object beyond C \rightarrow Image between F and C
 - o Object at F \rightarrow Image at infinity
 - o Object between F and C \rightarrow Image beyond C, enlarged
- This is a fundamental property of concave mirrors in optics.

23. Ans.(a)

Sol. The correct answer is: (A) 60 cm in front of the mirror

Explanation:

- ❑ The question describes a concave mirror, which is a converging mirror.
- ❑ When parallel rays of sunlight converge at a point 30 cm in front of the concave mirror, this point is the focal point (F).
- ❑ To get an image with the same size as the object, the object must be placed at twice the focal length of the mirror, which is the center of curvature (C).
- ❑ The focal length (f) of the mirror is 30 cm, so the center of curvature (C) is at $2f = 60$ cm from the mirror.
- ❑ Therefore, the object should be placed 60 cm in front of the concave mirror to produce an image of the same size.

Information Booster:

- ❑ In a concave mirror, if the object is placed at $2f$ (twice the focal length), the image formed will be of same size as the object, and it will be real and inverted.
- ❑ The mirror formula is:

$$\frac{1}{f} = \frac{1}{v} + \frac{1}{u}$$

$$\frac{1}{f} = \frac{1}{v} + \frac{1}{u}$$

where f is the focal length, v is the image distance, and u is the object distance.

24. Ans.(b)

Sol. The correct answer is (b) 1

Explanation:

When two resistors are connected in series, the total resistance (R_{total}) is the sum of the individual resistances.

Given:

- ❑ Resistance of each resistor = $2\ \Omega$
- ❑ Battery voltage = 4 V
- ❑

$$R_{\text{total}} = 2\ \Omega + 2\ \Omega = 4\ \Omega$$

Now, we can calculate the current using Ohm's Law:

$$I = \frac{V}{R}$$

Where:

- ❑ I is the current in amperes,
- ❑ V is the voltage (4 V),
- ❑ R is the total resistance ($4\ \Omega$).

Substituting the values:

$$I = \frac{4V}{4\Omega} = 1A$$

So, the current flowing through the resistors is 1 Ampere.

Information Booster:

Series Connection: In a series connection, the current is the same through all components, and the total resistance is the sum of the individual resistances.

Ohm's Law: Ohm's Law states that the current (I) flowing through a conductor between two points is directly proportional to the voltage (V) across the two points and inversely proportional to the resistance (R) of the conductor.

$$I = \frac{V}{R}$$

25. Ans.(c)

Sol. Correct Answer. (c) Thailand

The 2025 Para Archery Asia Cup was held in Bangkok, Thailand, from February 2-11, 2025.

Information Booster:

- India topped the medal tally in the tournament.
- 27-member Indian Para Archery contingent participated.
- Total events: 11
- India won a total of 12 medals in the 2025 Para Archery Asia Cup: 6 Gold, 3 Silver, and 3 Bronze.

26. Ans.(c)

Sol. Ans. (c)

The Global Forest Vision 2025 underscores a stark reality: despite formal pledges by over 140 governments to end deforestation by 2030, 6.37 million hectares of forest were lost in 2023 alone. This loss reflects a significant gap between international commitments and actual implementation, revealing persistent drivers such as agricultural expansion, illegal logging, infrastructure development, and weak governance.

This alarming figure is a wake-up call to the global community, suggesting that current policy efforts and financial mechanisms are insufficient to meet the 2030 zero-deforestation target. The Forest Declaration Assessment urges urgent corrective action, including enforcing deforestation-free supply chains, supporting indigenous land rights, and increasing climate finance to forest-rich nations. The report also calls for stronger monitoring, transparency, and accountability from both public and private sectors.

Therefore, option (c) is correct as it accurately captures the scale of forest loss in 2023, despite widespread global commitments.

Information Booster

- Over 6.37 million hectares of forest were lost in 2023 globally.
- More than 140 countries have signed deforestation pledges.
- Major drivers: agriculture, mining, logging, and infrastructure.
- Forest loss continues in Brazil, Congo Basin, Southeast Asia, etc.
- Current efforts are off track to meet 2030 zero-deforestation goals.
- Calls for urgent global cooperation and policy enforcement.

Additional Knowledge

(a) Only 10 governments have pledged to reduce deforestation by 2030 – Incorrect. Over 140 countries, representing over 90% of global forest cover, committed to end forest loss under declarations like the Glasgow Leaders' Declaration (2021).

(b) Deforestation was completely halted worldwide in 2023 – Incorrect. Far from being halted, forest loss remains high, with the 2023 figure of 6.37 million hectares demonstrating significant ongoing degradation, particularly in tropical regions.

(c) Despite commitments, 6.37 million hectares of forests were lost in 2023 – Correct. This is the verified estimate released by the Forest Declaration Assessment, highlighting a failure to translate pledges into effective actions.

(d) Forest loss in 2023 was solely due to natural disasters – Incorrect. While wildfires and climate events contributed in some regions, the majority of deforestation is still human-driven, especially for agriculture, logging, and infrastructure development.

27. Ans.(c)

Sol. The correct answer is: (c) Bangladesh, Bhutan, India, Myanmar, Nepal, Sri Lanka, Thailand.

Explanation:

- BIMSTEC (Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation) is a regional organization comprising countries from South Asia and Southeast Asia.
- It includes Bangladesh, Bhutan, India, Myanmar, Nepal, Sri Lanka, and Thailand. These seven countries collaborate on various sectors such as trade, technology, and environmental sustainability.

Information Booster:

- Pakistan and Maldives: Neither Pakistan nor Maldives is a member of BIMSTEC.
- BIMSTEC's Purpose: The main objective of BIMSTEC is to enhance regional connectivity and cooperation among member countries in multiple areas like trade, energy, tourism, and agriculture.

Additional Knowledge:

- BIMSTEC was established in 1997 and serves as a bridge between South Asia and Southeast Asia.

28. Ans.(b)

Sol. The correct answer is (b) Senior Adviser at Fairfax Financial Holdings.

- ❑ Amitabh Kant, who served as India's G20 Sherpa and CEO of NITI Aayog, has been appointed as the Senior Adviser to Fairfax Financial Holdings Ltd, a Canadian investment firm.
- ❑ His new role aims to support Fairfax's long-term investment strategies in India, particularly aligning with the country's ambitious Viksit Bharat 2047 vision, focusing on sectors like urbanization, digital infrastructure, and sustainability.

Additional Facts:

- ❑ Fairfax Financial is a leading Canadian investment firm, known for its subsidiaries in insurance, reinsurance, and investment management.
- ❑ Kant's leadership in initiatives like Startup India, Make in India, and Digital India is expected to strengthen Fairfax's India-focused growth strategy.
- ❑ His deep understanding of India's development trajectory and government policy will act as a bridge between the private sector and government initiatives in India.

29. Ans.(b)

❑ Sol:

❑ The correct answer is option (b) Diego Garcia.

❑ Explanation

❑ Diego Garcia is the largest island in the Chagos Archipelago, covering an area of about 30 square kilometers. It is also the most southerly island in the group. Diego Garcia is strategically important as it houses a major US military base, which plays a vital role in operations across the Indian Ocean and beyond. The island's size and military infrastructure make it the focal point of the archipelago in geopolitical terms.

❑ Information Booster

- Diego Garcia is the largest island in the Chagos Archipelago.
- It covers around 30 sq. km.
- It hosts a strategic US military base.
- It is the most southerly island in the group.
- The island is under a 99-year lease agreement between Mauritius and the UK/US.

❑ Additional Knowledge

(a) Peros Banhos: Another island group within the Chagos Archipelago, smaller than Diego Garcia.

(b) Diego Garcia: The largest and most strategically important island, central to military operations in the Indian Ocean.

(c) Eagle Islands: Smaller islands within the archipelago, not as significant in size or strategic value.

(d) Nelson Island: Part of the Chagos Archipelago but smaller and less prominent than Diego Garcia.

30. Ans.(b)

Sol:

The correct answer is (b) Operation Samudra Setu.

Explanation:

Operation Samudra Setu was launched by the Indian Navy in May 2020 to repatriate Indian citizens stranded abroad due to the COVID-19 pandemic.

- INS Jalashwa and INS Magar were deployed to bring back citizens from Maldives and other locations.

- The first phase of the operation commenced on 8 May 2020.

- The operation was part of the broader "Vande Bharat Mission" initiated by the Government of India.

- Over 3,000 citizens were brought back through this operation by sea routes.

Information Booster:

- "Samudra Setu" means "Sea Bridge" in Sanskrit, signifying a maritime connection for humanitarian assistance.

- The ships followed strict COVID-19 safety protocols, including quarantine measures and medical screening onboard.

Additional Knowledge:

(b) Operation Vanilla (Option b)

- Conducted in January 2020 by the Indian Navy to provide humanitarian assistance and disaster relief to Madagascar after a cyclone.

(c) Mission Sagar (Option c)

- Launched in May 2020 to provide food items, medicines, and medical assistance to Indian Ocean countries like Maldives, Mauritius, Seychelles, Madagascar, and Comoros during COVID-19.

(d) Mission Rahat (Option d)

- Conducted in 2015 to evacuate Indian and foreign nationals from Yemen during the civil war.

31. Ans.(c)

Sol. Sol. Rajendra Vishwanath Arlekar was sworn in as the 23rd Governor of Kerala on January 2, 2025.

Correct Answer: Rajendra Vishwanath Arlekar

Key Points:

- Rajendra Vishwanath Arlekar Sworn in as Kerala Governor

- Location of Ceremony: Raj Bhavan, Thiruvananthapuram

- Administering Officer: Chief Justice of Kerala High Court, Justice Nitin Madhukar Jamdar

Predecessor: Arif Mohammed Khan (Transferred to Bihar)

32. Ans.(b)

Sol. Correct Answer: B

Explanation:

- The Indian National Trust for Art and Cultural Heritage (INTACH), under the Ministry of Culture, launched Project Gaja-Lok at its headquarters in New Delhi.

Information Booster:

Launch Events:

- o Public Exhibition – 19 to 25 November 2025

- o Roundtable – 20 November 2025

Organised by: INTACH's Intangible Cultural Heritage (ICH) Division

Focus:

- o Human–elephant interactions

- o Ecological challenges

- o Ethical coexistence

- o Cross-border heritage collaboration

Exhibition Showcased: Indus Valley seals, Bharhut railings, Konark Temple statues.

33. Ans.(c)

Sol:

Ans. (c)

Real Madrid was awarded the Laureus World Team of the Year at the 2025 Laureus World Sports Awards held in Madrid. This prestigious honor recognized the club's remarkable 2023–24 season, during which they achieved tremendous success, including winning both the UEFA Champions League and the Spanish La Liga. Their consistent dominance in European football, star-studded roster, and tactical brilliance underlined their selection for this elite accolade.

The award was presented by Spanish tennis legend Rafael Nadal, adding emotional and national significance to the ceremony, which took place in Madrid—the home of the winning club. Real Madrid's success symbolized excellence in teamwork, strategy, and sportsmanship, reinforcing their reputation as one of the most successful and respected football clubs in history.

This win marks yet another recognition of Real Madrid's sustained excellence on the global football stage, highlighting not only their domestic and continental victories but also their broader cultural and sporting influence.

Information Booster

- Award: Laureus World Team of the Year 2025
- Winner: Real Madrid CF
- Achievements: UEFA Champions League + La Liga Titles
- Event Venue: Madrid, Spain
- Presented By: Rafael Nadal
- Legacy: Most decorated football club in Champions League history

Additional Knowledge

- (a) Argentina National Football Team: The 2022 FIFA World Cup winners, led by Lionel Messi, won the Team of the Year award in 2023. They were not the winners in 2025.
- (b) Manchester City: The English club had an excellent season and were strong contenders after winning the treble in 2023. However, they did not win the 2025 award.
- (c) Real Madrid: Correct answer. Their victory in both major European and Spanish competitions in the 2023–24 season led to them being named the best team in the world by the Laureus Academy.
- (d) South Africa Rugby Team: Winners of the 2023 Rugby World Cup, they received the Team of the Year award in 2024. While highly successful, they were not honored in 2025.

34. Ans.(b)

Sol:

The correct answer is (b) 17 November 2025

- 'AJEYA WARRIOR-25' started on 17 November 2025 in Rajasthan.
- It is the 8th edition of the India–UK joint military exercise.
- Conducted at Mahajan Field Firing Ranges, under a UN mandate for counter-terror training.

Information Booster:

- Venue – Foreign Training Node, Mahajan Field Firing Ranges, Rajasthan.
- Edition – 8th (held biennially since 2011).
- Duration – 17 to 30 November 2025.
- Total Troops – 240 soldiers (120 each) from India and UK.
- Indian Troops represented by Sikh Regiment.

Additional Knowledge:

- Focus – Counter-terror operations in semi-urban environments.
- Exercise aims to enhance interoperability & peacekeeping training under UN.
- Previous edition – AJEYA WARRIOR-23 was held in the UK.
- Supports India's role in global peacekeeping & Indo-Pacific security strategy.
- Similar exercises – Yudh Abhyas (US), Shakti (France), Garuda Shakti (Indonesia).

35. Ans.(c)

Sol. Correct Answer: (c) SAESI at GMR Aerospace Park

Explanation:

- ❑ Safran Aircraft Engine Services India (SAESI) at GMR Aerospace & Industrial Park, Hyderabad is India's first global MRO centre built by French engine manufacturer Safran S.A.
- ❑ PM Modi virtually inaugurated the facility on 26 November 2025.

Information Booster:

- ❑ Budget: ₹1,300 crore (USD 145M)
- ❑ Services: LEAP engines used in A320neo & Boeing 737 MAX
- ❑ Capacity: 300 engines/year by 2035
- ❑ Importance: First OEM-built MRO → boosts Aatmanirbhar Bharat & reduces foreign maintenance costs

About Telangana:

- ❑ Chief Minister (CM) – A Revanth Reddy
- ❑ Governor – Jishnu Dev Varma
- ❑ Capital – Hyderabad
- ❑ Wildlife Sanctuary (WLS) – Eturnagaram WLS, Shivaram WLS

36. Ans.(b)

Sol. Correct Answer: B

Explanation:

- ❑ ISRO Chairman Dr. V. Narayanan announced that the Oceansat satellite will be launched aboard India's first commercially built PSLV (PSLV-N1) in 2026.

Information Booster:

- ❑ Announcement Venue: 7th India Manufacturing Show (IMS) 2025, Bengaluru
- ❑ Commercial PSLV Developers: Consortium of HAL + L&T
- ❑ Industry Participation: ISRO will transfer 50% of PSLV development to industry
- ❑ Contract (2022): HAL–L&T consortium to build five PSLV-XL rockets
- ❑ ISRO's Role: Provides technology, design, mission clearance, and launch infrastructure
- ❑ Industry's Role: End-to-end manufacturing, integration, avionics, testing & launch support
- ❑ Alignment: Supports Aatmanirbhar Bharat in space manufacturing

About PSLV:

- ❑ Type: 4-stage rocket with alternating solid + liquid propulsion
- ❑ PSLV-XL Variant: Equipped with 6 extended strap-on boosters for higher payload life

About Indian Space Research Organization (ISRO):

Headquarters – Bengaluru, Karnataka

Established – 1969

37. Ans.(d)

Sol. The correct answer is (d) King Narasimhadeva I.

- The Konark Sun Temple was built in the 13th century by King Narasimhadeva I (1238 to 1264 CE) of the Eastern Ganga dynasty.
- The temple is located in Konark, Odisha, and is dedicated to the Sun God, Surya.
- It is designed in the shape of a colossal chariot with intricately carved stone wheels, pillars, and walls, symbolizing the Sun God's chariot.
- The temple is a UNESCO World Heritage Site and is renowned for its architectural grandeur and historical significance.
- The Konark Sun Temple is also known as the "Black Pagoda" due to its dark color and was used as a navigational landmark by sailors in ancient times.

Information Booster:

King Rajaraja Chola:

- Rajaraja Chola I was a great Chola ruler from Tamil Nadu, known for constructing the Brihadeeswarar Temple in Thanjavur, but he is not associated with the Konark Sun Temple.

King Raghunath Singha:

- King Raghunath Singha was a ruler from the Bengal region but has no connection to the Konark Sun Temple.

King Ashoka:

- King Ashoka was a Mauryan emperor known for spreading Buddhism and constructing stupas and pillars across India. He has no direct connection to the Konark Sun Temple.

38. Ans.(d)

Sol. The correct answer is (d) Gupta.

- The Bagh Caves are renowned for their exquisite murals and paintings, which are a significant example of ancient Indian art.
- These caves are situated in Madhya Pradesh, India, and their paintings belong to the Gupta period, which is often regarded as the Golden Age of India.
- The Gupta period (approximately 4th to 6th century CE) is known for its advancements in art, architecture, and culture. The paintings in the Bagh Caves reflect the artistic excellence and stylistic elements typical of this era.
- The paintings on the wall and ceilings of the Viharas of Bagh, the fragments of which are still visible in Cave 3 and Cave 4 (remnants seen also in Caves 2, 5 and 7), were executed in tempera.
- Cave 2 is the best preserved cave, also known as "Pandava Cave" These paintings are materialistic rather than spiritualistic.

Information Booster:

- Maurya: The Maurya period (approximately 322 to 185 BCE) is known for its contributions to Indian art and architecture, including the Ashokan pillars and stupas.
- Maukhari: The Maukhari dynasty ruled parts of northern India during the 6th century CE, but they are not particularly noted for cave paintings.
- Chola: The Chola period (approximately 9th to 13th century CE) is famous for its temple architecture and bronze sculptures in southern India, rather than cave paintings.

39. Ans.(c)

Sol. The correct answer is (c) military commanders.

- Amara-nayakas were feudal military chiefs who controlled Amara lands and provided troops to the king.
- They played a major role in maintaining the Vijayanagar military system.

Information Booster:

- Vijayanagar Empire existed from 1336 to 1646 CE.
- The empire was founded by Harihara and Bukka of Sangama dynasty.
- Amara-nayakas collected revenue from their territories.
- They maintained cavalry, infantry, and horses for the empire.
- They were similar to feudal lords in medieval Europe.

Additional Knowledge:

- Major dynasties of Vijayanagar: Sangama, Saluva, Tuluva, Aravidu.
- Krishna Deva Raya (1509–1529) was the greatest ruler of Vijayanagar.
- Nayaka system later evolved into small Nayaka kingdoms.
- Amara lands were revenue assignments, not hereditary property.

40. Ans.(d)

Sol. The correct answer is option (d) Declaring laws unconstitutional directly through an executive order

Explanation

The Chief Justice of India (CJI) holds several crucial constitutional, administrative, and judicial responsibilities. Some of these include the appointment of officers and servants of the Supreme Court as per Article 146, acting as Chairperson of Search-cum-Selection Committees for key statutory authorities like the National Company Law Appellate Tribunal (NCLAT), and exercising the exclusive power of 'Master of the Roster', where the CJI decides on the allocation of cases to various benches. This power is laid down in the Handbook of Practice and Procedure and Office Procedure, 2017, ensuring the smooth functioning of the Supreme Court's judicial business.

Additionally, the CJI has other roles such as administering the oath to the President of India, recommending ad hoc judges under Article 127, requesting retired judges to act as judges, and deciding the seat of the Supreme Court. However, the CJI does not have the power to declare laws unconstitutional through an executive order. This can only be done through a judicial process where the bench delivers a verdict after hearing the concerned parties. The CJI cannot bypass this due process of law.

Information Booster

- Article 146: Appointments of Officers and Servants of the SC are made by the CJI.
- Master of the Roster: CJI allocates cases to benches.
- Search-cum-Selection Committee: CJI heads appointments to bodies like NCLAT.
- Other powers: Administers President's oath, appoints ad hoc judges, decides SC seat.
- Cannot declare laws unconstitutional through executive orders; must follow judicial process.

Additional Knowledge

(a) Appointing Officers and Servants of the Supreme Court under Article 146: Under Article 146 of the Indian Constitution, the CJI is responsible for the appointment and service conditions of the officers and servants of the Supreme Court. This ensures administrative independence of the judiciary from the executive.

(b) Acting as Chairperson of the Search-cum-Selection-Committee for statutory bodies: The CJI often acts as the Chairperson of committees responsible for selecting members of key statutory and quasi-judicial bodies such as NCLAT, ensuring that appointments are merit-based and independent from political interference.

(c) Exercising the power of 'Master of the Roster' to allocate cases to benches: As per the Supreme Court's Handbook of Practice and Procedure, 2017, the CJI is the Master of the Roster, which gives him the exclusive authority to allocate cases to different benches. This power has been upheld by the Supreme Court itself to ensure effective judicial management.

(d) Declaring laws unconstitutional directly through an executive order: This is incorrect and unconstitutional. The judiciary, including the CJI, cannot declare laws unconstitutional outside of a judicial process. It requires a formal judgment delivered by a constitutional bench after due hearing of the matter. Executive orders cannot override legislative laws; only courts can declare laws unconstitutional after applying the doctrine of judicial review under Articles 13 and 32/226.

41. Ans.(a)

Sol. The correct answer is (A) The Speaker of the Lok Sabha presides over a joint sitting of the two Houses of Parliament.

Explanation:

- ❑ Article 118 and the Rules of Procedure specify that the Speaker of the Lok Sabha presides over a joint sitting of Parliament (Lok Sabha + Rajya Sabha).
- ❑ A joint sitting is summoned by the President of India under Article 108 when both Houses disagree on a bill.
- ❑ If the Speaker is absent, the Deputy Speaker of the Lok Sabha presides.
- ❑ If both are absent, the Deputy Chairman of the Rajya Sabha presides.
- ❑ The Chairman of the Rajya Sabha (Vice President) does *not* preside over joint sittings.

Purpose of Joint Sitting:

Used only for ordinary bills and financial bills (not for money bills or constitutional amendment bills).

Information Booster:

- ❑ Joint sittings have been held only three times in Indian history:
 1. Dowry Prohibition Act, 1961
 2. Banking Service Commission (Repeal) Bill, 1978
 3. Prevention of Terrorism Bill, 2002 (POTA)
- ❑ Chairman of Rajya Sabha (Vice President): Presides *only* over Rajya Sabha, not joint sittings.
- ❑ Prime Minister/Home Minister do not preside over any House.

42. Ans.(a)

Sol. The correct answer is: A) Article 118(1)

Explanation:

- ❑ Article 118(1) of the Indian Constitution empowers each House of Parliament (Lok Sabha & Rajya Sabha) to make rules for regulating its procedure and conduct of business, subject to the provisions of the Constitution.
- ❑ This ensures that both Houses function independently in matters of their internal working.

Information Booster:

- ❑ Article 118 belongs to Chapter II – Parliament of the Constitution.
- ❑ It provides the framework for rule-making by both Houses.
- ❑ Rules made must be consistent with constitutional provisions.
- ❑ Presiding officers (Speaker of Lok Sabha / Chairman of Rajya Sabha) enforce these rules.
- ❑ Similar power exists for State Legislatures under Article 208.

Additional Knowledge:

- ❑ Article 118(2): Empowers the Rajya Sabha to make rules regarding joint sittings with Lok Sabha.
- ❑ Article 118(3): Relates to rules regarding committees of Parliament.
- ❑ Article 118(4): Provides that until rules are made, the President can make rules for regulating the procedure.

43. Ans.(b)

Sol:

- ❑ The correct answer is option (b) Union audit reports are submitted to the President, and State audit reports are submitted to the Governor.

❑ Explanation

- ❑ Article 151 of the Indian Constitution requires that the Comptroller and Auditor General (CAG) submit Union audit reports to the President, who then lays them before Parliament. Similarly, State audit reports are submitted by the CAG to the Governor, who then lays them before the State Legislature. This ensures that the financial audits of both Union and State governments are presented for legislative review and scrutiny.

❑ Information Booster

- ❑ • CAG's Reports: The CAG's audit reports play a crucial role in ensuring transparency, accountability, and proper financial management within the government.
- The President and Governor act as intermediaries to ensure that audit reports are presented to the respective legislatures.

❑ Additional Knowledge

- ❑ • Union Audit Reports: These reports concern the financial accounts of the central government and are laid before Parliament for discussion.
- State Audit Reports: These reports pertain to the finances of the state governments and are laid before the State Legislature for consideration and further action.

44. Ans.(b)

Sol:

- ❑ The correct answer is: (b) People with large debts to pay for their homes and cars

❑ Explanation:

- ❑ • Unexpected inflation erodes the value of money, making the amount owed on debts less burdensome in real terms.
- ❑ • People with large debts are typically the most affected because inflation decreases the real value of the money they owe.
- ❑ • Fixed debts remain the same in nominal terms, but the money to repay them becomes cheaper.

❑ Information Booster:

- ❑ • Inflation reduces the real burden of fixed debts, benefiting borrowers.
- ❑ • People with large debts see their debt load decrease in real terms.
- ❑ • Homeowners with fixed-rate mortgages are less affected than those with variable rates.
- ❑ • Inflation can be advantageous to borrowers, especially in a rising interest rate environment.
- ❑ • People with high fixed-interest debts are particularly vulnerable when inflation unexpectedly increases.

❑ Additional Knowledge:

- ❑ • Option (a) Homeowners – Homeowners are generally less hurt if they have fixed-rate mortgages because inflation can increase the value of their property.

- ❑ • Option (c) People with large retirement savings held in savings accounts – Inflation erodes the purchasing power of savings, but this group is more affected in the long term rather than immediately.
- ❑ • Option (d) Workers with cost-of-living adjustments in their labour contracts – Workers with such adjustments are better protected against inflation as their wages increase with inflation.
- ❑ **45. Ans.(d)**
- ❑ Sol:
- ❑ The correct answer is: (D) Kelkar Committee
- ❑ Explanation:
- The Kelkar Committee (2002), headed by Dr. Vijay Kelkar, recommended simplification of direct taxes in post-liberalisation India.
 - It focused on widening the tax base, reducing exemptions, and making taxation more transparent and efficient.
- ❑ Information Booster:
- Formally known as the Task Force on Direct and Indirect Taxes.
 - Suggested replacing exemptions with lower, broad-based tax rates.
 - Supported better tax administration through technology.
 - Proposed a shift toward GST-like unified tax reforms.
 - Influenced later revisions in income tax structure.
- ❑ Additional Knowledge:
- Option A – Tarapore Committee: Related to capital account convertibility.
 - Option B – Dutt Committee: Linked to industrial licensing reforms.
 - Option C – Narasimham Committee: Recommended banking & financial sector reforms, not tax simplification.
- ❑ **46. Ans.(a)**
- ❑ Sol:
- ❑ The correct answer is (A) Pedology
- ❑ Explanation:
- Pedology is the branch of soil science that studies soil as a natural body, including its formation, classification, structure, and distribution.
 - It is an integrated scientific approach that examines physical, chemical, and biological properties of soil.
 - It helps in understanding soil profiles and various soil types for agriculture and land use planning.
- ❑ Information Booster:
- Derived from Greek word “pedon” meaning soil.
 - Deals with soil formation & classification.
 - Important for agriculture & land management.
 - Studies soil horizons and composition.
 - Related to edaphology, which studies soil–plant relation.
- ❑ Additional Knowledge:
- Ecology – Study of relationships between organisms and environment.
 - Serology – Study of blood serum (antibodies).
 - Oenology – Study of wine and winemaking.
- ❑ **47. Ans.(d)**
- ❑ Sol:
- ❑ The correct answer is (d) Gujarat
- ❑ Explanation:
- Kumudini Lakhia is a renowned Kathak dancer from Gujarat.
 - She was honored with the Padma Vibhushan in 2025 for her contribution to Indian classical dance.
 - She revolutionized Kathak by introducing group choreography.
 - She is the founder of Kadamb Centre for Dance in Ahmedabad.
 - Her work has influenced generations of dancers.
- ❑ Information Booster:
- She has earlier received Padma Shri and Padma Bhushan.
 - Known for modernizing traditional Kathak performances.

Additional Knowledge:

Tamil Nadu (Option a)

. Known for Bharatanatyam dancers, not Kathak stalwarts like Lakhia.

Karnataka (Option b)

. State known for classical music and dance, but not Lakhia's origin.

Haryana (Option c)

. No major association of Lakhia with Haryana.

48. Ans.(b)

Sol:

The correct answer is (b) MH-60R Seahawk.

- The Ministry of Defence signed a ₹7,995 crore, 5-year follow-on support contract under the US Foreign Military Sales (FMS) programme for India's 24 MH-60R helicopters.
- India originally signed the procurement deal in February 2020, and the first three helicopters were delivered in 2021.
- The new package includes spares, technical assistance, training, repair & replenishment, ensuring high operational availability for anti-submarine and anti-surface warfare roles.

Information Booster:

- Manufacturer: Sikorsky Aircraft (Lockheed Martin).
- Roles: ASW, ASuW, SAR, MEDEVAC, Surveillance, C2, Logistics.
- India will establish intermediate-level repair & maintenance facilities to reduce foreign dependence.
- Enhances Navy's ship-borne operations and dispersed-location deployment.
- Supports Aatmanirbhar Bharat by enabling MSMEs to join the maintenance ecosystem.

Additional Knowledge:

- MH-60R features multi-mode radar, EO/IR sensors, ESM suites & secure data-link systems.
- Globally operated by navies of the US, Australia, Denmark, Greece, Saudi Arabia, etc.
- MH-60R replaces India's ageing Sea King fleet for frontline ASW missions.
- FMS route ensures government-to-government defence procurement transparency.
- MoD leadership: Rajnath Singh (Defence Minister) and Sanjay Seth (MoS Defence).

49. Ans.(b)

Sol:

The correct option to fill in the blank is (b) for.

"Notorious for" is the standard collocation used to express the reason for someone's bad or infamous reputation.

Here, Dushasana is infamous because of his bad deeds. Notorious = infamous, ill-famed (कुख्यात). for here conveys cause/reason (के लिए/के कारण).

Example: Dushasana is notorious for his cruelty in the epic.

Explain why other options are incorrect.

- (a) of: shows possession/relationship (का/की/के); not used after *notorious*.
- (c) about: indicates topic/subject (के बारे में); *notorious about* is non-idiomatic.
- (d) over: indicates control/superiority or dispute (के ऊपर/पर विजय); incorrect with *notorious*.

Information booster:

- Use famous/renowned/well-known for (positive) vs notorious/infamous for (negative).
- Pattern: *be notorious for + noun/gerund* → *She is notorious for breaking rules.*

50. Ans.(a)

Sol:

The correct option to fill in the blank is (a) wane.

Explanation: Wane means to decrease, diminish, or become weaker over time—exactly matching "began to ____" as interests fade (घट जाना/कम होना/क्षीण होना). The sentence contrasts a fading interest with a growing passion, so the collocation "begin to wane" is semantically precise.

Example: *Her enthusiasm for video games began to wane as her interest in robotics increased.*

Why the other options are incorrect:

- (b) vein — a blood vessel; figuratively, a manner or style (शिरा/रग; शैली), not “decrease.”
- (c) wain — archaic word for a wagon or load (बैलगाड़ी/गाड़ा), unrelated to the context.
- (d) vain — conceited; also “futile/useless” (घमंडी; व्यर्थ), not about declining intensity.

51. **Ans.(a)**

Sol:

The correct antonym of the given word is (a) Negligent.

Given word — ‘Meticulous’:

· Meaning: Extremely careful and exact; paying close attention to every detail and following procedures with scrupulous accuracy. A meticulous person is methodical, painstaking, and thorough. (Hindi: अत्यंत सूक्ष्म/बारीकियों पर ध्यान देने वाला, बेहद सावधान)

· Example: The researcher kept meticulous records of every trial.

Correct answer word — ‘Negligent’:

· Meaning : Failing to take proper care; careless in fulfilling duties or paying attention to details; characterized by inattention or disregard. (Hindi: लापरवाह/उपेक्षापूर्ण)

· Example: The report was rejected because of negligent proofreading.

Synonyms (of ‘meticulous’): thorough, scrupulous, painstaking, exacting.

Antonyms (of ‘meticulous’): negligent, careless, slapdash, heedless.

Meanings of all the other given options:

· (b) Thorough: complete and detailed; not omitting anything important. (Hindi: विस्तृत/संपूर्ण)

· (c) Precise: exact and accurate in detail. (Hindi: सटीक/निर्दिष्ट)

· (d) Careful: exercising caution and attention. (Hindi: सावधान/सचेत)

All three (b), (c), and (d) are near-synonyms of meticulous, not antonyms.

52. **Ans.(c)**

Sol:

The correct antonym of the given word is (c) Innovate.

Given word — ‘Imitate’: To copy or mimic someone’s actions/style/model, often reproducing existing patterns rather than creating new ones. (Hindi: नकल करना/अनुकरण करना)

Example: Many beginners imitate their mentors before developing a unique style.

Correct answer — ‘Innovate’: To create something new, introduce novel ideas/methods/products—the opposite of merely copying. (Hindi: नवोन्मेष करना/नई चीज़ें लाना)

Example: Startups that innovate often disrupt traditional markets.

Synonyms (of imitate): mimic, emulate, copy, ape.

Antonyms (of imitate): innovate, originate, invent, create.

Meanings of the other options:

· (a) Replicate: To duplicate/reproduce something exactly. (Hindi: हू-ब-हू नकल करना)

· (b) Copy: To reproduce the same work/behavior. (Hindi: नकल करना)

· (d) Echo: To repeat or reverberate; to closely parrot an idea/phrase. (Hindi: प्रतिध्वनित करना/दोहराना)

53. **Ans.(a)**

Sol:

The correct antonym of the given word is (a) Obstinate.

Flexible: capable of bending or adapting easily in attitude or form; accommodating and adjustable. (Hindi: लचीला, अनुकूलनीय)

Example: Good teachers are flexible and adapt their methods to students’ needs.

Obstinate (Antonym): stubbornly refusing to change one’s opinion or chosen course of action; rigid and unyielding. (Hindi: हठी, ज़िद्दी)

Example: He remained obstinate, ignoring every sensible suggestion.

Synonyms (Flexible): pliable, supple, adaptable, malleable.

Antonyms (Flexible): rigid, inflexible, stubborn, unyielding.

Meanings of all the other given options:

- (b) Snobbish: having or showing the attitude of people who think they are better than others; arrogant. (Hindi: घमंडी, नकचढ़ा)
- (c) Hysterical: wildly emotional or exaggerated; out of control with fear or laughter. (Hindi: उन्मत्त, अति-उत्तेजित)
- (d) Staunch: very loyal and committed in attitude; firm and steadfast. (Hindi: दृढ़, वफादार)

54. Ans.(c)

- ❑ Sol:
- ❑ The correct spelling is Connoisseur.
- ❑ Explanation (English): "Connoisseur" means an expert judge in matters of taste, especially in fine arts or food. The correct spelling has double "n" and double "s" in the middle.
- ❑ Explanation (Hindi): "Connoisseur" का अर्थ है स्वाद या कला में विशेषज्ञ। सही वर्तनी में बीच में दो "n" और दो "s" आते हैं।

55. Ans.(d)

Sol. The correct one-word for the given group of words is (d) graphology.

Explanation: Graphology is the study/analysis of handwriting to infer character or psychological traits (हस्तलेख-विश्लेषण/लिपि-विज्ञान). It focuses on features like slant, spacing, and pressure to interpret personality indicators.

Example: *She studied graphology to help HR understand candidates' behavioural tendencies.*

Meanings of the given other options:

- (a) lithography: printing method using a flat stone/metal plate (शिलालेखन/प्रस्तर मुद्रण).
- (b) etiology (aetiology): study of causes of diseases/events (रोग-कारण विज्ञान/कार्य-कारण अध्ययन).
- (c) calligraphy: the art of beautiful handwriting (सुलेख/सुंदर लेखन कला).

56. Ans.(c)

Sol. The correct passive voice of the given sentence is (c) Onions are being sold by the vendor on a cart.

Active and Passive Voice:

In voice, active voice shows the subject performing the action, while passive voice shows the subject receiving the action.

Explanation:

- The sentence is in the present continuous tense: is selling
- In passive voice, present continuous is formed as am/is/are + being + past participle
- Structure:
- Active: Subject + is/are + verb + -ing + object
- Passive: Object + is/are + being + past participle + by + subject
- Example: He is reading a book → A book is being read by him.

57. Ans.(d)

Sol. Direct and Indirect Speech:

Direct speech reports the exact words spoken, whereas indirect speech reports the meaning of what was said without quoting the exact words.

Rule for Conversion (Direct to Indirect Speech):

1. If the reporting verb (here, *said*) is in the past tense, the tense in the reported speech usually changes.
2. Present Perfect Tense (*have passed*) changes to Past Perfect Tense (*had passed*).
3. Pronoun "I" changes to "she" because it refers to Sagarika.
4. No conjunction like *if* or *whether* is needed here because it's a statement, not a question.

Correct Answer:

(d) Sagarika said that she had passed her examination.

Explanation:

- *have passed* → *had passed* (Present Perfect → Past Perfect).
- *I* changes to *she* according to the subject (Sagarika).
- Sentence becomes a simple reported statement without quotation marks.

Example:

Direct: He said, "I have completed the work."

Indirect: He said that he had completed the work.

58. Ans.(b)

Sol. The correct active voice of the given sentence is (b) Please leave your phones at the reception.

Active and Passive Voice:

In voice, active voice shows the subject performing the action, while passive voice shows the subject receiving the action.

Explanation:

In passive voice, "You are requested to..." changes to active voice as a polite "Please + base verb" construction.

Structure:

Passive: You are requested to + base verb

Active: Please + base verb

Example:

Passive: You are requested to sign here.

Active: Please sign here.

Incorrect options:

- (a), (c), and (d) are grammatically incorrect due to verb form or usage.

59. Ans.(d)

Sol. Option (d) is the correct meaning of the given idiom.

Given Idiom — Old hat: something old-fashioned, out of date, or no longer interesting because it has been seen or done many times (पुराना ढर्रा/बासी बात). It describes ideas, fashions, or methods that are considered outdated.

Example: *That marketing trick is old hat now; audiences expect something fresher.*

Other related idioms and their meanings:

- Out of fashion: no longer popular (फैशन से बाहर).
- Behind the times: not keeping up with modern ideas (समय से पीछे).
- Passé: no longer in vogue (पुराना/बेदम).
- Dated: old-fashioned in style (पुराने ज़माने का).

60. Ans.(a)

Sol. Option (a) Assembly is the correctly spelt word.

Correct spelling: Assembly - A group of people gathered together for a particular purpose, such as a meeting or legislative session. (सभा, सम्मेलन)

Example: The school held an assembly to discuss the annual day celebrations.

61. Ans.(d)

Sol. Option (d) is the incorrectly spelt word.

Correct spelling: "Accommodation" — meaning a place to stay or live temporarily. (रहने की व्यवस्था)

Example: We booked comfortable accommodation near the beach.

Parts of Speech: *Noun*

Meanings of all the given options:

- (a) Referred: Mentioned or directed attention to. (उल्लेख किया हुआ)
- (b) Occurrence: An event or happening. (घटना)
- (c) Acknowledgment: Recognition or acceptance of truth or fact. (स्वीकारोक्ति)

· (d) Accommodation: A place where someone can stay. (आवास)

62. Ans.(c)

Sol. The correct option to fill in the blank is (c) break down.

Break down (a door) means to force it open by applying strength (दरवाज़ा तोड़ देना/धक्का देकर खोलना). It best fits the emergency action described.

Example: The rescuers broke down the door to reach the trapped family.

Explain why other options are incorrect:

- (a) break out: to escape or to start suddenly (फूट पड़ना/भाग निकलना); not used with forcing a door.
- (b) break in: to enter a place illegally or interrupt (जबरन घुसना/टोकना); without an object it doesn't convey forcing the door open; with an object it means "to wear in" (e.g., shoes).
- (d) break away: to separate or detach (अलग हो जाना/छूट जाना); contextually wrong.

63. Ans.(d)

Sol. The correct direct speech is: "I will not be able to make any home visits during this week."

Direct and Indirect Speech:

Direct speech reports the exact words spoken, whereas indirect speech reports the meaning of what was said without quoting the exact words.

Rule:

When converting from indirect to direct speech:

- Use first-person pronouns based on the subject ("he" becomes "I").
- 'Would' in indirect converts back to 'will' in direct.
- 'That week' becomes 'this week' to reflect current time in direct speech.

Structure:

Indirect: He said that he would...

Direct: He said, "I will..."

64. Ans.(a)

Sol. The correct passive voice is (a).

Active voice: The subject performs the action.

Passive voice: The action is performed on the subject.

Explanation:

The sentence uses the modal verb "can," so the passive voice will follow the structure:

can + be + past participle

Structure Used:

- Active: Subject + can + V1 + object
- Passive: Object + can + be + V3 + by + subject

Example:

Active: She can complete the task.

Passive: The task can be completed by her.

65. Ans.(c)

Sol. The correct synonym of the given word is (c) Hate.

Loathe: Deeply dislike; to feel intense aversion or disgust towards someone/something; strong emotional repulsion.

Hindi: घृणा करना/बहुत नापसंद करना.

Example (given word): Many people loathe dishonesty in public life.

Hate (correct answer): Intense or passionate dislike; a strong negative feeling often involving hostility or repugnance.

Hindi: घृणा/द्वेष करना.

Example (correct answer word): I hate wasting food when so many people go hungry.

Synonyms: detest, abhor, despise, hate.

Antonyms: love, like, admire, relish.

Meanings of all the other given options:

- Accept: to receive/agree to something willingly; Hindi: स्वीकार करना.
- Like: to find agreeable/pleasing; Hindi: पसंद करना.
- Love: deep affection or great liking; Hindi: प्रेम/अत्यधिक पसंद करना.

66. Ans.(d)

Sol. The correct indirect speech is (d) Pallavi said that she was going to bake a sponge cake the next day.

Direct and Indirect Speech:

Direct speech reports the exact words spoken, whereas indirect speech reports the meaning of what was said without quoting the exact words.

Explanation:

- "Am going to" changes to "was going to"
- "Tomorrow" changes to "the next day"
- "I" changes to "she" as per the speaker

Rules of conversion:

- Present continuous → Past continuous
- Time indicators change in reported speech

Example: Direct – She said, "I am going to travel tomorrow." → Indirect – She said that she was going to travel the next day.

67. Ans.(b)

Sol. The correct antonym of the given word is (b) appreciative.

Given word — derogatory: Language or remarks that *disparage*, *belittle*, or *show a lack of respect* towards someone; intended to lower reputation. (Hindi: अपमानजनक, तुच्छतापूर्ण)

Example (given word): *Derogatory* comments can damage a learner's confidence.

Correct answer word — appreciative: Showing *gratitude*, *admiration*, or *approval*; expressing positive recognition.

(Hindi: सराहनात्मक, प्रशंसात्मक)

Example (answer word): The mentor's *appreciative* feedback motivated the team.

Synonyms (derogatory): disparaging, demeaning, belittling, pejorative.

Antonyms (derogatory): appreciative, complimentary, laudatory, respectful.

Meanings of all the other given options:

- (a) cunning: skillful in achieving aims by deceit; crafty. (Hindi: धूर्त, चालाक)
- (b) appreciative: showing gratitude/approval; full of praise. (Hindi: सराहनात्मक, प्रशंसात्मक)
- (c) critical: expressing disapproval or analysis; fault-finding. (Hindi: आलोचनात्मक)
- (d) sarcastic: using irony/mockery to convey contempt. (Hindi: व्यंग्यात्मक, तंजपूर्ण)

68. Ans.(b)

Sol. The correct answer is option (b).

The phrase "when words fail" in the passage means when peaceful dialogue or diplomacy no longer works, and as a result, war begins. It emphasizes that war is a consequence of failed communication or diplomacy between nations.

Other options are incorrect because:

- (a) Incorrect – English skills of the leader are not the context
- (c) Incorrect – Passage talks about diplomatic failure, not academics
- (d) Incorrect – Use of severe words is irrelevant to the main idea

69. Ans.(d)

Sol. The correct answer is option (d).

The passage emphasizes that war causes destruction, trauma, and long-lasting suffering. A true hero is someone who avoids war through diplomacy and leadership. Hence, the summary is: "A warless world is peaceful."

Other options are incorrect:

- (a) Incorrect – Leadership is praised not during war but by avoiding it
- (b) Incorrect – The passage promotes peace, not weaponry
- (c) Incorrect – Passage highlights both psychological and physical losses, not comparison

70. Ans.(a)

Sol. The correct antonym of the given word is (a) Idleness.

Endeavour: to try hard to achieve something; make an effort. (कोशिश करना / प्रयास करना)

Example: He endeavoured to complete the project on time.

Idleness: the state of being inactive or lazy, not making any effort. (आलस्य / निष्क्रियता)

Example: His idleness kept him from achieving anything.

Synonyms: effort, attempt, strive, venture.

Antonyms: idleness, inactivity, laziness, indifference.

Meanings of other options:

- (b) Readiness – willingness to do something (तत्परता)
- (c) Selflessness – concern for others before self (निःस्वार्थता)
- (d) Effort – same as endeavour (प्रयास)

71. Ans.(a)

Sol. The correct answer is option (a).

The passage clearly states that modern-day heroes are those who work to prevent war, not those who win on the battlefield. It emphasizes peace, diplomacy, and leadership over violence.

Other options are incorrect:

- (b) – battlefield tactics are mentioned but not as heroic
- (c) – valor is not the focus, peace is
- (d) – passage says the one who wins war is actually the first loser

72. Ans.(c)

Sol. The correct answer is option (c).

The passage strongly opposes war and advocates for diplomacy and peace. The writer never suggests that war is essential; rather, it is portrayed as a failure of words and a destructive force.

Other options are clearly mentioned in the passage:

- (a) – Innocent lives and property are lost in war
- (b) – Real heroes are needed in the modern world
- (d) – War damages people and the earth

73. Ans.(b)

Sol. Given:

Aryan alone = 12 hours

Aryan + Armaan together = 7 hours

Find: Time taken by Armaan alone (using LCM method)

Formula Used:

Efficiency = Work / Time

Solution:

Total work = LCM(12, 7) = 84 units

Aryan's efficiency =

$$\frac{84}{12}$$

= 7 units/hour

Aryan + Armaan efficiency =

$$\frac{84}{7}$$

= 12 units/hour

So,

Armaan's efficiency = 12 - 7 = 5 units/hour

Time taken by Armaan = $\frac{84}{5} = 16.8$ hours

= 16 hours 48 min.

74. Ans.(b)

Sol. Given:

A is an acute angle. We are asked to simplify the expression:

$$\frac{(1 + \tan^2 A)}{(1 + \cot^2 A)}$$

Formula Used:

We know the identity: $\tan^2 A + 1 = \sec^2 A$ and $\cot^2 A + 1 = \operatorname{cosec}^2 A$.

Solution:

$$\frac{(1 + \tan^2 A)}{(1 + \cot^2 A)} = \frac{\sec^2 A}{\operatorname{cosec}^2 A} = \frac{\sec^2 A}{\frac{1}{\sin^2 A}} = \frac{\sec^2 A \sin^2 A}{1} = \tan^2 A$$

75. Ans.(b)

Sol. Given:

The points (0, 3) and (-3, 0)

Formula Used:

$$D = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

Solution:

$$D = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

D =

$$\sqrt{(-3 - 0)^2 + (0 - 3)^2}$$

D =

$$\sqrt{9 + 9}$$

D =

$$3\sqrt{2}$$

units

76. Ans.(c)

Sol. Given :

$$\frac{1}{3} \times$$

40% of first number =

$$\frac{1}{5} \times$$

30% of second number

Solution :

Let first number = A, second number = B.

$$\frac{1}{3} \times \frac{40}{100} A = \frac{1}{5} \times \frac{30}{100} B$$

$$\frac{40}{300} A = \frac{30}{500} B$$

$$\frac{2}{15} A = \frac{3}{50} B$$

$$2 \times 50A = 3 \times 15B$$

$$100A = 45B$$

$$\frac{A}{B} = \frac{45}{100} = \frac{9}{20}$$

Thus, option (c) is right answer.

77. Ans.(d)

Sol. Given:

Two equal sides of an isosceles triangle = 5 cm each

Base of the triangle = 8 cm

Formula Used:

Area of triangle (A) =

base

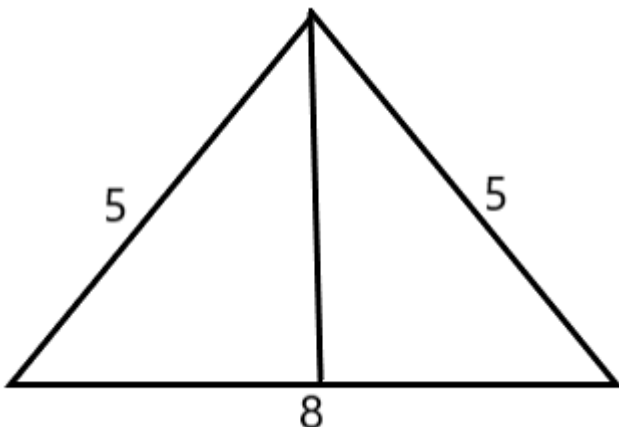
height

By Pythagoras Theorem:

height =

$$\frac{1}{2} \times \text{base} \times \sqrt{\text{side}^2 - \left(\frac{\text{base}}{2}\right)^2}$$

Solution:



$$h = \sqrt{5^2 - \left(\frac{8}{2}\right)^2} = \sqrt{25 - 16} = \sqrt{9} = 3 \text{ cm} \quad A = \frac{1}{2} \times \text{Base} \times \text{Height} = \frac{1}{2} \times 8 \times 3 = 12 \text{ cm}^2$$

78. Ans.(c)

Sol. Given:

Equation: $2y^2 - 6y - 7 = 0$

Formula Used:

For a quadratic equation $ay^2 + by + c = 0$,

Sum of roots =

$$\frac{-b}{a}$$

Solution:

Here, $a = 2$, $b = -6$, $c = -7$

Sum of roots =

$$\frac{-(-6)}{2}$$

= 3

The sum of the solutions is 3.

79. Ans.(b)

Sol. Given:

$\tan 45^\circ = 1$, $\cos 30^\circ = \sqrt{3}/2$, $\sin 60^\circ = \sqrt{3}/2$

Solution:

$2 \tan^2 45^\circ + \cos^2 30^\circ - \sin^2 60^\circ$

$2(1)^2 + (\sqrt{3}/2)^2 - (\sqrt{3}/2)^2 = 2 + 3/4 - 3/4 = 2$

80. Ans.(b)

Sol. Given:

A standard deck has 52 cards.

There are 4 queen cards (one from each suit: hearts, diamonds, clubs, and spades).

Formula Used:

$$P(\text{Queen}) = \frac{\text{Number of Queens}}{\text{Total Number of Cards}}$$

Solution:

Queen =

$$\frac{4}{52} = \frac{1}{13}$$

$$\boxed{\frac{1}{13}}$$

81. Ans.(b)

Sol. Given:

Two fair six-faced dice are thrown.

Formula Used:

Probability =

$$\frac{\text{favourable outcomes}}{\text{total outcomes}}$$

Solution:

Total outcomes with two dice =

$$6 \times 6 = 36.$$

Sums greater than 10 are (11) and (12).

For (11): ((5,6), (6,5)) → 2 outcomes.

For (12): (6, 6) → 1 outcome.

Favourable outcomes = 2 + 1 = 3

P(

$$\text{sum} > 10) = \frac{3}{36} = \frac{1}{12}.$$

82. Ans.(c)

Sol. Given:

ABC is a right-angled triangle.

Length of two sides containing the right angle (perpendicular and base) = 4 cm and 3 cm.

Formula Used:

Area of triangle =

base

height

Area of triangle = r

s (where 'r' is the inradius and 's' is the semi-perimeter)

Pythagorean theorem: $\text{hypotenuse}^2 = \text{base}^2 + \text{perpendicular}^2$

Semi-perimeter (s) =

$$\frac{a + b + c}{2}$$

Solution:

$$\text{Hypotenuse}^2 = 3^2 + 4^2 = 9 + 16 = 25$$

Hypotenuse = 5 cm

Semi-perimeter =

$$\frac{(3 + 4 + 5)}{2} = \frac{12}{2} =$$

6 cm

Area =

$$\frac{1}{2} \times$$

base

×

height =

| | |
|-------------------------------------|---------------|
| | $\frac{1}{2}$ |
| | × |
| 3 | |
| | × |
| 4 = 6 sq cm | |
| Area = r | |
| | × |
| s | |
| 6 = r | |
| | × |
| 6 | |
| r = 1 cm | |
| The radius of the incircle is 1 cm. | |

83. Ans.(d)

Sol. Given:

Initial ratio of sugar : salt = 5 : 6

After adding 500 g of sugar, the new ratio of sugar : salt = 7 : 8

Solution:

Let the initial quantity of sugar be 5x and the quantity of salt be 6x

After adding 500 g of sugar, the new ratio is:

$$\frac{5x + 500}{6x} = \frac{7}{8}$$

$$8(5x + 500) = 7(6x)$$

$$40x + 4000 = 42x$$

$$42x - 40x = 4000$$

$$2x = 4000$$

$$x = 2000$$

$$\text{Salt in new mixture} = 6x = 6 \times 2000 = 12000\text{g} = 12 \text{ kg}$$

84. Ans.(a)

Sol. Given:

The ratio of gold coins to non-gold coins is 1:4 initially.

20 more gold coins are added, and the ratio of gold to non-gold coins becomes 2:3.

Concept Used:

Let the number of gold coins be xx.

The number of non-gold coins is 4x4x.

After adding 20 gold coins, the number of gold coins becomes x+20x + 20, and the number of non-gold coins remains 4x4x.

The new ratio of gold to non-gold coins is given as 2:3.

Solution:

Using the ratio

$$\frac{x + 20}{4x} = \frac{2}{3}$$

$$3x + 60 = 8x$$

$$x = 12$$

The number of gold coins x = 12 and the number of non-gold coins = 4x = 48

after adding 20 gold coins, the total number of gold coins becomes $12 + 20 = 32$ and the total number of non-gold coins remains 40.

The total number of coins in the collection now is $32 + 48 = 80$

85. Ans.(d)

Sol. Given:

The equation is 9(

$$(x + 9)^2 = 441$$

Solution:

$$9(x + 9)^2 = 441$$

(

$$(x + 9)^2 = \frac{441}{9}$$

(x

$$+9)^2 = 49$$

Take the square root of both sides:

$$x + 9 =$$

$$\pm\sqrt{49}$$

$$x + 9 =$$

$$\pm 7$$

For $x + 9 = 7$, we get:

$$x = 7 - 9 = -2$$

For $x + 9 = -7$, we get:

$$x = -7 - 9 = -16$$

The roots of the equation are $x = -2$ and $x = -16$.

86. Ans.(a)

Sol. Given:

A sum becomes 4 times at 10% SI.

Same duration makes the sum become 7 times.

Find the new rate of interest.

Formula Used:

$$SI =$$

$$\frac{P \times T \times R}{100}$$

Solution:

From first condition (4 times at 10%):

$$4P = P + SI \Rightarrow SI = 3P$$

Now,

$$3P = \frac{P \cdot T \cdot 10}{100} \Rightarrow 3 = \frac{10T}{100} \Rightarrow T = 30 \text{ years}$$

Now for second condition (7 times):

$$7P = P + SI \Rightarrow SI = 6P$$

Now,

$$6P = \frac{P \times 30 \times R}{100} \Rightarrow 6 = \frac{30R}{100}$$

$$R = 20\%$$

87. Ans.(c)

Sol. Given:

Sum of the squares of two numbers = 2426

Square root of one number = 7

Solution:

Let the first number be x.

Given

$$\sqrt{x} = 7$$

then, $x = 49$

Let the second number be y.

$$\text{Given } x^2 + y^2 = 2426$$

$$49^2 + y^2 = 2426$$

$$y^2 = 2426 - 2401 = 25$$

$$y = 5$$

88. Ans.(a)

Sol. Given:

$$41 - [21 - \{11 - (16 - 4 \div 2 \times 3)\}]$$

Concept Used:

Operation preference wise Symbol

Brackets $[], \{\}, ()$

Orders, of x (power), $\sqrt{}$ (root), of

Division \div

Multiplication \times

Addition $+$

Subtraction -

Solution:

$$\begin{aligned}
 & 41 - [21 - \{11 - (16 - 4 \div 2 \times 3)\}] \\
 &= 41 - [21 - \{11 - (16 - 2 \times 3)\}] \\
 &= 41 - [21 - \{11 - (16 - 6)\}] \\
 &= 41 - [21 - \{11 - (10)\}] \\
 &= 41 - [21 - \{11\}] \\
 &= 41 - [10] \\
 &= 21
 \end{aligned}$$

89. Ans.(a)

Sol. Given:

Selling Price at 30% loss = ₹1526

Target: 40% profit

Solution:

CP =

$$\frac{1526 \times 100}{70}$$

$$= 2180$$

Selling Price for 40% Profit:

$$\text{New SP} = 2180 \times$$

$$\frac{140}{100}$$

$$= 2180 \times$$

$$\frac{14}{10}$$

$$= ₹3052$$

90. Ans.(d)

Sol. Given:

The first 10 odd prime numbers are:

3, 5, 7, 11, 13, 17, 19, 23, 29, 31

Formula Used:

Average =

$$\frac{\text{Sum of numbers}}{\text{Number of numbers}}$$

Solution:

Average =

$$\frac{3 + 5 + 7 + 11 + 13 + 17 + 19 + 23 + 29 + 31}{10}$$

=

$$\frac{158}{10}$$

$$= 15.8$$

Thus, the average of the first 10 odd prime numbers is 15.8

91. Ans.(b)

Sol. Given:

Father's present age = F

Son's present age = S

8 years ago: father's age = F - 8

8 years ago: son's age = S - 8

Given: $(F - 8 = 2(S - 8) + 27)$

Required: Years after which father will be twice the son's age

Solution:

Past condition:

$$F - 8 = 2(S - 8) + 27$$

$$F - 8 = 2S - 16 + 27$$

$$F = 2S + 19$$

Future condition:

$$F + t = 2(S + t)$$

Substitute $(F = 2S + 19)$:

$$2S + 19 + t = 2S + 2t$$

$$19 + t = 2t$$

$$t = 19$$

Thus, After 19 years, father will be twice the son's age

92. Ans.(d)

Sol. Given:

The number of boys and girls were in the ratio = 5 : 7

After adding 8 boys new ratio = 1:1

Solution:

Let the number of boys in the beginning = 5x

The number of girls = 7x .

After 8 more boys were admitted, the new number of boys becomes $5x + 8$.

It is given that the new ratio of girls to boys is 1:1, so we have the equation:

$$7x = 5x + 8$$

$$7x - 5x = 8$$

$$2x = 8$$

$$x = 4$$

Thus, the initial number of boys was $5x = 20$ and the initial number of girls was $7x = 28$.

The difference between the number of boys and girls in the beginning was:

$$28 - 20 = 8 .$$

93. Ans.(d)

Sol. Given:

Length of train:

$$L_{\text{train}}$$

$$= 60 \text{ m}$$

Speed of train: $v = 72 \text{ km/h}$

Length of platform:

$$L_{\text{platform}}$$

$$= 600 \text{ m}$$

Need to find: Time elapsed to entirely clear the platform

Formula Used:

Time =

$$\frac{\text{Distance}}{\text{Speed}}$$

Solution:

Speed into m/s:

$$v = 72 \text{ km/h} =$$

$$72 \times \frac{5}{18}$$

$$= 20 \text{ m/s}$$

For the train to entirely clear the platform, it must travel from the moment its front enters until its rear end exits.

$$\text{Total distance} = 60 + 600 = 660 \text{ m}$$

Time =

$$\frac{660}{20}$$

$$= 33 \text{ seconds}$$

Therefore, the elapsed time for the train to entirely clear the platform = 33 seconds

94. Ans.(b)

Sol. Given :

$$\text{Divisor } D = 14Q$$

$$\text{Divisor } D = 7R$$

$$\text{Remainder } R = 34$$

Find the dividend.

Formula Used :

$$\text{Dividend} = \text{Divisor (D)}$$

$$\text{Quotient (Q) + Remainder (R)}$$

Solution :

From

$$D = 7R =$$

$$38$$

Now,

$$D = 14Q$$

$$238 = 14Q$$

$$Q =$$

$$= 17$$

$$7 \times 34 = 2$$

$$\frac{238}{14}$$

$$\text{Dividend} = 238 \times 17 + 3$$

$$4$$

$$= 4046 + 34 = 4080$$

95. Ans.(c)

Sol. Given:

Quadrant a point $(-4, -5)$ is located.

Solution:

To determine the quadrant of the point $(-4, -5)$, we consider the signs of the coordinates:

The x-coordinate is -4 , which is negative.

The y-coordinate is -5 , which is also negative.

In the coordinate plane:

The first quadrant has both positive x and y coordinates.
 The second quadrant has negative x and positive y coordinates.
 The third quadrant has both negative x and y coordinates.
 The fourth quadrant has positive x and negative y coordinates.
 So, Since both coordinates are negative, the point $(-4, -5)$ lies in the third quadrant.
 Thus, the correct answer is (c).

96. Ans.(a)

Sol. Given:

Speed of man = 14 km/h

Total distance to cover = 7 km

Formula Used:

$$\text{Time} = \frac{\text{Distance}}{\text{Speed}}$$

Solution:

If the man doesn't stop to rest:

Time taken to complete the distance of 7 km = $\frac{7}{14} = \frac{1}{2}$ hours = 30 minutes

Total rest time = $7 \times 6 = 42$ minutes

Total time to cover the distance = $30 + 42 = 72$ minute = $1\frac{1}{5}$ hours

97. Ans.(d)

Sol. Given:

U is to the left of V and W is to the right of X.

X is sitting on the right of Y and he is the second person from the left.

According to the given information, the arrangement is as follows:



So, V is the first from the right end.

Thus, the correct answer is (d).

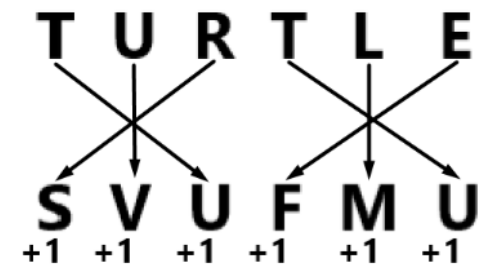
98. Ans.(d)

Sol. Given:

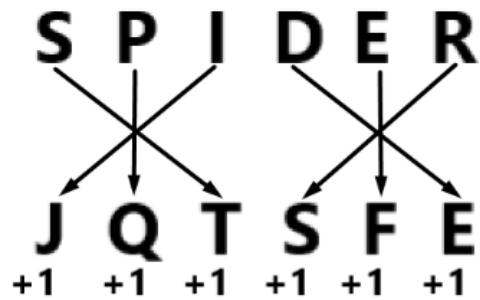
In a code language, 'TURTLE' is coded as SVUFMU and 'SPIDER' is coded as JQTSFE.

| | | | | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| A | B | C | D | E | F | G | H | I | J | K | L | M |
| Z | Y | X | W | V | U | T | S | R | Q | P | O | N |
| 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 | 15 | 14 |

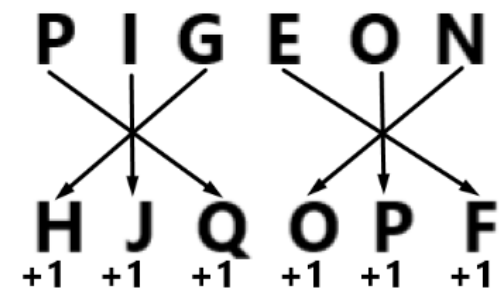
For, TURTLE - SVUFMU



For, SPIDER - JQTSFE



Similarly,
PIGEON - ?

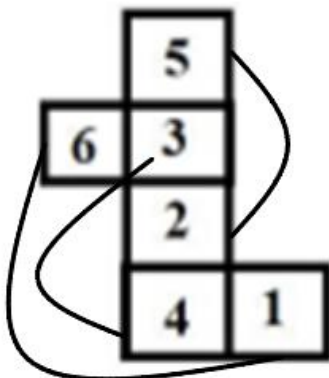


So, PIGEON is coded as HJQOPF.

Thus, correct option is (d).

99. Ans.(b)

Sol. Given:



The opposites will be:

| | | |
|---|---|---|
| 5 | 6 | 4 |
| | | |
| 2 | 1 | 3 |

So, the correct formation will be:



Thus, the correct option is (B).

100. Ans.(b)

Sol. Given:

3, 8, 15, 24, ?

Logic:

Each term = $n^2 - 1$

Explanation:

$$2^2 - 1 = 3$$

$$3^2 - 1 = 8$$

$$4^2 - 1 = 15$$

$$5^2 - 1 = 24$$

$$6^2 - 1 = 35$$

Thus, correct option is 35.

101. Ans.(d)

Sol. Given: A + B means 'A is the daughter of B'

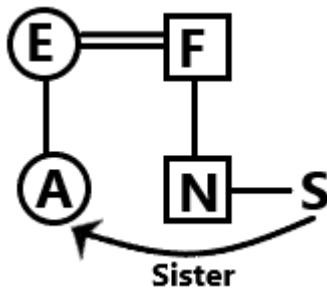
Sign + - × ÷

Relationship Daughter Wife Father Brother

Expression: 'A + E - F × N ÷ S'?

According to the given information, family tree diagram of expression will be:

| Symbol in Diagram | Meaning |
|-------------------|--------------------------|
| - / O | Female |
| + / □ | Male |
| = | Married Couple |
| — | Siblings |
| | Difference Of Generation |



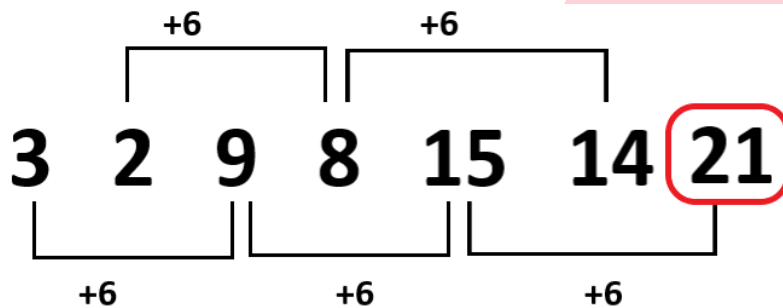
As per the diagram, A is the sister of S.
Thus, the correct option is (D) Sister

102. Ans.(c)

Sol. Given:

3, 2, 9, 8, 15, 14, ____

Let's check the series:



So, the next term is: 21

Thus, the correct option is: (c)

103. Ans.(d)

Sol. Given: When seen through a mirror, a clock shows 8:30 as the time.

For a mirror (left-right) image the rule is: real time = 11:60 - shown time.

$11:60 - 8:30 = 3:30$

The correct time is: 3:30

Thus, correct option is (d).

104. Ans.(a)

Sol. Given:

(31, 59, 40)

(56, 83, 39)

Logic: Third number = (Second number - First number) + 12

Set 31, 59, 40

$$59 - 31 = 28$$

$$28 + 12 = 40$$

Set 56, 83, 39

$$83 - 56 = 27$$

$$27 + 12 = 39$$

Now check options:

Option A: (41, 74, 45) → Pattern follow.

$$74 - 41 = 33$$

$$33 + 12 = 45$$

Option B: (38, 89, 42)

$$89 - 38 = 51$$

$$51 + 12 = 63 \neq 42$$

Option C: (45, 90, 47)

$$90 - 45 = 45$$

$$45 + 12 = 57 \neq 47$$

Option D: (29, 71, 42)

$$71 - 29 = 42$$

$$42 + 12 = 54 \neq 42$$

Only option A follows the same pattern.

Thus, the correct option is (A) 41, 74, 45.

105. Ans.(c)

Sol. As we know that -

$$\text{Angle} = |H \times 30 - (11/2) M|$$

$$\text{Require angle} = |3 \times 30 - (11/2) \times 30|$$

$$= |90 - 165|$$

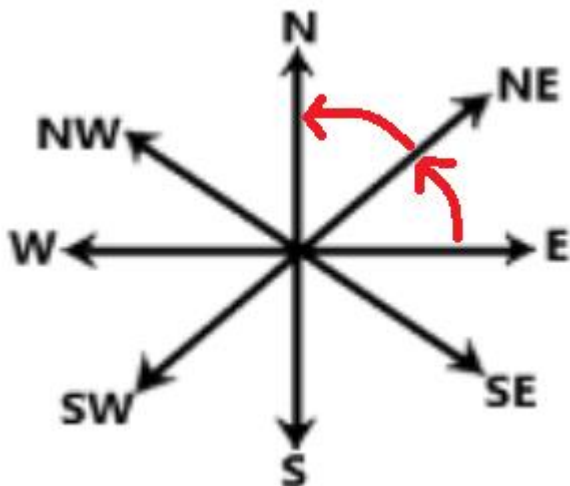
$$= |-75|$$

$$= 75^\circ$$

Correct answer is (c) 75°

106. Ans.(c)

Sol. Given: If North - East becomes North.



East become North-East.

Thus, correct option is (c).

107. Ans.(b)

Sol. Given:

The mirror image of a 12-hour clock is 3:25,

Formula

$$11:60 - hh:mm \rightarrow$$

$$(h \rightarrow$$

$$\text{hour, m} \rightarrow$$

$$\text{minute}) \rightarrow$$

$$11:60 - 3:25 = 8:35,$$

Thus, the actual time of 3:25 will be 8:25

Thus, the correct option is (b) 8:25

108. Ans.(c)

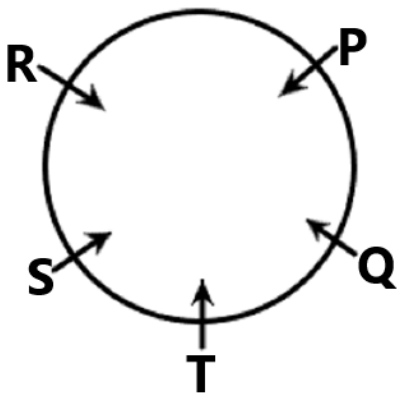
Sol. Given:

Five students - P, Q, R, S and T - are sitting in a circle facing the center.

P is to the immediate right of Q.

R is between P and S.

From the given information seating arrangement will be.

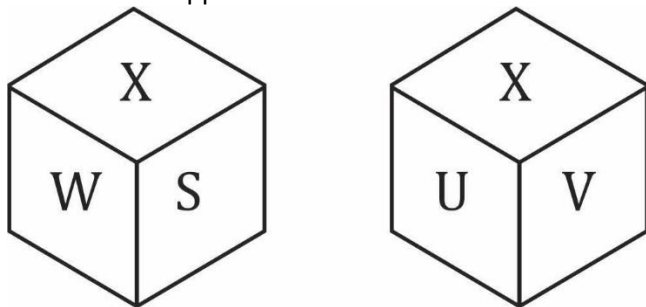


S is sitting to the immediate left of T.

Thus, correct option is (c).

109. Ans.(c)

Sol. Logic: If two dice have the same face value in the given image then their clockwise or anticlockwise wise letter are known as opposite numbers in dice.



$$X \rightarrow S \rightarrow W$$

$$X \rightarrow V \rightarrow U$$

So, the opposite of V is S.

Thus, correct option is (c).

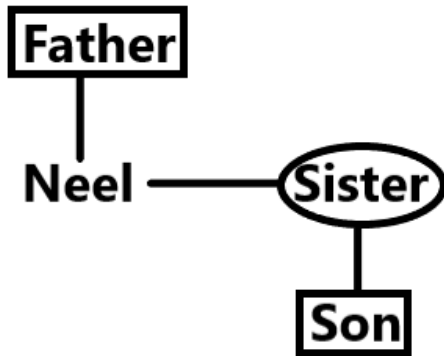
110. Ans.(a)

Sol. Given:

Pointing to a photograph, Neel says he is the son of the only daughter of the father of my sister.

| Symbol in Diagram | Meaning |
|-------------------|--------------------------|
| - / 0 | Female |
| + / □ | Male |
| = | Married Couple |
| — | Siblings |
| | Difference Of Generation |

From the given information blood relation diagram will be.



Neel is pointing at his Nephew.

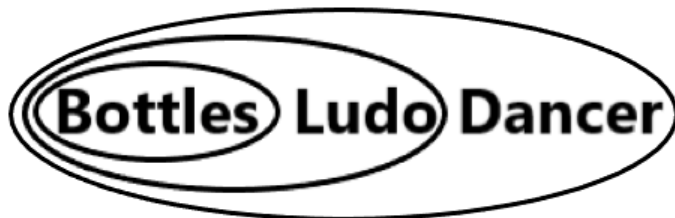
Thus, correct option is (a).

111. Ans.(a)

Sol. Statements:

1. All bottles are ludo.
2. All ludo are dancer.

From the given statements possible Venn diagram will be.



Conclusions:

I. Some dancers are ludo. (True, all ludo are dancer, so that means som dancers are ludo).

II. All bottles are dancers. (True, all bottles are ludo and all ludo are dancers, so that means all bottles are dancer).

So, Both conclusions I and II follow.

Thus, correct option is (a).

112. Ans.(a)

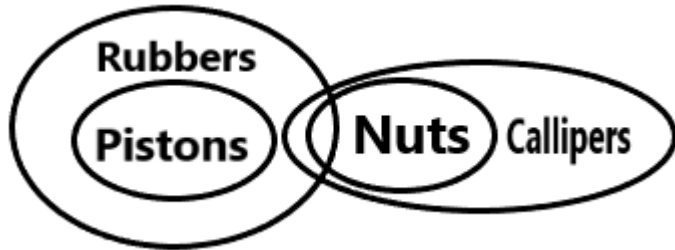
Sol. Statements:

All pistons are rubbers.

Some rubbers are nuts.

All nuts are callipers.

According to the given statements, Venn diagram will be:



Analyse the conclusions:

Conclusions:

I. Some callipers are rubbers. → True

Since, some rubbers are nuts and all nuts are callipers. So those same nuts are both rubbers and callipers.

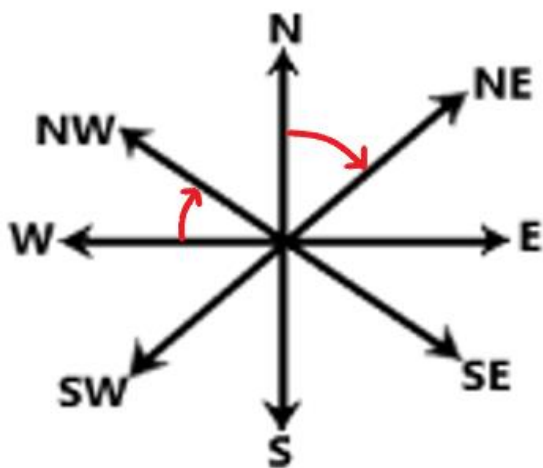
II. All pistons are nuts. → False

Since, some rubbers are nuts, not all rubbers.

Thus, the correct option is (A) Only conclusion I follows.

113. Ans.(b)

Sol. Given: In a system, if west becomes north-west.



North become North - East.

Thus, correct option is (b).

114. Ans.(d)

Sol. Given:

BEH, DGJ, (?), EJO, GLQ, INS,

Logic: Each letter + 2

| | | | | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| A | B | C | D | E | F | G | H | I | J | K | L | M |
| Z | Y | X | W | V | U | T | S | R | Q | P | O | N |
| 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 | 15 | 14 |

1st letters:

$B + 2 = D$, $D + 2 = F$, $F - 1 = E$, $E + 2 = G$, $G + 2 = I$

2nd letters:

$E + 2 = G$, $G + 2 = I$, $I - 1 = J$, $J + 1 = L$, $L + 1 = N$

3rd letters:

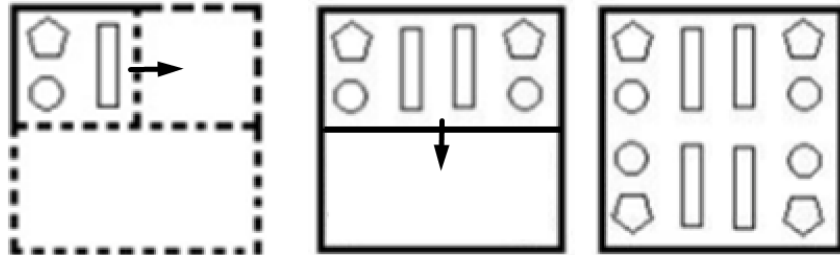
$H + 2 = J$, $J + 2 = L$, $L + 1 = O$, $O + 1 = Q$, $Q + 1 = S$

So, missing group is: F I L

Thus, correct option is (d).

115. Ans.(b)

Sol. After unfolding the given figure following cuts will be shown as given below.



Correct option is option (b)

116. Ans.(a)

Sol. Given: Ammeter \rightarrow Current :: Anemometer \rightarrow ?

Logic: The first instrument measures the second term.

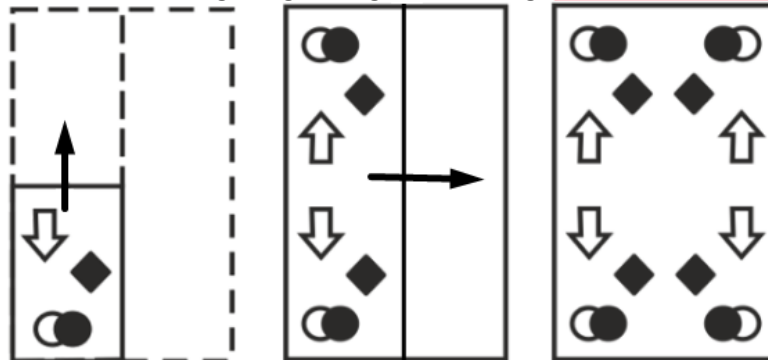
Ammeter measures current.

Anemometer measures wind speed.

Thus, correct option is (a).

117. Ans.(a)

Sol. After unfolding the given figure following cuts will be shown as given below.



Thus, the correct option is: (a)

118. Ans.(b)

Sol. Sun is a star, meaning it should be a subset of "Star."

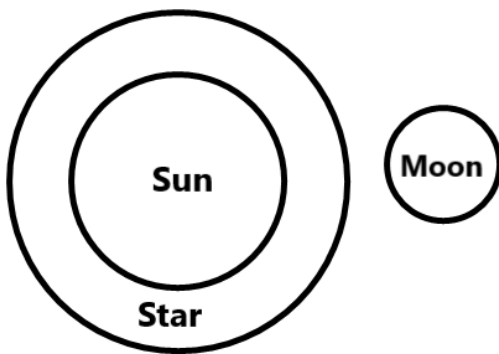
Moon is neither a star nor the Sun, meaning it is a separate entity.

Venn Diagram Representation:

A big circle for Stars.

Inside the Stars circle, a smaller circle for the Sun (since the Sun is a star).

A separate circle for the Moon (since it is not a star and not related to the Sun directly).



Correct answer is (b).

119. Ans.(c)

Sol. Given: 5 : 125

Logic: (1st number)³ = 2nd number

$$5^3 = 5 \times 5 \times 5 = 125$$

Now apply the same logic to 8:

$$8^3 = 8 \times 8 \times 8 = 512$$

Thus, the correct option is (c) 512.

120. Ans.(b)

Sol. Given:

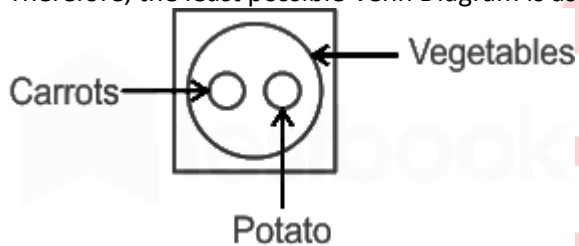
Venn diagram : Vegetable, Carrot, Potato

Logic:

All carrots are Vegetables

All Potato are Vegetables.

Therefore, the least possible Venn Diagram is as follows:



Hence, the answer figure 2 is the correct answer.