# Agniveer Army GD 10th June 2026 (Shift 2) Memory-Based Paper (Previous Year Paper)

Army GD Agniveer • 2026 • 50 questions • 60 minutes • Answer key and solutions

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## GENERAL KNOWLEDGE

**Q1.** Dholavira is unique for which of the following?

**(a)** Water conservation systems
**(b)** Scripted seals
**(c)** Use of palm leaves
**(d)** Rock-cut architecture

**Q2.** Which ruler of the Delhi Sultanate was associated with the expedition to Bhilsa (Vidisha) in AD 1292?

**(a)** Ghazi Malik
**(b)** Iltutmish
**(c)** Ulugh Khan
**(d)** Alauddin Khilji

**Q3.** Which Act ended the monopoly of the East India Company over trade with India?

**(a)** Pitt's India Act of 1784
**(b)** Regulating Act of 1773
**(c)** Charter Act of 1833
**(d)** Charter Act of 1813

**Q4.** The Paramhansa Sabha was founded in:

**(a)** 1875
**(b)** 1849
**(c)** 1857
**(d)** 1865

**Q5.** In the Indian Constitution, the Principle of Liberty is borrowed from which of the following countries?

**(a)** UK
**(b)** Japan
**(c)** France
**(d)** Germany

**Q6.** _____ protects children from hazardous employment till the age of 14 years.

**(a)** Article 24
**(b)** Article 39(e)
**(c)** Article 39(f)
**(d)** Article 21

**Q7.** Article 2 of the Indian constitution is related with _____.

**(a)** Admission or establishment of new states
**(b)** Alteration of areas of existing states
**(c)** Alteration of names of existing states

**(d)** Name and territory of the Union

**Q8.** Which of the following is NOT one of the eight core industries in India?

I. Coal

II. Crude Oil

**(a)** Only II
**(b)** Both I and II
**(c)** Only I
**(d)** Neither I nor II

**Q9.** Which is the world's largest floating solar project in India?

**(a)** Barmer Floating Solar Plant
**(b)** Omkareshwar Floating Solar Plant
**(c)** Vijayawada Floating Solar Plant
**(d)** Jaisalmer Floating Solar Plant

**Q10.** In India, which of the following is a groundwater-based irrigation source?

**(a)** Pond
**(b)** River canal
**(c)** Tank
**(d)** Open-well

**Q11.** Which State of India has borders with three countries namely Nepal, Bhutan and China?

**(a)** Meghalaya.
**(b)** Mizoram.
**(c)** Sikkim.
**(d)** Assam.

**Q12.** Which wildlife sanctuary is located in Panchkula district of Haryana state?

**(a)** Bhindawas
**(b)** Kalesar
**(c)** Bir Shikargah
**(d)** Nahar

**Q13.** With which of the following games is the Wade Trophy associated?

**(a)** Hockey
**(b)** Football
**(c)** Tennis
**(d)** Basketball

**Q14.** Kalakshetra style is associated with which Indian classical dance form?

**(a)** Odissi
**(b)** kathak
**(c)** kuchipudi
**(d)** Bharatanatyam

**Q15.** Who is the founder of Sikh religion?

**(a)** Guru Teg Bahadur
**(b)** Guru Govind Singh
**(c)** Guru Arjun Dev
**(d)** Guru Nanak

## GENERAL SCIENCE

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**Q16.** The capacity to do work is called:

**(a)** Power
**(b)** Pressure
**(c)** Energy
**(d)** Force

**Q17.** The chemical formula of arsenic is:

**(a)** Ar
**(b)** As
**(c)** Ac
**(d)** An

**Q18.** Which of the following parts of a flower forms part of stamen?

**(a)** Style
**(b)** Anther
**(c)** Stigma
**(d)** Sepal

**Q19.** Which of the following is the main thinking part of the human brain?

**(a)** Hind-brain
**(b)** Cerebellum
**(c)** Mid-brain
**(d)** Fore-brain

**Q20.** 'Laughing Gas' is:

**(a)** Hydrogen Peroxide
**(b)** Nitrous Oxide
**(c)** Carbon Monoxide
**(d)** Sulphur Dioxide

**Q21.** Which of the following serves as a nutritive tissue for the growing embryo?

**(a)** Ovule
**(b)** Ovary
**(c)** Endosperm
**(d)** Zygote

**Q22.** Amarbel (Cuscuta) is an example of:

**(a)** Autotroph
**(b)** Parasite
**(c)** Saprotroph
**(d)** Host

**Q23.** When a gun is fired, the bullet moves forward because:

**(a)** air resistance acts forward
**(b)** the recoil of the gun acts backward as reaction
**(c)** the barrel exerts no force
**(d)** gravity pushes it forward

**Q24.** _____ instrument is used to measure potential difference.

**(a)** Thermometer
**(b)** Ammeter
**(c)** Galvanometer
**(d)** Voltmeter

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**Q25.** Who is the father of Genetics?

**(a)** Gregor mendel
**(b)** Thomas hunt morgan
**(c)** Francis galton
**(d)** Krateuas

**Q26.** CPR stands for:

**(a)** Cardiac Pulsatile Revision
**(b)** Cardiopulmonary Resuscitation
**(c)** Cardio Programme Rescue
**(d)** Cardiopulmonary Revision

**Q27.** Neurons have many short, branched parts or processes attached to cell body called _____.

**(a)** axons
**(b)** dendrites
**(c)** nuclei
**(d)** nerve endings

**Q28.** What is the name of the device for measuring some characteristics of a liquid, such as its density or specific gravity?

**(a)** Hydrometer
**(b)** Lactometer
**(c)** Calibrator
**(d)** Alkalimeter

**Q29.** The process of taking oxygen rich air in the body is called _____.

**(a)** Inhalation
**(b)** Exhalation
**(c)** Flotation
**(d)** Exploration

**Q30.** What are the temporary finger-like extensions of the cell surface used by Amoeba to take in food called?

**(a)** Flagella
**(b)** Cilia
**(c)** Vacuoles
**(d)** Pseudopodia

## MATHEMATICS

**Q31.** Find the value of 121 ÷ 5 + (8740 ÷ 5 - 4) ÷ 5.

**(a)** 373
**(b)** 473
**(c)** 543
**(d)** None of the above

**Q32.** For how many possible values of A the number 657321A will be divisible by 3?

**(a)** 3
**(b)** 4
**(c)** 2
**(d)** 1

**Q33.** Mohan borrowed an amount of Rs. 18,000 and paid a simple interest of Rs. 2,700 at 10% per annum. Find the duration for

**(a)** 3 years
**(b)** 3/2 years
**(c)** 2/3 years

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**(d)** 3/20 years

**Q34.** Rahul's monthly income is Rs. 1,50,000. Of this, he saves Rs. 1,500. Find the percentage of his savings.

**(a)** 4%
**(b)** 2%
**(c)** 3%
**(d)** 1%

**Q35.** A can finish a work in 15 days, B in 20 days and C in 25 days. All these three worked together and earned Rs. 4700. The share of C is?

**(a)** Rs. 1200
**(b)** Rs. 1500
**(c)** Rs. 1800
**(d)** Rs. 2000

**Q36.** A garrison of 100 men has provisions for 50 days. If 40 men more arrived, then the food will now last for how many days?

**(a)** 35 days
**(b)** 40 days
**(c)** 37.51 days
**(d)** 35.71 days

**Q37.** The square root of 169 is:

**(a)** 12
**(b)** 13
**(c)** 14
**(d)** 15

**Q38.** Find the circumference of a circle whose area is 314 cm2 (π = 3.14).

**(a)** 6.2 cm
**(b)** 62.8 cm
**(c)** 12.8 cm
**(d)** 32.4 cm

**Q39.** One person travels on through the sides of an equilateral triangle at a speed of 12 kmph, 24 kmph, and 8 kmph. Find the average speed of it. (In kmph)

**(a)** 14
**(b)** 13
**(c)** 12
**(d)** 11

**Q40.** Area of a rectangular ground is 12500 m². Its length is 125 m. its perimeter is

**(a)** 450 m
**(b)** 100 m
**(c)** 900 m
**(d)** 1250 m

**Q41.** The value of 6 × 7 - {9 ÷ 3 + [3 × (5 - 2)]} is:

**(a)** 24
**(b)** 30
**(c)** 45
**(d)** 11

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**Q42.** The length of a rectangle is 3 times its width. If the width is 4cm, what is the length?

**(a)** 8 cm
**(b)** 16 cm
**(c)** 12 cm
**(d)** 20 cm

**Q43.** The time in which a train 1800 m long, travelling at the speed of 30 kmph, will pass a signal pole is:

**(a)** 220 seconds
**(b)** 200 seconds
**(c)** 250 seconds
**(d)** 216 seconds

**Q44.** If the ratio of a : b = 1 : 3, b : c = 2 : 5 and c : d = 2 : 3, then find the value of a : b : c : d.

**(a)** 5 : 10 : 15 : 40
**(b)** 3 : 9 : 12 : 30
**(c)** 4 : 12 : 30 : 45
**(d)** 4 : 8 : 12 : 20

**Q45.** A shirt was marked at Rs. 1600. During a Diwali festival offer, 10% discount was allowed on it. What will be the selling price of the shirt?

**(a)** Rs. 1540
**(b)** Rs. 1400
**(c)** Rs. 1440
**(d)** Rs. 1240

## LOGICAL REASONING

**Q46.** which number will come in place of the question mark (?) in the following series?

27, 28, 36, 63, 127, ?

**(a)** 186
**(b)** 174
**(c)** 215
**(d)** 252

**Q47.** Select the correct option and replace the question mark.

AB : EF :: IJ : ?

**(a)** MN
**(b)** KL
**(c)** OP
**(d)** LM

**Q48.** Suresh ranked 13^(th) from the bottom and 19^(th) from the top in his class. How many students are there in his class?

**(a)** 30
**(b)** 33
**(c)** 31
**(d)** 32

**Q49.** Seven girls Mansi, Shweta, Monika, Payal, Aarti, Kajal and Laxmi are sitting around a circular table facing opposite to the centre (not necessarily in the same order). Kajal is second to the left of Laxmi. Payal is the immediate neighbour of both Mansi and Laxmi. Monika is not the immediate neighbour of Laxmi. Aarti is second to the left of Kajal. Who is sitting second to the left of Payal?

**(a)** Aarti
**(b)** Laxmi

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**(c)** Kajal
**(d)** Shweta

**Q50.** Find the missing number in the given analogy.

25 : 625 :: 35 : _____

**(a)** 1225
**(b)** 865
**(c)** 1115
**(d)** 825

## ANSWER KEY

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | a | 2 | d | 3 | d | 4 | b | 5 | c | 6 | a | 7 | a | 8 | d |
| 9 | b | 10 | d | 11 | c | 12 | c | 13 | d | 14 | d | 15 | d | 16 | c |
| 17 | b | 18 | b | 19 | d | 20 | b | 21 | c | 22 | b | 23 | b | 24 | d |
| 25 | a | 26 | b | 27 | b | 28 | a | 29 | a | 30 | d | 31 | a | 32 | b |
| 33 | b | 34 | d | 35 | a | 36 | d | 37 | b | 38 | b | 39 | c | 40 | a |
| 41 | b | 42 | c | 43 | d | 44 | c | 45 | c | 46 | d | 47 | a | 48 | c |
| 49 | d | 50 | a | | | | | | | | | | | | |

## SOLUTIONS

**Q1. Answer: (a) Water conservation systems**

The Correct answer is Water conservation systems.

Key Points

• Dholavira, located in the present-day state of Gujarat, India, is one of the most prominent archaeological sites of the Indus Valley Civilization (IVC).

• The site is unique for its advanced and ingenious water conservation systems, which include reservoirs, step wells, and channels for water harvesting.

• The people of Dholavira constructed sophisticated systems to manage water, as the region is characterized by arid climatic conditions with limited rainfall.

• It is believed to be one of the earliest examples of urban water management in human history, showcasing the engineering and technological advancements of the civilization.

• The water conservation systems at Dholavira were essential for agriculture, drinking water, and other daily needs, making it a sustainable settlement in a harsh environment.

• Archaeological excavations have revealed massive water reservoirs, some of which are among the largest found in ancient civilizations.

• The ingenuity of the water systems highlights the importance of rainwater harvesting and resource management during the Indus Valley Civilization.

• In 2021, Dholavira was declared a UNESCO World Heritage Site, further emphasizing its cultural and historical significance.

Additional Information

• Scripted seals

• Scripted seals are a hallmark of the Indus Valley Civilization, featuring the still undeciphered Indus script.

• They were primarily used for trade, identification, and administrative purposes.

• While seals have been found at Dholavira, the site is more renowned for its water conservation systems rather than scripted seals.

• Use of palm leaves

• Palm leaves were historically used for writing manuscripts in many ancient Indian cultures, but there is no evidence linking their use specifically to Dholavira.

• Rock-cut architecture

• Rock-cut architecture, such as caves and temples, is associated with later periods of Indian history, particularly the Buddhist, Jain, and Hindu traditions.

• Dholavira, being part of the Indus Valley Civilization, predates the development of rock-cut architecture in India.

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**Q2. Answer: (d) Alauddin Khilji**

The correct answer is Alauddin Khilji.

Key Points

• Alauddin Khilji, the second ruler of the Khilji dynasty (1296–1316), is associated with the expedition to Bhilsa (modern-day Vidisha, Madhya Pradesh) in AD 1292.

• Bhilsa was a prominent cultural and religious center during the medieval period, known for its strategic location and wealth.

• This expedition aimed to subdue the region and establish control over its resources as part of Alauddin Khilji's expansionist policies.

• Alauddin's military campaigns were instrumental in consolidating the Delhi Sultanate's rule and extending its influence over central India.

• The Bhilsa expedition was a precursor to his later, more significant campaigns in the Deccan and other regions.

Additional Information

• Alauddin Khilji's Military Campaigns

• He is known for his conquests in Gujarat, Ranthambore, Chittor, and the Deccan, which expanded the Delhi Sultanate's territorial reach significantly.

• His campaigns were marked by meticulous planning, strong military leadership, and efficient resource management.

• Bhilsa (Vidisha)

• An ancient city located in Madhya Pradesh, Vidisha was historically significant for its Buddhist monuments and the famous Sanchi Stupa nearby.

• It was a center of trade, culture, and religion during the medieval period, attracting the attention of invading rulers.

• The Khilji Dynasty

• Established by Jalaluddin Khilji in 1290, the dynasty ruled the Delhi Sultanate until 1320.

• Alauddin Khilji is considered its most prominent ruler, known for his administrative reforms and military strategies.

• Administrative and Economic Reforms of Alauddin Khilji

• He introduced market control policies to stabilize prices and prevent hoarding.

• Land revenue reforms ensured a steady income for the state while curbing the power of local chieftains.

• Legacy of Alauddin Khilji

• He is remembered for his ambitious expansionist policies and his efforts to strengthen the Delhi Sultanate.

• His reign marked a significant phase in the consolidation of Muslim rule in India.

**Q3. Answer: (d) Charter Act of 1813**

The correct answer is Charter Act of 1813.

Key Points

• The Charter Act of 1813 ended the monopoly of the British East India Company over trade in India, except for trade in tea and trade with China.

• This Act allowed other British merchants to trade freely with India, marking the beginning of free trade policies.

• The Act renewed the East India Company's charter for another 20 years but curtailed its trading privileges, focusing more on administrative functions.

• It allocated funds for the promotion of education and authorized Christian missionaries to propagate their religion in India.

• The Act also introduced provisions for the expenditure on welfare and education, laying the foundation for modern education in India.

Additional Information

• Pitt's India Act of 1784:

• This Act aimed to address the shortcomings of the Regulating Act of 1773.

• It established dual control over the British East India Company's administration in India by creating a Board of Control in Britain to oversee civil and military affairs.

• The Act strengthened British control over Indian administration but did not address trade-related issues.

• Regulating Act of 1773:

• The Regulating Act was the first attempt by the British Parliament to regulate the affairs of the East India Company.

• It established the office of Governor-General of Bengal and made provisions for a Supreme Court in Calcutta.

• However, the Act did not affect the Company's monopoly over trade in India.

• Charter Act of 1833:

• This Act was significant for administrative reforms and marked the end of the East India Company's commercial activities entirely.

• It centralized the administration by making the Governor-General of Bengal the Governor-General of India.

• The Act also paved the way for legal reforms but was not directly linked to ending the Company's monopoly over trade.

**Q4. Answer: (b) 1849**

The correct answer is 1849.

Key Points

• The Paramhansa Sabha was founded in 1849 in Maharashtra as a secret socio-religious reform society.

• It was started by Dadoba Pandurang, along with his associates, with the aim of promoting social and religious reforms.

• The Sabha focused on abolishing caste discrimination and promoting equality within society.

• It emphasized the study of religious texts, spreading knowledge, and creating a sense of brotherhood among people.

• The Sabha played a crucial role in laying the foundation for later reform movements, such as the Prarthana Samaj.

Additional Information

• Dadoba Pandurang Tarkhadkar: A key figure in the socio-religious reform movement in Maharashtra, known for his efforts in promoting liberal thought and education.

• Prarthana Samaj: Inspired by the Paramhansa Sabha, this organization was later founded in 1867 with a focus on social reform and religious rationalism.

• Social Reform Movements in India: The 19th century saw a wave of reform movements aimed at eradicating social evils like caste discrimination, child marriage, and sati.

• Secret Societies for Reform: Many early reform initiatives, like the Paramhansa Sabha, operated in secrecy to avoid opposition from orthodox sections of society.

• Legacy of Paramhansa Sabha: It influenced other reform movements and became a precursor to organizations advocating for equality, education, and rationalism in India.

**Q5. Answer: (c) France**

• The Principles of Liberty, Equality, and Fraternity of the Indian Constitution are borrowed from the French constitution.

• India has borrowed Directive Principles of State Policy, Nomination of members to Rajya Sabha and Method of election of president from Ireland.

• India has borrowed Federation with a strong Centre, Vesting of residuary powers in the Centre, Appointment of state governors by the Centre and Advisory jurisdiction of the Supreme Court from Canada.

• India has borrowed Fundamental rights, judicial review from the United States.

**Q6. Answer: (a) Article 24**

The correct answer is Article 24.

• All people under the age of 18 are entitled to the standards and rights guaranteed by the laws that govern our country and the international legal instruments we have accepted by ratifying them.

• The Constitution of India guarantees all children certain rights, which have been specially included for them.

• These include:

• Right to free and compulsory elementary education for all children in the 6- 14 year age group (Article 21 A).

• Right to be protected from any hazardous employment till the age of 14 years (Article 24).

Additional Information

• Right to be protected from being abused and forced by economic necessity to enter occupations unsuited to their age or strength (Article 39(e)).

• Right to equal opportunities and facilities to develop in a healthy manner and in conditions of freedom and dignity and guaranteed protection of childhood and youth against exploitation and against moral and material abandonment (Article 39 (f)).

**Q7. Answer: (a) Admission or establishment of new states**

The correct answer is Admission or establishment of new states.

Key Points

• Article 2 of the Indian Constitution

• This article provides the Parliament of India the authority to admit into the Union of India, or establish, new states on such terms and conditions as it thinks fit.

• It is not necessary to pass such a law by a special majority or obtain the ratification of the states.

Mistake Points

• Article 3

• The Parliament can by law form a new state, increase the area of any state, diminish the area of any state, alter the boundaries

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of any state, or alter the name of any state.

Additional Information

Article 1: Names and Territory of the Union

Article 3: Formation of new states and alteration of areas, boundaries, or names of existing state

**Q8. Answer: (d) Neither I nor II**

The correct answer is Neither I nor II

Key Points

• The eight core industries in India are electricity, steel, refinery products, crude oil, coal, cement, natural gas, and fertilizers.

• The growth rate of the core sector is a key indicator of the overall health of the Indian economy.

• A strong growth rate in the core sector often signals a positive economic outlook.

**Q9. Answer: (b) Omkareshwar Floating Solar Plant**

The Correct answer is Omkareshwar Floating Solar Plant.

Key Points

• The Omkareshwar Floating Solar Plant in Khandwa, Madhya Pradesh is set to become the world's largest floating solar facility upon completion, with a planned capacity of 600 MW. As of late 2024 and early 2025, phases of this project were being commissioned, making it one of the largest in the world and in Asia

• This project aligns with India’s commitment to generating 500 GW of renewable energy by 2030, as part of its climate action plan.

• Floating solar projects are especially suitable for countries like India, where land availability for large-scale solar farms can be a challenge.

**Q10. Answer: (d) Open-well**

The correct answer is Open-well.

Key Points

• Open-wells are one of the most common sources of groundwater-based irrigation in India, particularly in rural areas.

• These wells are manually or mechanically dug to access groundwater, which is then used for irrigation purposes.

• Open-wells do not require advanced drilling technology, making them cost-effective and accessible for small and marginal farmers.

• This irrigation method relies on natural recharge processes, such as rainfall, to replenish the groundwater.

• Open-wells are widely used in regions where groundwater is available at shallow depths, such as parts of peninsular India.

Additional Information

• Groundwater Irrigation in India:

• Groundwater irrigation accounts for nearly 63% of the total irrigated area in India, making it the largest source of irrigation.

• It is primarily extracted using open-wells, tube wells, and bore wells.

• States like Punjab, Haryana, Uttar Pradesh, and Bihar are major users of groundwater for irrigation.

• Comparison with Surface Water Irrigation:

• Surface water irrigation uses sources like rivers, canals, ponds, and tanks, while groundwater irrigation depends on aquifers and underground reserves.

• Groundwater irrigation is independent of surface water flow, making it more reliable during dry seasons.

• Challenges of Groundwater Irrigation:

• Over-extraction of groundwater can lead to depletion of aquifers and falling water tables.

• Regions like Punjab and Haryana are facing critical groundwater stress due to excessive irrigation for water-intensive crops like paddy.

• Government Initiatives for Sustainable Irrigation:

• Programs like Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) aim to promote efficient water use and reduce dependence on groundwater.

• Micro-irrigation techniques like drip and sprinkler irrigation are being encouraged to save water and ensure sustainable farming.

**Q11. Answer: (c) Sikkim.**

The correct answer is Sikkim.

Key Points

• Sikkim is the only Indian state that shares its borders with three countries: Nepal in the west, Bhutan in the east, and China (Tibet Autonomous Region) in the north.

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• The state is strategically located in the eastern Himalayas and has a significant geopolitical importance for India.

• Sikkim became a part of India in 1975, merging as the 22nd state of the Indian Union through a referendum.

• The Nathula Pass, located in Sikkim, is a key trade route between India and China.

• Sikkim is renowned for its rich biodiversity, home to the Kanchenjunga National Park, a UNESCO World Heritage Site, and the world's third-highest mountain, Mount Kanchenjunga.

Additional Information

• Meghalaya

• Meghalaya is a northeastern state of India that shares its international border with Bangladesh but does not border Nepal, Bhutan, or China.

• It is known for its heavy rainfall, living root bridges, and biodiversity-rich tropical forests.

• Cherrapunji and Mawsynram in Meghalaya are among the wettest places on Earth.

• Mizoram

• Mizoram is another northeastern state of India sharing international borders with Myanmar to the east and south, and Bangladesh to the west.

• It is known for its rolling hills, dense bamboo forests, and cultural diversity with vibrant tribal traditions.

• Mizoram does not share borders with Nepal, Bhutan, or China.

• Assam

• Assam is a state in northeastern India that shares its international border with Bhutan and Bangladesh but not with Nepal or China.

• The state is famous for its tea plantations, Kaziranga National Park (home to the one-horned rhinoceros), and the Brahmaputra River.

• Assam is a vital hub for trade, culture, and biodiversity in the northeastern region of India.

**Q12. Answer: (c) Bir Shikargah**

The correct answer is Bir Shikargah Wildlife Sanctuary.

Key Points

• Bir Shikargah Wildlife Sanctuary, located in the Panchkula district of Haryana, India, is a protected ecological reserve covering approximately 767 hectares.

• Nestled in the Shivalik foothills of the Himalayas, it is particularly famous for housing the Jatayu Conservation and Breeding Centre, a pioneering facility for the conservation of critically endangered vulture species.

• Eco-Sensitive Zone: Declared an Eco-Sensitive Zone in 2009, development is restricted within a 5-km radius to protect its fragile ecosystem.

Additional Information

• Bhindawas Wildlife Sanctuary:

• Located in the Jhajjar district of Haryana.

• This sanctuary is a wetland ecosystem and is home to numerous migratory birds.

• It is recognized as a Ramsar site, highlighting its international importance for wetland conservation.

• Kalesar Wildlife Sanctuary:

• Situated in Yamunanagar district, Haryana.

• This sanctuary is part of the Shivalik Hills and is known for its dense forests and diverse wildlife.

• It hosts species like leopards, elephants, and several bird species.

• Nahar Wildlife Sanctuary:

• Located in the Rewari district of Haryana.

• This sanctuary primarily serves as a refuge for local wildlife and a variety of bird species.

• Its proximity to urban areas makes it a significant location for environmental education and awareness.

• Wildlife in Haryana:

• Haryana is home to 8 wildlife sanctuaries, each contributing to the preservation of the state's natural heritage.

• The state government has undertaken various initiatives to promote eco-tourism and wildlife conservation.

Important Points

• Bir Shikargah Wildlife Sanctuary is specifically focused on preserving the local ecosystem in the Panchkula region.

• Haryana's diverse sanctuaries, like Bhindawas and Kalesar, provide habitats for a wide range of species, showcasing the state's commitment to biodiversity conservation.

• Many of these sanctuaries serve as critical zones for migratory birds, rare species, and local wildlife.

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• Efforts like Ramsar site recognition and eco-tourism promotion enhance the value of Haryana's wildlife sanctuaries globally.

**Q13. Answer: (d) Basketball**

The correct answer is Basketball.

Key Points

• The Wade Trophy is an annual award in women's college basketball in the United States.

• It is named after the late Lily Margaret Wade, a former basketball coach at Delta State University.

• The award is presented to the best women's college basketball player in NCAA Division I.

• The Wade Trophy is considered one of the most prestigious individual awards in women's college basketball.

Additional Information

• NCAA Division I Women's Basketball

• The NCAA Division I Women's Basketball Tournament is an annual college basketball tournament for women.

• It determines the national champion in the top-tier level of college basketball in the United States, the NCAA Division I.

• The tournament was first held in 1982, and it has grown significantly in popularity and prestige over the years.

• Teams compete in a knockout format, and the tournament culminates in the "Final Four," which is the semi-finals and championship game.

• Lily Margaret Wade

• Lily Margaret Wade was a pioneering figure in women's basketball.

• She coached the Delta State University women's basketball team to three consecutive national championships from 1975 to 1977.

• Her contributions to the sport have been honored through the Wade Trophy, which is named in her memory.

• Other Prestigious Awards in Women's College Basketball

• John R. Wooden Award: Given annually to the most outstanding men's and women's college basketball players.

• Naismith College Player of the Year: Named in honor of Dr. James Naismith, awarded to the top men's and women's college basketball players.

• Ann Meyers Drysdale Award: Presented to the top shooting guard in women's NCAA Division I basketball.

**Q14. Answer: (d) Bharatanatyam**

The correct answer is Bharatanatyam

Key Points

• Bharatanatyam is a classical dance form that originated in Tamil Nadu, India, and is known for its intricate footwork, hand gestures, facial expressions, and body movements.

• Kalakshetra is a renowned dance institution in Chennai, Tamil Nadu, founded in 1936 by Rukmini Devi Arundale, a prominent dancer and theosophist. The institution is dedicated to the promotion and preservation of Bharatanatyam and other Indian classical art forms.

• The Kalakshetra style of Bharatanatyam is characterized by its emphasis on purity, precision, and simplicity. The movements are graceful, subtle, and expressive, and the costumes and makeup are minimalistic and traditional.

• The Kalakshetra style has influenced many other styles of Bharatanatyam and has contributed to the revival and popularity of the dance form in India and abroad.

Additional Information

• Odissi is a classical dance form that originated in Odisha, India, and is known for its fluid movements, sculpturesque poses, and expressive abhinaya (mime).

• It has a rich repertoire of themes and styles, including the mahari, nartaki, and gotipua traditions.

• Kathak is a classical dance form that originated in North India and is known for its rhythmic footwork, pirouettes, and storytelling.

• It has a strong influence of Persian and Mughal culture and has evolved into several styles, including the Jaipur, Lucknow, and Banaras gharanas.

• Kuchipudi is a classical dance form that originated in Andhra Pradesh, India, and is known for its dynamic movements, intricate footwork, and dramatic storytelling.

• It has a rich tradition of solo and group performances, and its repertoire includes mythological, devotional, and social themes.

**Q15. Answer: (d) Guru Nanak**

The correct answer is Guru Nanak Dev.

Key Points

• Guru Nanak Dev Ji is considered as the founder of Sikhism.

• He was born on 15th April 1469 in Rai Bhoi ki Talwandi, presently in Pakistan.

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• He died at the age of 70 in Kartarpur, Pakistan.

Additional InformationGurus of Sikhism:

| Number | Name | Important works |
|---|---|---|
| First | Guru Nanak | • founder of Sikhism - Langar instituted by him - Believed in universal god. - Against the Vedas and caste system. |
| Second | Guru Angad | • Gave importance of Gurumukhi script |
| Third | Guru Amardas | • Manji and Piri system instituted by him - Against the Sati system. |
| Fourth | Guru Ram das | • Anand Karaj was composed by him. |
| Fifth | Guru Arjan | • The first martyr of the Sikh religion. |
| Sixth | Guru Har Gobind | • Fought war against Shah Jahan and Jahangir. |
| Seventh | Guru Har Rai | • He gave shelter to Dara Shikhoh. |
| Eighth | Guru Har Krishna | • Aurangzeb summoned him in his forcibly. |
| Ninth | Guru Tegh Bahadur | • He popularized Sikhism in Assam and Bihar. |
| Tenth | Guru Gobind Singh | • He was the tenth and last guru of Sikhs as humans. - He was the founder of Khalsa. |
| Eleventh | Guru Granth Sahib | • Last eternal guru of Sikh. |

**Q16. Answer: (c) Energy**

• The capacity to perform work is called energy.

• Work and energy has the same unit. The unit in SI system is Joule while that in CGS system is Erg.

Additional Information

• Power is defined as the rate of doing work.

• It is a scalar quantity that has only magnitude but no direction.

• The SI unit of power is Watt.

• There is another unit of power i.e. horsepower.

• 1 h.p. = 746 Watts or 0.75 kW.

• When work is done, an equal amount of energy is consumed.

• 1 Watt is the power of an appliance that consumes energy at the rate of 1 Joule per second.

• 1 Watt = 1 Joule per second

**Q17. Answer: (b) As**

The correct answer is As.

Key Points

• The chemical formula of arsenic is As.

• Arsenic:

• Atomic number: 33

• Atomic mass: 74.93 u

• Arsenic is an element that causes arsenicosis.

• It is found in water that has flowed through arsenic-rich rocks.

• Arsenic and fluoride have been recognized by the World Health Organization (WHO) as the most serious inorganic contaminants in drinking water on a worldwide basis.

Additional Information

• There are 7 metalloids in the modern periodic table.

• The seven commonly recognized metalloids are:-

• Boron (B), Silicon (Si), germanium (Ge), arsenic (As), antimony (Sb), tellurium (Te), and Polonium*.*

• Metalloids Silicon and Germanium are widely used in the semiconductor industry.

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**Q18. Answer: (b) Anther**

The correct answer is Anther.

Key Points

• The male reproductive organ of the flower is known as the stamen.
• This produces pollen. Pollen is a powder produced from pollen grains, containing seed plant sperm cells.
• It is having two parts:
• Anthers - The part of the stamen where pollen is produced.
• Filaments - It is a stalk-like structure that connects the base of the flower with anther.
• The anther is composed of microsporangia.
• The Pistil is the female reproductive part of a flower.
• A floral style is a stalk that supports the stigma and connects it to the ovary.

Additional Information

• Ovary - It is the enlarged basal portion of the pistil, where ovules are produced.
• Pistil - It is the female reproductive part of the flower.
• Stigma - It is the part of the pistil where pollen germinates.
-

**Q19. Answer: (d) Fore-brain**

• Fore-brain is the main thinking part of the human brain.
• Fore-brain comprises of Cerebrum, Thalamus and Hypothalamus.
• The cerebrum controls all the voluntary activities like thinking, learning, reasoning, etc.
• Hind-brain comprises of Pons, Cerebellum and Medulla oblongata. The Medulla contains centres of respiration, cardiovascular reflexes, etc.
• Cerebellum maintains orientation, posture and equilibrium of the body.
• Mid-brain comprises of four lobes called corpora quadrigemina.

**Q20. Answer: (b) Nitrous Oxide**

The correct answer is Nitrous Oxide.

Key Points

• Nitrous oxide is a chemical compound.
• It is known as Laughing Gas or Haas Gas.
• Its chemical formula is N2O.
• It is a colourless and Non-flammable gas at room temperature.

Additional Information

• Hydrogen Peroxide is a chemical compound which formula is H2O2.
• Hydrogen Peroxide used as a bleaching agent, antiseptic, and oxidizer.
• Carbon monoxide is a toxic, colourless, tasteless gas.
• The carbon monoxide chemical formula is CO.
• Carbon monoxide is known as silent killer gas.
• The sulfur dioxide chemical formula is SO2.
• Sulfur dioxide is a toxic gas and it smells like burnt matches.
• Sulfur dioxide naturally released in Volcanic activity.

**Q21. Answer: (c) Endosperm**

• Endosperm is a tissue that surrounds the embryo in the seeds of angiosperms and provides nutrition to it in the form of starch and protein.
• The ovary is a female reproductive organ that produces female gametes and after fertilization, it develops to become a fruit.
• The ovule is present inside the ovary that develops into female reproductive cells and after fertilization, it develops into a seed.
• The egg fertilized by sperm is called Zygote.

**Q22. Answer: (b) Parasite**

The correct answer is Parasite.

Important Points

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• Cuscuta is a parasitic plant.

• Since Cuscuta does not have chlorophyll, it cannot synthesize its own food by photosynthesis.

• It uses the nutrients of host plants for its growth.

• Other parasitic plants are - Rafflesia, Viscum, Nuytsia floribunda.

• Parasitic plants cause damage to the host plant.

**Q23. Answer: (b) the recoil of the gun acts backward as reaction**

The correct answer is the recoil of the gun acts backward as reaction.

Key Points

• Newton's Third Law of Motion: When the gun is fired, it exerts a forward force on the bullet. In reaction, the bullet exerts an equal and opposite force on the gun. This is explained by Newton's Third Law of Motion, which states, "For every action, there is an equal and opposite reaction."

• Recoil of the gun: The backward motion of the gun after firing a bullet is called recoil. The gun moves backward as a reaction to the forward motion of the bullet.

• Conservation of Momentum: The firing process also illustrates the principle of conservation of momentum. Before firing, the total momentum of the system (gun and bullet) is zero. After firing, the backward momentum of the gun equals the forward momentum of the bullet, maintaining the total momentum of the system at zero.

• Air resistance and gravity: The forward motion of the bullet is not caused by air resistance or gravity. Air resistance acts as a retarding force, while gravity pulls the bullet downward. These forces do not contribute to the bullet's initial forward motion. Hence, statements 1 and 4 are incorrect.

• Force exerted by the barrel: The barrel guides the bullet's path but does not actively exert a forward force. The force comes from the combustion of gunpowder inside the chamber. Hence, statement 3 is incorrect.

Additional Information

• Newton's Laws of Motion:

• First Law: An object remains at rest or in uniform motion in a straight line unless acted upon by an external force.

• Second Law: The force acting on an object is equal to the mass of the object multiplied by its acceleration (F = ma).

• Third Law: For every action, there is an equal and opposite reaction.

• Conservation of Momentum:

• The total momentum of an isolated system remains constant if no external forces are acting on it.

• For example, in the case of firing a gun, the backward momentum of the gun is equal and opposite to the forward momentum of the bullet.

• This principle is fundamental in various fields, including rocketry and ballistics.

• Recoil Velocity:

• The backward velocity of the gun is called recoil velocity.

• It can be calculated using the formula derived from the conservation of momentum: $m_1v_1 = -m_2v_2$, where $m_1$ and $v_1$ are the mass and velocity of the bullet, and $m_2$ and $v_2$ are the mass and velocity of the gun.

• Applications of Conservation of Momentum:

• Rocket Propulsion: Rockets work on the same principle. The expulsion of gases in one direction results in the rocket moving in the opposite direction.

• Ballistics: The study of bullets and their motion also relies on the conservation of momentum.

• Water Sprinklers: Water exiting the nozzle of a sprinkler causes it to spin due to the reactionary force.

• Practical Implications:

• Recoil can be significant in larger firearms, and mechanisms like recoil pads or hydraulic systems are used to absorb the shock.

• In small firearms, the recoil is usually manageable but can still affect the shooter's accuracy.

Important Points

• Gunpowder Combustion: The forward motion of the bullet is due to the rapid expansion of gases from the combustion of gunpowder. This generates a high-pressure force that propels the bullet.

• Air Resistance: While the bullet moves forward, air resistance acts as a drag force, slowing it down over time. It does not contribute to the bullet's initial motion.

• Gravity's Role: Gravity influences the trajectory of the bullet, causing it to follow a parabolic path. However, it does not provide any forward force.

• Ballistics: The study of the motion of projectiles like bullets is called ballistics. It involves understanding forces like gravity, air resistance, and the initial propulsion.

• Safety Considerations: Recoil can impact the shooter, especially in high-caliber firearms. Proper training and equipment are essential to manage the recoil effectively.

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**Q24. Answer: (d) Voltmeter**

The correct answer is Voltmeter.

Key Points

• A voltmeter is an instrument used to measure the potential difference.

• A voltmeter is used between two points in an electric circuit to measure the potential difference between those two points.

• Voltmeter was invented in 1819 by Hans Oersted.

• The symbol for the voltmeter is shown below:

• Additional Information

• The ammeter is the instrument used for measuring current in the electrical circuit.

• The galvanometer is the instrument that detects current in the electrical circuit.

**Q25. Answer: (a) Gregor mendel**

The correct answer is Gregor Mendel

Explanation:

• Genetics is the study of heredity and the variation of inherited characteristics.

• Gregor Mendel, an Austrian monk, is considered the father of genetics due to his pioneering work with pea plants that laid the foundation for the understanding of how traits are inherited from one generation to the next.

• Mendel conducted experiments on pea plants in the mid-19th century.

• He discovered the fundamental laws of inheritance, including the concepts of dominant and recessive traits, segregation of alleles, and independent assortment.

• His work was published in 1866 but gained recognition posthumously.

Other Options:

• Thomas Hunt Morgan: Morgan is known for his work with the fruit fly (Drosophila melanogaster). He demonstrated that genes are located on chromosomes and discovered the phenomenon of genetic linkage.

• Francis Galton: A cousin of Charles Darwin, Galton was a pioneer in the field of eugenics and biostatistics. He studied heredity and human intelligence.

Additional Information

| Subjects | Father |
|---|---|
| Evolution / Natural selection | Charles Darwin |
| Taxonomy | Carl Linnaeus |
| Virology | Martinus Beijerinck |
| Zoology | Aristotle |

**Q26. Answer: (b) Cardiopulmonary Resuscitation**

The correct answer is option 2.

Key Points

• CPR (Cardiopulmonary Resuscitation) is an emergency lifesaving procedure performed when someone's heartbeat or breathing has stopped. Hence, option 2 is correct.

• It involves chest compressions and rescue breaths to restore circulation and oxygen supply to the brain.

• It is commonly used in cases of cardiac arrest, drowning, or choking.

**Q27. Answer: (b) dendrites**

The correct answer is dendrites.

Key Points

• Dendrites are the short, branched projections of a neuron that extend from the cell body (soma). These structures are primarily responsible for receiving signals from other neurons or sensory inputs.

• They play a critical role in transmitting electrical impulses toward the neuron’s cell body, allowing the neuron to process incoming information.

• Each neuron may have multiple dendrites, which increase the surface area for receiving synaptic connections, thus enhancing the neuron's ability to communicate with multiple other neurons.

• Dendrites contain specialized receptors that bind neurotransmitters released by other neurons at synapses, facilitating the transfer of information.

• The structure of dendrites can vary among different types of neurons, but their primary function remains the same – to receive and integrate information.

Additional Information

• Axons:

• An axon is a long, slender projection of a neuron that conducts electrical impulses away from the neuron's cell body to other neurons, muscles, or glands.

• Unlike dendrites, axons are usually singular and unbranched, although they may have collateral branches.

• The axon is often covered by a myelin sheath, which increases the speed of impulse transmission.

• Axons end in axon terminals, which form synapses with other neurons or target cells.

• Nuclei:

• In the context of neurons, "nuclei" refer to clusters of neuron cell bodies within the central nervous system, not a part of individual neurons.

• The nucleus of a neuron (located within the cell body) contains genetic material (DNA) and is essential for the cell's functioning and survival.

• Nerve Endings:

• Nerve endings are the terminal parts of neurons where they connect with target tissues (like muscles, glands, or other neurons).

• These endings are involved in transmitting signals via neurotransmitters or directly stimulating target cells.

• Neurons:

• Neurons are the fundamental structural and functional units of the nervous system, specialized for transmitting electrical and chemical signals.

• They consist of three main parts: the cell body (soma), dendrites, and axon.

• Neurons are classified into various types based on their structure (e.g., unipolar, bipolar, multipolar) and function (e.g., sensory, motor, interneurons).

Important Points

• Synaptic Connections: Dendrites form synapses with axon terminals of other neurons to receive neurotransmitters, which generate electrical signals called postsynaptic potentials.

• Plasticity: Dendrites exhibit plasticity, meaning they can change their structure and strength of connections in response to learning and experience. This phenomenon is known as synaptic plasticity.

• Dendritic Spines: Many dendrites have small, bulbous protrusions called dendritic spines, which further increase the surface area for synaptic connections and play a role in learning and memory.

• Role in Neural Networks: Dendrites are vital for integrating signals from thousands of synapses, enabling the neuron to generate an appropriate output signal.

**Q28. Answer: (a) Hydrometer**

The correct answer is Hydrometer.

Key Points

• A hydrometer is a device for measuring some characteristics of a liquid, such as its density or specific gravity.

• It works on the Archimedes principle.

• It is used to know the (specific) density of the fluid.

• The lower the density of the fluid, the more the hydrometer will sink.

Additional InformationImportant instruments:

| Instrument | Uses |
|---|---|
| Altimeter | Measures altitude of an aircraft |
| Ammeter | Measures electric current in ampere |
| Barometer | Measures atmospheric pressure |
| Calliper | Measures distance |
| Dynamometer | Measures torque |
| Ellipsometer | Measures optical refractive indices |
| Galvanometer | Measures electric current |
| Inclinometer | Measures angle of slope |

| | |
|---|---|
| Manometer | Measures pressure of the gas |
| Ohmmeter | Measures electric resistance |
| Pyrometer | Measures temperature of a surface |
| Anemometer | Measures wind speed |
| Photometer | Measures intensity of light |
| Seismometer | Measures motion of the ground (earthquake/ seismic waves) |
| Spectrometer | Measures spectra (light spectrum) |
| Thermometer | Measures temperature |
| Udometer | Measures amount of rainfall |
| Voltmeter | Measures volt |

**Q29. Answer: (a) Inhalation**

The correct answer is option 1 i.e Inhalation.

Important Points

• Breathing is the process of transfer of air into and out of the lungs to perform gas exchange.

• The breathing cycle consists of two processes namely inhalation and exhalation.

• The process of taking oxygen-rich air in the body is called inhalation.

• The process of giving out carbon dioxide-rich air is known as exhalation.

• Carbon dioxide is a waste product of cellular respiration during the production of energy.

• Both inhalation and exhalation are autonomic processes.

• The average respiration rates for an adult person at rest range from 12 to 20 breaths per minute.

• The average respiration rates for a newborn baby range from 30 to 40 breaths per minute.

**Q30. Answer: (d) Pseudopodia**

The correct answer is Pseudopodia.

Key Points

• Pseudopodia are temporary, finger-like projections of the cell membrane in amoeboid organisms like Amoeba.

• They play a crucial role in capturing food particles through a process called phagocytosis.

• Pseudopodia are formed by the cytoplasmic streaming mechanism, where the cytoplasm flows into the projections, causing the cell membrane to extend outward.

• Besides food intake, pseudopodia also help in locomotion, allowing the Amoeba to move by changing its shape and anchoring itself.

• These extensions are highly dynamic structures that continuously change their form to adapt to the environment and facilitate survival.

Additional Information

• Flagella:

• Flagella are whip-like structures used for locomotion in certain microorganisms such as bacteria and protozoa (e.g., Euglena).

• They are made of microtubules and powered by motor proteins that enable the organism to move in liquids.

• Unlike pseudopodia, flagella are permanent structures and are not involved in food intake.

• Cilia:

• Cilia are short, hair-like structures that cover the surface of certain cells (e.g., Paramecium).

• They beat rhythmically to enable movement and help in creating water currents for capturing food particles.

• Cilia are structurally similar to flagella but are smaller and more numerous.

• Vacuoles:

• Vacuoles are membrane-bound organelles found in cells, primarily used for storage and maintaining cellular homeostasis.

• In Amoeba, food vacuoles are formed after the pseudopodia engulf food particles, enclosing them for digestion.

• Unlike pseudopodia, vacuoles are not directly involved in the process of capturing food; they function after the food is ingested.

• Amoeba and its feeding mechanism:

• Amoeba is a unicellular organism that uses pseudopodia for both movement and feeding.

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• The process of food intake begins with the formation of pseudopodia that surround and engulf the food particle, forming a food vacuole.
• Enzymes inside the vacuole digest the food, and the nutrients are absorbed into the cytoplasm.
• The versatility of pseudopodia is essential for Amoeba's survival, as it enables adaptation to diverse environments.

**Q31. Answer: (a) 373**

Concept used:
Calculation:
121 ÷ 5 + (8740 ÷ 5 - 4) ÷ 5
=> 121 ÷ 5 + (8740 × 1/5 - 4) ÷ 5
=> 121 ÷ 5 + (1748 - 4) ÷ 5
=> 121 ÷ 5 + 1744 ÷ 5
=> 121 × 1/5 + 1744 × 1/5
=> 121/5 + 1744/5
=> 1865/5 = 373
Therefore The correct answer is 373.

**Q32. Answer: (b) 4**

Shortcut Trick
For divisibility by 3, the sum of digits must be divisible by 3.
Sum of 6 + 5 + 7 + 3 + 2 + 1 + A = 24 + A.
Since 24 is already divisible by 3, A can be 0, 3, 6, or 9.
Total possible values for A = 4.
Therefore The correct answer is 4.
Alternate Method
Given: The number is 657321A and it is divisible by 3.
Formula Used: A number is divisible by 3 if the sum of its digits is a multiple of 3.
=> Sum of digits = 6 + 5 + 7 + 3 + 2 + 1 + A
=> Sum = 24 + A
=> For (24 + A) to be divisible by 3, A must be a single-digit whole number {0, 1, 2, 3, 4, 5, 6, 7, 8, 9}.
=> Possible values of A: 0 (24+0=24), 3 (24+3=27), 6 (24+6=30), 9 (24+9=33).
=> Total count of values = 4.
Therefore The correct answer is 4.
Additional Information
Divisibility by 9
Similar to the rule of 3, a number is divisible by 9 if the sum of its digits is divisible by 9.
Divisibility by 6
A number is divisible by 6 if it satisfies the divisibility rules of both 2 (even number) and 3 (sum of digits divisible by 3).
Digit Constraints
In place-value problems, a single digit like A can only take integer values from 0 to 9.

**Q33. Answer: (b) 3/2 years**

Given:
Principal = Rs. 18,000
SI = Rs. 2700
Rate = 10%
Formula used:
SI = (P × R × T)/100
Calculation:
According to the question
=> 2700 = (18000 × 10 × t)/100
=> 2700 = 1800t
=> t = 2700/1800

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=> t = 3/2

Therefore The required time is 3/2 years

**Q34. Answer: (d) 1%**

Given:-

(1) Monthly income = Rs. 1,50,000

(2) Savings = Rs. 1,500

Formula used:-

Percentage = (Savings /Total Monthly income) × 100

Calculation:-

=> Percentage of his savings =(1500/150000) × 100

=> Percentage of his savings = 1%

Therefore The required answer is 1%.

**Q35. Answer: (a) Rs. 1200**

Shortcut Trick

Total work = LCM(15, 20, 25) = 300 units.

Efficiency ratio (A : B : C) = 300/15 : 300/20 : 300/25 = 20 : 15 : 12.

Since they worked together for the entire duration, their wages are distributed directly in the ratio of their efficiencies.

C's share = [12 ÷ (20 + 15 + 12)] × 4700 = (12 ÷ 47) × 4700 = Rs. 1200

Therefore The correct answer is Rs. 1200.

Alternate Method

Given:

A can finish the work in 15 days.

B can finish the work in 20 days.

C can finish the work in 25 days.

Total wages earned = Rs. 4700.

Concept Used:

Wages are distributed in proportion to the total work done by each person. If they work together for the same number of days, the wages are divided strictly in the ratio of their daily efficiencies.

| Person | Days | Total Work | Efficiency |
|---|---|---|---|
| A | 15 | 300 | 20 |
| B | 20 | 15 | |
| C | 25 | 12 | |

Calculation:

=> Ratio of their wages = Efficiency of A : Efficiency of B : Efficiency of C

=> Wage ratio = 20 : 15 : 12

=> Sum of ratio parts = 20 + 15 + 12 = 47 parts

=> Total wages = 47 parts = Rs. 4700

=> Value of 1 part = 4700 ÷ 47 = Rs. 100

=> Share of C = 12 parts

=> Share of C = 12 × 100 = Rs. 1200

Therefore The correct answer is Rs. 1200.

Additional Information

Work and Wages

Wages are always distributed in the ratio of the total work done by each individual. If persons work for an equal number of days from start to finish, the wages are divided proportionally to their per-day efficiency.

Leaving Mid-way or Joining Later

If someone leaves the work midway or joins late, their total share is strictly proportional to the actual units of work they have personally completed (Efficiency × Number of days worked).

Pipes and Cisterns

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This concept operates identically to Time & Work. Filling pipes have a positive efficiency (similar to completing a task), whereas leakages or emptying pipes have a negative efficiency (similar to destroying work).

**Q36. Answer: (d) 35.71 days**

Given:

The garrison of 100 men has provisions for 50 days

Formula used:

$m1 \times d1 = m2 \times d2$

Where, m1 = men1

m2 = men2

d1 = day1

d2 = day2

Calculation:

According to the question:

$100 \times 50 = (100 + 40) \times d2$

$d2 = 35.71$ days

Therefore Food will last for 35.71 days

**Q37. Answer: (b) 13**

Shortcut Trick

Observe the unit digit of 169, which is 9.

A perfect square ending in 9 must have a square root ending in either 3 or 7.

Since $10^2 = 100$ and $20^2 = 400$, the square root must be between 10 and 20.

Testing 13: $13 \times 13 = 169$.

Therefore The correct answer is 13.

Alternate Method

Given: Number = 169

Method: Prime Factorization

$\Rightarrow 169 = 13 \times 13$

$\Rightarrow \sqrt{169} = \sqrt{(13 \times 13)}$

$\Rightarrow \sqrt{169} = 13$

Therefore The correct answer is 13.

Additional Information

Perfect Squares

A perfect square is an integer that is the square of an integer. For example, 144 ($12^2$) and 196 ($14^2$) are perfect squares.

Prime Numbers

13 is a prime number, meaning it has only two distinct factors: 1 and 13. Therefore, 169 only has factors 1, 13, and 169.

Square Root Properties

The square root of a number x is a value y such that $y^2 = x$. For positive numbers, there is one positive square root.

**Q38. Answer: (b) 62.8 cm**

Given:

Area of the circle = 314 $cm^2$

$\pi = 3.14$

Formula Used:

Area of a circle, $A = \pi \times r^2$

Circumference of a circle, $C = 2 \times \pi \times r$

Calculation:

Given, Area (A) = 314 $cm^2$

$314 = 3.14 \times r^2$

$\Rightarrow r^2 = 314 / 3.14$

$\Rightarrow r^2 = 100$

$\Rightarrow r = \sqrt{100}$

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=> r = 10 cm

Now, Circumference (C) = 2 × π × r

=> C = 2 × 3.14 × 10

=> C = 62.8 cm

The circumference of the circle is 62.8 cm.

**Q39. Answer: (c) 12**

Shortcut Trick

For an equilateral triangle, distances are equal (d1 = d2 = d3).

Average Speed = 3 ÷ (1/s1 + 1/s2 + 1/s3)

Average Speed = 3 ÷ (1/12 + 1/24 + 1/8) = 3 ÷ [(2 + 1 + 3)/24]

Average Speed = (3 × 24) ÷ 6 = 12 kmph.

Therefore The correct answer is 12 kmph.

Alternate Method

Given: Speeds s1 = 12 kmph, s2 = 24 kmph, s3 = 8 kmph. Distance is equal for all sides.

Let the length of each side of the equilateral triangle be the LCM of (12, 24, 8) = 24 km.

=> Total Distance = 24 + 24 + 24 = 72 km

=> Time taken for side 1 (t1) = 24 ÷ 12 = 2 hours

=> Time taken for side 2 (t2) = 24 ÷ 24 = 1 hour

=> Time taken for side 3 (t3) = 24 ÷ 8 = 3 hours

=> Total Time = 2 + 1 + 3 = 6 hours

=> Average Speed = Total Distance ÷ Total Time = 72 ÷ 6 = 12 kmph

Therefore The correct answer is 12 kmph.

Additional Information

Average Speed (Equal Distances)

For two equal distances with speeds x and y, Average Speed = 2xy/(x + y). For three equal distances, use the Harmonic Mean formula.

Equilateral Triangle Property

In an equilateral triangle, all three sides are equal in length, which is why we assume the distance for each speed to be identical.

LCM Method for Speed

Assuming distance as the Least Common Multiple of given speeds simplifies calculations by providing whole number time values.

**Q40. Answer: (a) 450 m**

Given:

Area of a rectangular ground (A) = 12500 m2

Length (L) = 125 m

Concept used:

Area of rectangle = Length × Breadth

Perimeter = 2 × (Length + Breadth)

Calculation:

Area of rectangle = Length × Breadth

12500 = 125 × Breadth

=> Breadth = (12500/125) = 100 m

Perimeter = 2 × (Length + Breadth)

= 2 × (125 + 100)

= 450 m

Therefore Perimeter of rectangular ground = 450 m

**Q41. Answer: (b) 30**

Concept used:

Follow the BODMAS rule as given in the below table:

Calculation:

=> 6 × 7 - {9 ÷ 3 + [3 × (5 - 2)]}

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=> 6 × 7 - {9 ÷ 3 + [3 × 3]}
=> 6 × 7 - {9 ÷ 3 + [9]}
=> 6 × 7 - {3 + 9}
=> 42 - 12
=> 30
TheThw answer is 30.

**Q42. Answer: (c) 12 cm**

Shortcut Trick
Ratio of Width : Length = 1 : 3
Given, 1 unit = 4 cm
Therefore 3 units = 3 × 4 = 12 cm
Therefore The correct answer is 12 cm.
Alternate Method
Given:
Width (W) of the rectangle = 4 cm
Relationship: Length (L) = 3 × Width (W)
Calculation:
=> Length = 3 × Width
=> Length = 3 × 4 cm
=> Length = 12 cm
Therefore The correct answer is 12 cm.
Additional Information
Area of a Rectangle
The total space enclosed by a rectangle is calculated as Length × Width.
Perimeter of a Rectangle
The total boundary length of a rectangle is given by the formula 2 × (Length + Width).
Diagonal of a Rectangle
The length of the diagonal connecting opposite vertices is √(Length² + Width²).

**Q43. Answer: (d) 216 seconds**

Given:-
An 1800 m long train is running at the speed of 30 km/hr.
The train passes a signal pole near the railway line.
Formula used:-
1 km = 1000 m,
1 hr = 3,600 seconds (s)
Time = Distance/Speed
Calculation:-
Length of train = Distance covered in passing the pole = 1800 m
Speed of train = 30 km/hr
=> Speed of train = (30 × 1000)/(1 × 3,600) m/s
=> Speed of train = 25/3 m/s
Time = Distance covered by train in passing the pole/Speed of train
=> 1800/(25/3) seconds
=> 216 seconds
Therefore The required answer is 216.

**Q44. Answer: (c) 4 : 12 : 30 : 45**

Shortcut Trick
Write the ratios side-by-side and fill gaps with the adjacent number:
a : b : c : d
1 : 3 : 3 : 3

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2 : 2 : 5 : 5
2 : 2 : 2 : 3
Multiply vertically: (1×2×2) : (3×2×2) : (3×5×2) : (3×5×3) = 4 : 12 : 30 : 45.
Therefore The correct option is C.
Alternate Method
Given: a : b = 1 : 3, b : c = 2 : 5, c : d = 2 : 3
Formula Used: Ratio balancing by making common terms equal.
a : b 1 : 3 b : c 2 : 5 c : d 2 : 3 Target Ratio → a : b : c : d = 4 : 12 : 30 : 45
=> To combine (a : b) and (b : c), multiply (a : b) by 2 and (b : c) by 3.
=> a : b : c = (1 × 2) : (3 × 2) : (5 × 3) = 2 : 6 : 15
=> Now, to combine (a : b : c) and (c : d), the common term is c.
=> In (a : b : c), c = 15. In (c : d), c = 2. LCM of 15 and 2 is 30.
=> Multiply (a : b : c) by 2 and (c : d) by 15.
=> a : b : c : d = (2 × 2) : (6 × 2) : (15 × 2) : (3 × 15)
=> a : b : c : d = 4 : 12 : 30 : 45
Therefore The correct option is C.
Additional Information
Compound Ratio
For two ratios a : b and c : d, the compound ratio is (a × c) : (b × d).
Mean Proportional
The mean proportional between two numbers x and y is given by √(x × y).
Third Proportional
If a : b = b : c, then c is the third proportional to a and b, calculated as $c = b^2 \div a$.
Invertendo Rule
If a : b = c : d, then b : a = d : c.

**Q45. Answer: (c) Rs. 1440**

Shortcut Trick
Marked Price (MP) = Rs. 1600
Discount% = 10%
Multiplier for SP = (100 − 10) ÷ 100 = 0.9
Selling Price (SP) = 1600 × 0.9 = 1440
Therefore The correct answer is Rs. 1440.
Alternate Method
Given: Marked Price = Rs. 1600, Discount Rate = 10%
Formulas: Discount = MP × (Discount% ÷ 100) | SP = MP − Discount
=> Discount = 1600 × (10 ÷ 100) = Rs. 160
=> Selling Price (SP) = 1600 − 160
=> Selling Price (SP) = Rs. 1440
Therefore The correct answer is Rs. 1440.
Additional Information
Marked Price (MP)
The price printed on an item or the label price is called the Marked Price. Discounts are always calculated on this value.
Selling Price (SP)
The actual price at which the item is sold to the customer after deducting the discount from the MP.

**Q46. Answer: (d) 252**

The pattern followed here is;
Hence, the correct answer is "252".

**Q47. Answer: (a) MN**

The positions of the letters according to the English alphabet series:
The pattern for this is as follows;

Similarly;

Hence, the correct answer is "MN".

**Q48. Answer: (c) 31**

Given: Suresh is 13th from the bottom and 19th from the top.

Here, total students = 19 + 13 − 1 = 31.

So, there are '31' students in his class.

Hence, the correct answer is "Option 3".

**Q49. Answer: (d) Shweta**

As per the given information, the sitting arrangement is:

1. Kajal is second to the left of Laxmi and Payal is the immediate neighbour of both Mansi and Laxmi.
2. Aarti is second to the left of Kajal and Monika is not the immediate neighbour of Laxmi.
3. The remaining girl Shweta is sitting to the right of Kajal.

Here, 'Shweta' is sitting second to the left of Payal.

Hence, the correct answer is "Option (4)".

**Q50. Answer: (a) 1225**

The logic followed here is:

Logic: (1st number)$^2$ = 2nd number.

Now,

For, 25 : 625

=> $25^2 = 625$.

Similarly, for 35 : ?

=> $35^2 = 1225$.

Hence, the correct answer is "Option 1".

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