Agniveer Army GD 3rd June 2026 (Shift 1) 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. Which tribal leader from Jharkhand led the 'Ulgulan' (Great Rebellion) movement against British exploitation of tribal lands?

(a) Sidhu Murmu
(b) Kanhu Murmu
(c) Birsa Munda
(d) Tilka Manjhi

Q2. Where are the Andaman and Nicobar islands situated?

(a) Arabian sea
(b) Indian ocean
(c) Bay of Bengal
(d) Red sea

Q3. In which part of India do the Himalayas lie from southwest to northwest direction?

(a) Tripura
(b) Meghalaya
(c) Mizoram
(d) Arunachal Pradesh

Q4. Which of the following words is mentioned in the preamble of the Indian constitution regarding 'Justice'?

(a) Secular
(b) Socialist
(c) Sovereign
(d) Economic

Q5. "My Life" is the autobiography of _____?

(a) Dr. Rajendra Prasad
(b) Bill Clinton
(c) Hillary Clinton
(d) Dr. APJ Abdul Kalam

Q6. Who is known as the 'Grand Old Man of India'?

(a) Dadabhai Naoroji
(b) Gopal Krishna Gokhale
(c) Bal Gangadhar Tilak
(d) A.O. Hume

Q7. Which Indian state hosted the 38th National Games of India in 2025?

(a) Gujarat
(b) Karnataka
(c) Uttarakhand
(d) Maharashtra

Q8. The first state to establish Panchayati Raj in 1959 was _____.

(a) Haryana
(b) Rajasthan
(c) Uttar Pradesh
(d) Punjab

Q9. Which crop is most suitable for dry farming in Rajasthan?

(a) Rice
(b) Wheat
(c) Bajra
(d) Sugarcane

Q10. What is the uppermost layer over the earth's surface called?

(a) Magma
(b) Core
(c) Mantle
(d) Crust

Q11. Which fibre is called the 'Golden Fibre' ?

(a) Cotton
(b) Jute
(c) Rayon
(d) Wool

Q12. Which film won the prestigious Golden Peacock Award for Best Feature Film at the 56th International Film Festival of India (IFFI) in November 2025?

(a) Gondhal
(b) Skin of Youth
(c) Little Trouble Girls
(d) Poet

Q13. Which among the following is a saltwater lake?

(a) Barapani lake
(b) Sambhar lake
(c) Loktak lake
(d) Bhimtal lake

Q14. India created history by clinching its maiden ICC Women’s ODI World Cup title on November 2, 2025, defeating South Africa by 52 runs at the DY Patil Stadium, Navi Mumbai. Who was named the Player of the Match in the final?

(a) Harmanpreet Kaur
(b) Shafali Verma
(c) Deepti Sharma
(d) Laura Wolvaardt

Q15. What is the motto of the Indian Army?

(a) Satyameva Jayate
(b) Karo Ya Maro
(c) Service Before Self
(d) Vande Mataram

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GENERAL SCIENCE

Q16. Which disease is caused by the deficiency of Vitamin-A?

(a) Scurvy
(b) Night blindness
(c) Rickets
(d) Beri-Beri

Q17. The dimensional formula of surface tension is -

(a) [M¹L²T^0]
(b) [M¹L¹T^(-2)]
(c) [M¹L¹T^(-1)]
(d) [M¹L^0T^(-2)]

Q18. The SI Unit of Charge is -

(a) Ampere
(b) Volt
(c) Coulomb
(d) Ohm

Q19. Which gas is typically produced when metal reacts with acids?

(a) Carbon dioxide
(b) Oxygen
(c) Hydrogen
(d) Nitrogen

Q20. The force generated due to the rotation of the Earth is called _____.

(a) Kinetic Force
(b) Coriolis force
(c) Pressure Prevalence
(d) Gravitational Force

Q21. Indian LPG is a mixture of :

(a) Sulphur and hydrogen
(b) Butane and oxygen
(c) Butane and propane
(d) methane and oxygen.

Q22. Complete digestion of food occurs in:

(a) Stomach
(b) Small Intestine
(c) Pancreas
(d) Large Intestine

Q23. Energy is stored in liver and muscles in the form of

(a) Carbohydrate
(b) Fat
(c) Protein
(d) Glycogen

Q24. Which of the following acids is found in spinach?

(a) Oxalic acid
(b) Tartaric acid
(c) Ascorbic acid
(d) Acetic acid

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Q25. Which of the following best describes an opaque object?

(a) An object that allows light to pass through it completely
(b) An object that reflects light
(c) An object that does not allow light to pass through it
(d) An object that bends light

Q26. Which of the following natural resources is referred as ‘buried sunshine’ ?

(a) Gold
(b) Silver
(c) Coal
(d) Shale gas

Q27. Which of the following is the causative agent of Ergot disease?

(a) Virus
(b) Bacteria
(c) High temperature
(d) Fungus

Q28. What components are part of the electric circuit in the Shielded Metal Arc Welding (SMAW) process?

(a) The power source, shielding gas, and filler rod
(b) The power source, welding cables, electrode holder, workpiece, and electrode
(c) The power source, flux, and cooling system
(d) The power source, plasma gas, and wire feed system

Q29. A ball is thrown vertically upward with a speed of 30 m/s. The magnitude of its displacement after 4 s will be _____ (Take g = 10 m/s².)

(a) 50 m
(b) 40 m
(c) 30 m
(d) 15 m

Q30. If a body's net external force is zero, then it has

(a) Zero time
(b) Zero acceleration
(c) Zero mass
(d) Non-zero acceleration

MATHEMATICS

Q31. Find the value of x so that the numbers 4, 10, 24 and x are in proportion

(a) 60
(b) 45
(c) 40
(d) 50

Q32. In what duration (in years) will Rs. 7,200 fetch a simple interest of Rs. 1,080 at 6% per annum rate of interest?

(a) 2.5
(b) 1.5
(c) 5
(d) 3.5

Q33. The mode of the observations 7, 5, 6, 3, 3, 7, 1, 7, 8, 7, 1, 4, 8, 8 and 4 is:

(a) 7
(b) 6
(c) 3

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(d) 5

Q34. Find the area of circle whose radius is 8.4cm. (π = 22/7)

(a) 221.76 cm²
(b) 220.50 cm²
(c) 120.75 cm²
(d) 260.26 cm²

Q35. Simplify: 1723 + 551 ÷ 19 - 12 × 32

(a) 1301
(b) 1571
(c) 1421
(d) 1368

Q36. If 4% of x = 96, then x is equal to:

(a) 2500
(b) 2400
(c) 4800
(d) 4900

Q37. The price of 3 pens is equal to the price of 5 pencils. The price of 5 pens and 3 pencils is Rs. 34. The price of 3 pen and 5 pencils is Rs. ____.

(a) 31
(b) 35
(c) 32
(d) 30

Q38. What will be the remainder when the largest two digit prime number is divided by 6?

(a) 1
(b) 5
(c) 2
(d) 3

Q39. If a + b = 7 and ab = 12, then what will be the value of $a^2 + b^2$?

(a) 40
(b) 25
(c) 39
(d) 45

Q40. Find the square of 16:

(a) 144
(b) 196
(c) 289
(d) 256

Q41. What will be the value of cbrt6859 ?

(a) 16
(b) 62
(c) 19
(d) 61

Q42. The average price of three items is Rs. 14,265. If their prices are in the ratio 7 : 9 : 11, then the price of the costliest item is:

(a) Rs. 19,875
(b) Rs. 16,235
(c) Rs. 14,875

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(d) Rs. 17,435

Q43. Simplify 1600 + 60 × 2 + 300 = ?

(a) 2052
(b) 2020
(c) 2040
(d) 2660

Q44. Selling price and cost price of an article are Rs. 1333 and Rs. 2150. What will be the loss percentage?

(a) 38%
(b) 61.30%
(c) 485
(d) 54.4%

Q45. The sum of two numbers is 45 and their difference is 9. Find the smaller number.

(a) 12
(b) 18
(c) 15
(d) 20

LOGICAL REASONING

Q46. Six people, A, B, C, D, E, and F are seated in a row facing north. Only two people sit to the right of C. Only two people sit between B and C. F sits fourth to the right of B. E is an immediate neighbour of A and B. What is the position of D?

(a) Third to the left of A
(b) Third to the right of E
(c) Third to the left of E
(d) Third to the right of A

Q47. Jigyasa is seven ranks ahead of Shekhar in a class of forty students. If Shekhar is 16^(th)from the last, what is Jigyasa’s rank from the top?

(a) 16^(th)
(b) 15^(th)
(c) 18^(th)
(d) 17^(th)

Q48. Select the option that is related to the fourth term in the same way as the first term is related to the second term.

Theatre : Actor :: Laboratory : ?

(a) Microscope
(b) Scientist
(c) Astronomer
(d) Lab-coat

Q49. In a certain code language, 'GATE' is coded as '3579' and 'THIN' is coded as '4236'. What is the code for 'T' in that language?

(a) 4
(b) 3
(c) 2
(d) 7

Q50. If '-' is multiplication, '+' is division, '. ' is subtraction and '÷' is addition, then find the correct equation.

(a) 5 ÷ 8 - 3.3 = 36
(b) 9 + 3 - 1 ÷ 9 = 10
(c) 15.2 - 3 + 3 = 39

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(d) 9 - 7 ÷ 7 + 7 = 64

ANSWER KEY

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

SOLUTIONS

Q1. Answer: (c) Birsa Munda

The correct answer is Birsa Munda.

Key Points

• Birsa Munda was a prominent tribal leader from the Munda tribe in Jharkhand, renowned for his leadership during the 'Ulgulan' (Great Rebellion), which occurred during the late 19th century.

• He led the rebellion against British colonial exploitation and the oppressive feudal system imposed on tribal lands. His movement aimed to protect the indigenous identity and rights of the tribal people.

• The rebellion focused on resisting the British policies of land revenue and the exploitation of tribal communities by landlords, moneylenders, and British officials.

• Birsa Munda is considered a hero and a symbol of tribal resistance, and his efforts brought significant attention to the plight of tribal communities under British rule.

• He passed away at the young age of 25 years in 1900, but his contributions remain a source of inspiration for tribal rights movements in India.

Additional Information

• Birsa Munda's Early Life:

• He was born on 15 November 1875 in the village of Ulihatu, Jharkhand, and grew up in a rural tribal community.

• Birsa Munda received education from missionary schools, where he learned about Christianity and Western ideologies but later focused on tribal traditions and practices.

• 'Ulgulan' Movement:

• The term 'Ulgulan' translates to 'The Great Tumult', signifying the uprising of tribal communities against British rule and exploitation.

• It was primarily aimed at the restoration of tribal rights to land and the abolition of forced labor and oppressive systems.

• Birsa Munda advocated for the establishment of a self-governed tribal state free from British interference.

• Legacy:

• Birsa Munda is regarded as a freedom fighter and a symbol of tribal unity and resilience.

• The Jharkhand state was officially created in 2000, fulfilling the demand for tribal autonomy, which was inspired by leaders like Birsa Munda.

• His contributions are commemorated through Birsa Munda Airport in Ranchi and various institutions named after him.

• Other Tribal Leaders:

• Sidhu Murmu: Along with Kanhu Murmu, led the Santhal Rebellion (1855-1856) against British exploitation of the Santhal tribe's lands and resources.

• Kanhu Murmu: Co-leader of the Santhal Rebellion alongside Sidhu Murmu, focusing on tribal rights and resistance against British policies.

• Tilka Manjhi: The first tribal leader to revolt against British colonial rule in 1784, representing the tribal uprising in Bihar.

Important Points

• Impact on Tribal Movements:

• Birsa Munda's movement laid the foundation for several tribal rights movements in India, advocating for the preservation of indigenous culture, traditions, and land rights.

• The struggle highlighted the exploitation faced by tribal communities and remains an important part of India's freedom struggle history.

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• Commemoration:

• Birsa Munda's birth anniversary, 15 November, is celebrated as Jharkhand Foundation Day, marking the creation of Jharkhand state.

• His life and achievements have been the subject of books, documentaries, and public memorials across India.

Q2. Answer: (c) Bay of Bengal

The correct answer is Bay of Bengal.

Key Points

• The Andaman and the Nicobar Islands lie to the southeast of the Indian mainland in the Bay of Bengal.

• Andaman and Nicobar Islands is a union territory in India.

• There are a total of 572 islands in Andaman and Nicobar.

• Port Blair is the territorial capital of Andaman and Nicobar.

• The Andaman in the south is separated from the Nicobar Islands by the Ten Degree Channel.

• Andaman and Nicobar were earlier known as Emerald islands.

• Onch, Jarawa, Sentinelis etc are the major tribal peoples of Andaman and Nicobar.

• Barren Island is the only active volcano in Andaman and Nicobar.

• The British captured Andaman and Nicobar in 1872.

Additional Information

• Lakshadweep is the smallest union territory of India.

• It is situated in the Arabian sea.

• The Maldives is the country lying nearest to Lakshadweep.

• Minicoy is an island in Lakshadweep.

• Minicoy is also known as "island without crow".

• Amindiv is an island in Lakshadweep.

• Formerly Lakshadweep was known as Laccadive, Minicoy, and Amindivi Islands,

Q3. Answer: (d) Arunachal Pradesh

The Correct Answer is Arunachal Pradesh.

Key Points

• The Himalayas in the Darjiling and Sikkim regions lie in an east-west direction, while in Arunachal Pradesh they are from the southwest to the northwest direction.

• Dihang River/Siang River is the name given to the Brahmaputra River in Arunachal Pradesh.

• Punjab/Kashmir Himalayas

• The part of the Himalayas that lies between the Indus River and Satluj River.

• Kumaon Himalayas

• The part of the Himalayas that lies between Satluj River and Kali River.

• Nepal Himalayas

• The part of the Himalayas that lies between the Kali River and Teesta River.

• Assam Himalayas

• The part of the Himalayas that lies between the Teesta River and the Dihang River.

• Purvanchal / Eastern Himalayas

• The part of the Himalayas that lies beyond the Dihang River valley.

Additional Information

• The Himalayas: These are geologically young and structurally fold mountains.

• They stretch over the northern borders of India.

• They represent the loftiest and one of the most rugged mountain barriers in the world.

• This mountain ranges run in a west-east direction from the river Indus to the Brahmaputra.

• They form an arc, which covers a distance of about 2,400 Km.

• Their width varies from 400 Km in Kashmir to 150 Km in Arunachal Pradesh.

Q4. Answer: (d) Economic

The correct answer is Economic.

Key Points

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• The Preamble of the Indian Constitution mentions various ideals that the nation strives to achieve, including Justice.

• Justice in the Preamble is categorized into three forms: Social, Economic, and Political, reflecting the core objectives of the Indian Constitution.

• Social justice aims to eliminate inequalities among individuals in society and ensure equal treatment for all, regardless of caste, gender, or religion.

• Economic justice ensures that wealth and resources are distributed fairly and that there is no exploitation of the economically weaker sections of society.

• Political justice guarantees equal participation in the democratic process, ensuring every citizen has an equal voice in governance.

• Among the listed options, Economic specifically refers to one of the forms of Justice explicitly mentioned in the Preamble. Hence, this is the correct answer.

Additional Information

• The Preamble to the Indian Constitution:

• The Preamble serves as the introductory statement of the Constitution, highlighting the guiding principles and objectives of the nation.

• It was adopted on 26th November 1949 and came into effect on 26th January 1950.

• The Preamble declares India as a Sovereign, Socialist, Secular, Democratic Republic.

• It guarantees citizens Justice, Liberty, Equality, and Fraternity.

• The ideals mentioned in the Preamble were inspired by the Objectives Resolution proposed by Jawaharlal Nehru on December 13, 1946

• Forms of Justice in the Preamble:

• Social Justice: Elimination of social discrimination and promotion of equality among all citizens.

• Economic Justice: Fair distribution of wealth and opportunities, ensuring protection against economic exploitation.

• Political Justice: Equal rights to participate in the political process and governance.

• Key Features of the Preamble:

• The Preamble is considered the spirit of the Constitution and provides the framework for its interpretation.

• It underwent an amendment during the 42nd Constitutional Amendment Act, 1976, which added the terms Socialist, Secular, and Integrity.

• The Preamble is non-justiciable, meaning its provisions cannot be enforced in a court of law.

• Important Terms in the Preamble:

• Sovereign: India has the supreme authority to make decisions without external interference.

• Socialist: The government strives for social and economic equality.

• Secular: India does not promote any particular religion and treats all religions equally.

• Democratic: Power lies with the people, who elect their representatives.

• Republic: India has an elected head of state (the President) rather than a monarch.

Important Points

• The 42nd Amendment (1976):

• Known as the Mini Constitution, this amendment added the words Socialist, Secular, and Integrity to the Preamble.

• It reinforced the goal of achieving social and economic justice for all citizens.

• Dr. B.R. Ambedkar’s Contribution:

• Dr. Ambedkar, the Father of the Indian Constitution, emphasized Justice as a cornerstone for the nation’s development.

• He advocated for the protection of marginalized communities and the elimination of social inequalities.

• Judicial Interpretation:

• The Supreme Court of India has described the Preamble as the key to the Constitution and an essential guide to its interpretation.

• In the landmark case of Keshavananda Bharati v. State of Kerala (1973), the Preamble was upheld as part of the Constitution’s basic structure.

Q5. Answer: (b) Bill Clinton

The correct answer is Bill Clinton.

Key Points

• "My Life" is the autobiography of Bill Clinton.

• He was the 42nd President of United States.

• Some important books and their authors :

• | Books | Author |

Becoming	Michelle Obama
Thoughts on Pakistan	B.R.Ambedkar
Wings of fire	A.P.J Abdul Kalam
What Happened	Hillary Clinton

Q6. Answer: (a) Dadabhai Naoroji

The correct answer is option 1 i.e Dadabhai Naoroji.

• Dadabhai Naoroji Dordi also known as the "Grand Old Man of India".

• Co-founder of the Indian National Congress.

• Father of Indian Economics.

• The propounder of 'Drain theory in India'.

• The first person attempted to calculate National income in India.

• Notable works:

• Poverty and Un-British Rule in India.

• The European and Asiatic races.

• Condition of India.

• The European and Asiatic races.

Gopal Krishna Gokhale	• The founder of Servants of India society. - Political guru of Mahatma Gandhi. - He is also known as Prince of workers.
Bal Gangadhar Tilak	• Popularly known as 'Lokmanya'. - Sir Valentine Chirol called him the 'Father of Indian unrest'. - Newspapers started by him: The Maratha, Kesari.
A.O. Hume	• Co-founder of the Indian National Congress. - He is also called the 'Pope of Indian ornithology'. - Notable works: - Hints on Esoteric Theosophy. - List of the Birds of India. - The Nests and Eggs of Indian Birds. - Stray Feathers.

Q7. Answer: (c) Uttarakhand

The correct answer is Uttarakhand.

Key Points

• The 38th National Games of India are officially scheduled to be hosted by the state of Uttarakhand in 2025.

• The Indian Olympic Association (IOA), led by President P.T. Usha, announced the dates for the event to be held from January 28 to February 14, 2025.

• The games will feature 38 sporting disciplines and are expected to see participation from over 10,000 athletes, officials, and coaches from across the country.

• The state government has designated multiple host cities to ensure balanced infrastructure utilization, including Dehradun, Haldwani, Haridwar, Rishikesh, Rudrapur, and the summer capital Gairsain.

• Key venues prepared for the event include the Maharana Pratap Sports College in Dehradun and the Indira Gandhi International Cricket Stadium in Haldwani.

• This marks the first time Uttarakhand is hosting this prestigious multi-sport event, aimed at promoting sports tourism and athletic excellence in the Himalayan region.

Additional Information

• Evolution of National Games:

• The first edition of the Indian Olympic Games (the precursor to the National Games) was held in 1924 in Lahore.

• The event is modeled after the Olympics and is held every two years, though schedules have historically varied due to infrastructure readiness.

• Recent Editions:

• 37th National Games: Hosted by Goa in 2023, where Maharashtra topped the medal tally, winning the Raja Bhalindra Singh Trophy.

• 36th National Games: Hosted by Gujarat (Option 1) in 2022 after a seven-year hiatus, covering six major cities in the state.

• Other Participating States:

• Maharashtra (Option 4) has a strong history in the games, consistently ranking among the top three states in the overall medal standings.

• Karnataka (Option 2) is known for its high-performance centers in Bengaluru, particularly in swimming and athletics, though it is not the 2025 host.

Q8. Answer: (b) Rajasthan

The correct answer is Rajasthan.

Important Points

• A committee constituted in 1957 by the National Development Council which was headed by Balwant Rai Mehta suggested a three-tier PRIs, namely, Grama Panchayats (GPs) at the village level, Panchayat Samiti (PSs) at the block level, and Zilla Parishad (ZPs) at the district level.

• L.M.Singhvi committee in 1986 recommended constitutional status to the panchayats.

• The Panchayat Raj System was first established in the state of Rajasthan in Nagaur district on 2nd Oct 1959 while the second state was Andhra Pradesh.

Key Points

• Panchayat Raj System:

• Part IX of the Constitution deals with Panchayat Raj System in India.

• Panchayati Raj was constitutionalized through the 73rd Constitutional Amendment Act of 1992.

• All the seats in panchayat are filled by direct election.

• The chairperson of each panchayat is elected according to the law passed by the state.

• Every panchayat can continue for a term of five years from the date of its first meeting.

• It can be dissolved earlier in accordance with state law.

• A panchayat reconstituted after premature dissolution continues only for the remainder of the period. But if the remainder of the period is less than 6 months it is not necessary to hold elections.

• All the persons above 21 years of age and qualified to be a member of the state legislature are qualified as a member of panchayat.

• A state can authorize a panchayat to levy, collect, and appropriate taxes, duties, tolls, etc.

• Finance Commission is constituted for every 5 years to review the financial position of panchayats and make recommendations.

• State election commissioner is appointed by the Governor for superintendence, direction, and control of elections to panchayats.

Additional Information

• Facts to remember about given states:

• Rajasthan:

• Jaipur is a famous city and capital of Rajasthan.

• Bhajan Lal Sharma is the current CM of Rajasthan.

• Kalraj Mishra is the current governor of Rajasthan.

• Rajasthan shares its borders with Punjab, Haryana, Madhya Pradesh, Gujarat and Uttar Pradesh.

• Uttar Pradesh:

• It shares a boundary with a maximum number of Indian states.

• Yogi Adityanath is the CM of Uttar Pradesh.

• Anandiben Patel is the governor of Uttar Pradesh.

• Punjab:

• Chandigarh serves as the joint capital of the two neighbouring states of Haryana and Punjab.

• Bhagwant Mann is the current CM of Punjab.

• V. P. Singh Badnore is the current governor of Punjab.

• Haryana:

• Chandigarh is the capital of Haryana.

• Nayab Singh Saini is the current CM of Haryana.

• Satyadev Narayan Arya is the current governor of Haryana.

Q9. Answer: (c) Bajra

The correct answer is Bajra.

Key Points

• Bajra (Pearl Millet) is one of the most suitable crops for dry farming due to its high drought resistance and ability to grow in arid and semi-arid regions like Rajasthan.

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• It requires very low water for cultivation, with a rainfall range of around 40-50 cm annually, making it ideal for areas with scanty rainfall.

• Bajra is well-suited to sandy or loamy soils that are common in Rajasthan's desert regions.

• It is a short-duration crop, maturing in 3-4 months, which aligns well with the limited monsoon season in Rajasthan.

• Bajra is a staple food in Rajasthan and serves as an essential source of nutrients like carbohydrates, protein, and iron for the local population.

Additional Information

• Rice

• Rice is a water-intensive crop that requires standing water or heavy rainfall (100-200 cm annually).

• It is primarily cultivated in areas with sufficient irrigation facilities or naturally high rainfall, such as West Bengal, Punjab, and Odisha.

• Due to the arid climate and low rainfall in Rajasthan, rice is not a suitable crop for dry farming in this region.

• Wheat

• Wheat requires moderate rainfall (50-90 cm) and low temperatures during its growing season.

• It is mostly cultivated in areas with irrigation facilities or regions like Punjab, Haryana, and Uttar Pradesh that have favorable climatic conditions.

• While some parts of Rajasthan grow wheat under irrigated conditions, it is not suited for dry farming in the state.

• Sugarcane

• Sugarcane is a water-demanding crop that thrives in regions with abundant rainfall (150-250 cm) or excellent irrigation systems.

• It requires fertile alluvial soil and a long growing season (10-18 months).

• Given Rajasthan's arid conditions, sugarcane farming is not feasible without substantial irrigation support.

• Dry Farming in Rajasthan

• Dry farming refers to the cultivation of crops in regions with low rainfall and without significant irrigation facilities.

• Crops like Bajra, Jowar (Sorghum), and Pulses are commonly grown in Rajasthan due to their drought-resistant nature and ability to thrive under water-scarce conditions.

• This practice is essential for ensuring food security in arid and semi-arid regions.

Q10. Answer: (d) Crust

Option 4 is correct, i.e Crust.

Structure of the earth	Information
The Crust	• It is the uppermost layer of the earth’s surface which is in the solid-state. - On average, it is 30 to 35 km thick. - Mean thickness of the oceanic crust is 5 km whereas that of the continental is around 30 km
The Mantle	• Below the crust lies the mantle - The density of mantle is 3.4 g/cm^3
The Core	• It is the innermost part of the earth. - At the center of the earth, the density value is around 13 g/cm^3

• Magma-

• It is a mixture of molten or semi-molten rock, volatiles, and solids that is found beneath the surface of the Earth and is expected to exist on other terrestrial planets and some natural satellites.

• Note-

• The Earth’s crust mainly consists of Silica. The silica percentage is 27.7%.

Element	Approximate% by weight
Oxygen	46.6
Silica	27.7
Aluminum	8.1
Iron	5.0
Calcium	3.6
Sodium	2.8

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Potassium	2.6
Magnesium	2.1
All others	1.5

Q11. Answer: (b) Jute

The correct answer is Jute.

Key Points

• Jute is known as the golden fibre.

• Jute is known as golden fibre because of its shiny brown colour.

• Jute is the crop of hot and humid climates.

• It requires a high temperature (24^o C to 35^o C) and heavy rainfall of 120 to 150 cm.

• Sowing period- March-April to May-June.

• Harvesting period- July to October.

• Uses- gunny bags, ropes, strings, carpets, rugs and clothes, tarpaulins, and decoration pieces.

• Grown in West Bengal, Assam and Bihar.

Additional Information

• Cotton

• Temperature- Warm and humid (20^oC to 30^o C) and a lot of sunshine.

• Rainfall- 55 to 100 cm.

• Sowing period- June-July

• Harvesting period- December- January.

• It requires frost-free days.

• States- Gujrat is the leading producer followed by Maharashtra, Telangana, Andhra Pradesh, Madhya Pradesh.

• Wool

• It is obtained from sheep and other animals.

• It is generally used in clothing especially winter clothes because it is warm.

• Rayon

• It is an artificial fibre.

• It is made from regenerated and purified cellulose derived from plant sources.

• It is used in clothing i.e. sarees, blouses, dresses and socks, bed sheets, curtains etc.

Q12. Answer: (b) Skin of Youth

The correct answer is Skin of Youth.

Key Points

• The 56th International Film Festival of India (IFFI), held in November 2025, is one of the most prestigious film festivals in the country, known for recognizing excellence in cinema from around the world.

• The film "Skin of Youth" won the Golden Peacock Award for the Best Feature Film, a highly coveted honor at IFFI.

• The Golden Peacock Award is presented to a film that showcases exceptional storytelling, direction, and artistic merit, and "Skin of Youth" stood out among the entries for its outstanding cinematic qualities.

• The award-winning film explores themes of adolescence, identity, and resilience, making it a thought-provoking and impactful piece of cinema.

• The director of "Skin of Youth" received widespread acclaim for their innovative approach to storytelling and the film's ability to connect with audiences on an emotional level.

Additional Information

• Golden Peacock Award:

• It is the highest honor awarded at the International Film Festival of India (IFFI).

• The award recognizes films that excel in storytelling, direction, technical aspects, and overall impact.

• The winner of the Golden Peacock Award receives a cash prize along with a trophy and a citation.

• The award is open to films from across the globe, making it a significant international accolade in the film industry.

• International Film Festival of India (IFFI):

• Established in 1952, IFFI is one of the most prominent film festivals in Asia.

• It aims to provide a platform for the showcase of world cinema while encouraging dialogue and collaboration between

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filmmakers.

• Held annually in Goa, the festival attracts filmmakers, critics, and cinema enthusiasts from around the world.

• IFFI includes various categories such as World Panorama, Indian Panorama, and International Competition.

• Characteristics of "Skin of Youth":

• The film delves into the challenges faced during adolescence, portraying them with empathy and realism.

• It has been praised for its innovative narrative techniques and compelling performances by the cast.

• The cinematography and background score contribute significantly to the film's immersive experience.

• "Skin of Youth" has also garnered attention for its representation of diverse perspectives and cultural nuances.

• Other Contenders at the 56th IFFI:

• "Gondhal": A Marathi film celebrated for its cultural storytelling but did not win the Golden Peacock.

• "Little Trouble Girls": A coming-of-age story that was well-received but lacked the universal appeal of "Skin of Youth."

• "Poet": A visually stunning film that was a strong contender but ultimately did not secure the top honor.

Q13. Answer: (b) Sambhar lake

The correct answer is Sambhar Lake.

Key Points

• Sambhar Lake is India's largest inland saltwater lake, located in the state of Rajasthan.

• The lake is a significant source of salt production in India, contributing about 9% of the country's salt output.

• It spans an area of 190 to 230 square kilometers and is situated approximately 96 kilometers southwest of Jaipur.

• The lake has been declared a Ramsar Wetland Site, highlighting its ecological importance.

• Sambhar Lake is famous for its saline water, which supports a unique ecosystem, including migratory birds like flamingos, pelicans, and cranes.

Additional Information

• Barapani Lake:

• Located in Meghalaya, Barapani Lake, also known as Umiam Lake, is a man-made reservoir.

• The lake was created in 1965 as part of a dam project for generating hydroelectric power.

• It is a freshwater lake and serves as a popular tourist destination for water sports and scenic beauty.

• Loktak Lake:

• Loktak Lake, located in Manipur, is the largest freshwater lake in northeastern India.

• It is famous for its phumdis (floating islands) and houses the Keibul Lamjao National Park, the only floating national park in the world.

• The lake serves as an important source of water for irrigation, hydropower generation, and drinking purposes.

• Bhimtal Lake:

• Bhimtal Lake is a freshwater lake located in Uttarakhand.

• It is named after Bhim, one of the Pandavas in the Mahabharata.

• The lake features a small island in its center and is a popular tourist spot for boating and bird watching.

• Important Points:

• Saltwater lakes are characterized by the presence of dissolved salts, primarily sodium chloride, making their water saline.

• These lakes are often located in arid or semi-arid regions where evaporation exceeds precipitation.

• Sambhar Lake is a prominent example of such lakes in India, with historical and ecological significance.

Q14. Answer: (b) Shafali Verma

The correct answer is Shafali Verma.

In News

• India’s women’s cricket team won its first-ever ICC Women’s ODI World Cup by defeating South Africa by 52 runs on November 2, 2025, at DY Patil Stadium, Navi Mumbai.

Key Points

• Shafali Verma starred with an explosive 87 runs and took 2 wickets, earning her the Player of the Match award.

• Deepti Sharma scored a vital half-century and claimed a five-wicket haul, steering India’s dominance.

• Despite Laura Wolvaardt’s century, South Africa fell short by 52 runs.

• India bagged a prize of USD 4.48 million, while runners-up South Africa received USD 2.24 million.

• The BCCI announced a Rs. 51 crore cash reward for the Indian women’s team for their historic triumph.

Additional Information

• Event: ICC Women's ODI World Cup 2025 Final
• Venue: DY Patil Stadium, Navi Mumbai
• Date: November 2, 2025
• Result: India beat South Africa by 52 runs
• Captain: Harmanpreet Kaur

Q15. Answer: (c) Service Before Self

The correct answer is Service Before Self.

Key Points

• Indian Army
• Army Day: 15 January
• Motto: Service Before Self
• Chief of the Army Staff: General Manoj Pande
• Vice-Chief of the Army Chief: Lieutenant General Baggavalli Somashekar Raju

Force	Day	Motto	Chief
Indian Navy	4 December	May the Lord of Water be auspicious unto us	Admiral DINESH K TRIPATHI
Indian Air Force	8 October	Touch the Sky with Glory	Air Chief Marshal Vivek Ram Chaudhari

Additional Information

• Satyameva Jayate
• It is a part of a mantra from the Hindu scripture Mundaka Upanishad.
• It was adopted as the national motto of India on 26 January 1950.
• It is inscribed in the Devanagari script at the base of the Lion Capital of Ashoka and forms an integral part of the Indian National Emblem and inscribed on one side of all Indian currency and national documents.
• Vande Mataram
• It is the National Song of India and was written by Bankim Chandra Chatterjee in his novel Anandmath in 1882.
• On 24 January 1950, it was adopted as a national song of India by the Constituent Assembly of India.
• 1896 session of the Indian National Congress held at Calcutta is the first political event where the National Song was sung.

Q16. Answer: (b) Night blindness

• Vitamin is an organic non-protein substance that is required by an organism for normal metabolic function but cannot be synthesized in sufficient quantity by that organism.
• These can be divided into two categories: fat-soluble and water-soluble.

Fat-Soluble vitamins

• Fat-soluble vitamins are soluble in fats.
• They are absorbed by fat globules that travel through the small intestines and into the general blood circulation within the body.
• Unlike water-soluble vitamins, fat-soluble vitamins are stored in the body when they are not in use.
• Vitamin A, D, E K are fat-soluble.

Water-soluble vitamins

• Water-soluble vitamins dissolve in water, which means these vitamins and nutrients dissolve quickly in the body.
• Unlike fat-soluble vitamins, water-soluble vitamins are carried to the body's tissues, but the body cannot store them.
• Any excess amounts of water-soluble vitamins simply pass through the body
• Vitamin B and Vitamin C are water-soluble.

Key Points

Vitamin	Vitamers	Solubility	Diseases	Sources
Vitamin A	Retinol, retinal, and four carotenoids	Fat	Night-blindness, Hyperkeratosis, and Keratomalacia	Orange, ripe yellow fruits, leafy vegetables, carrots, pumpkin, squash, spinach, liver

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Vitamin B1	Thiamine	Water	Beriberi, Wernicke-Korsakoff syndrome	Pork, oatmeal, brown rice, vegetables, potatoes, liver, eggs
Vitamin B2	Riboflavin	Water	Ariboflavinosis	Dairy products, bananas, popcorn, green beans, asparagus
Vitamin B3	Niacin, niacinamide	Water	Pellagra	Meat, fish, eggs, many vegetables, mushrooms, tree nuts
Vitamin B5	Pantothenic acid	Water	Paresthesia	Meat, broccoli, avocados
Vitamin B6	Pyridoxine, pyridoxamine, pyridoxal	Water	Anaemia peripheral neuropathy.	Meat, vegetables, tree nuts, bananas
Vitamin B7	Biotin	Water	Dermatitis, enteritis	Raw egg yolk, liver, peanuts, certain vegetables
Vitamin B9	Folic acid, folinic acid	Water	Megaloblast and deficiency during pregnancy are associated with birth defects, such as neural defects.	Leafy vegetables, pasta, bread, cereal, liver
Vitamin B12	Cyanocobalamin, hydroxycobalamin, methylcobalamin	Water	Megaloblastic anaemia	Meat and other animal products
Vitamin C	Ascorbic acid	Water	Scurvy	Many fruits and vegetables, liver
Vitamin D	Cholecalciferol	Fat	Rickets and Osteomalacia	Fish, eggs, liver, mushrooms
Vitamin E	Tocopherols, tocotrienols	Fat	Deficiency is very rare; mild hemolytic anemia in newborn infants.	Many fruits and vegetables, nuts and seeds
Vitamin K	phylloquinone, menaquinones	Fat	Bleeding diathesis	Leafy green vegetables such as spinach, egg yolks, liver

Thus, Night blindness is caused by the deficiency of Vitamin-A.

Q17. Answer: (d) [M¹L^0T^(-2)]

The correct answer is [M¹L^0T^(-2)].

Key Points

• Surface tension is measured as the force acting per unit length of an imaginary line drawn on the liquid surface i.e.,

• surface tension(S) = (S) = (S) = (S) = (S) =

(Force(F))/(length(l))

• The dimension formula of force (F) = [MLT^(-2)]

• The dimension formula of length (l) = [L]

• Therefore The dimension formula of surface tension (S) is

• S = ([MLT^(−2)])/([L]) = [ML^0T^(−2)]

• So the dimension formula of surface tension is [ML0T−2]

Q18. Answer: (c) Coulomb

The correct answer is Coulomb.

• The SI Unit of Charge is Coulomb.

Key Points

• Coulomb

• The SI Unit of Charge is Coulomb.
• It is denoted as C.
• The coulomb is defined as the quantity of electricity transported in one second by a current of one ampere.

Additional Information

• Ampere
• It is denoted as symbol A.
• It is the SI unit of electric current.
• Volt
• The SI unit of electric potential difference is the volt (V) 1 V = 1 W/A.
• Ohm
• The ohm (symbol: Ω) is the SI derived unit of electrical resistance.
• It is named after German physicist Georg Ohm.

Q19. Answer: (c) Hydrogen

The correct answer is Hydrogen.

Key Points

• The metal reacts with acids to form salt and hydrogen gas.
• Metals that are above in the reactivity series react with acid. The reactivity series in given in the tabular form below.

	Metal	Symbol
These metals are more reactive than hydrogen	Potassium Sodium Calcium Magnesium Aluminum Zinc Iron Tin Lead	K Na Ca Mg Al Zn Fe Sn Pb
Hydrogen	H	
These metals are less reactive than hydrogen	Copper Mercury Silver Gold	Cu Hg Ag Au

Q20. Answer: (b) Coriolis force

The correct answer is 'Coriolis force'

Key Points

• Coriolis force:
• The Coriolis force is an apparent force caused by the Earth's rotation.
• It acts perpendicular to the direction of motion and the axis of rotation.
• In the Northern Hemisphere, it causes moving objects to deflect to the right, and in the Southern Hemisphere, it causes deflection to the left.
• This force significantly influences atmospheric and oceanic circulation patterns, such as trade winds, cyclones, and ocean currents.

Additional Information

• Kinetic Force:
• Kinetic force refers to the force associated with the motion of an object.
• It is not related to the Earth's rotation but rather to the energy an object possesses due to its motion.
• Pressure Prevalence:
• Pressure prevalence is not a standard term in physics or Earth sciences.
• It might refer to atmospheric pressure, but it does not describe a force caused by the Earth's rotation.
• Gravitational Force:
• Gravitational force is the attraction between two masses.
• While it is a fundamental force affecting all objects on Earth, it is not specifically generated by the Earth's rotation.
• Gravitational force is responsible for keeping objects grounded on Earth and for the orbits of celestial bodies.

Q21. Answer: (c) Butane and propane

The correct answer is Butane and Propane.

Key Points

• Liquefied Petroleum Gas (LPG) is a mixture of two main hydrocarbons: Butane (C4H10) and Propane (C3H8). These gases are used as fuel for heating, cooking, and automotive purposes.

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• The hydrocarbons Butane and Propane are gases at room temperature but are liquefied under pressure for easy storage and transportation.

• LPG is stored in pressurized containers, and when released, it evaporates and forms a highly flammable gas that is used for combustion.

• The presence of both butane and propane provides a balanced mix that ensures the fuel remains effective even in varying temperatures. For instance, propane has a lower boiling point than butane, making it more suitable for colder environments.

• To ensure safety during usage, an odorant (like ethyl mercaptan) is added to LPG to detect leaks, as both propane and butane are naturally odorless.

Additional Information

• Characteristics of Butane and Propane:

• Butane:

• Chemical formula: C4H10

• Boiling point: Approximately -0.5°C

• Used in portable stoves, cigarette lighters, and as a refrigerant.

• Propane:

• Chemical formula: C3H8

• Boiling point: Approximately -42°C

• Ideal for cold climates due to its lower boiling point and is widely used for residential heating, cooking, and powering vehicles.

• Advantages of LPG:

• It is a clean-burning fuel with fewer emissions compared to coal or wood.

• High energy efficiency due to its higher calorific value.

• Convenient storage and transportation in pressurized cylinders.

• Uses of LPG:

• Domestic: Cooking and heating purposes in households.

• Industrial: Used in metal cutting, welding, and as a fuel for industrial ovens.

• Automotive: Used as an alternative fuel for vehicles, known as AutoGas.

• Safety Measures:

• Proper ventilation is essential to prevent the accumulation of LPG in case of leaks.

• Regular maintenance of LPG cylinders and pipelines ensures safety during usage.

Important Points

• Comparison with Other Gases:

• Methane: Methane (CH4) is the primary component of natural gas, not LPG. It is lighter than air and less commonly used in domestic cylinders.

• Oxygen: Oxygen is not a fuel gas but an oxidizer. It supports combustion but is not a component of LPG.

• Sulphur and Hydrogen: These are not components of LPG. Sulphur compounds are added in trace amounts for odor detection in natural gas or LPG.

• Global Use of LPG:

• LPG is widely used across the world, with countries like India, China, and Brazil being major consumers for domestic cooking purposes.

• In the automotive sector, LPG is a popular alternative to conventional fuels due to its lower carbon emissions.

Q22. Answer: (b) Small Intestine

The correct answer is option 2, i.e. Small intestine.

• The small intestine is the part of the human digestive system is the digestion of food completed.

• It is an organ in the gastrointestinal tract where most nutrient and mineral absorption from food ends up.

• It lies between the stomach and the large intestine and absorbs bile and pancreatic juice to help in digestion through the pancreatic duct.

• There are three distinct regions of the small intestine-duodenum, jejunum, and ileum.

• The large intestine is the last part of the gastrointestinal tract and of the vertebrate digestive system.

• In humans, in the right iliac region of the pelvis, the large intestine begins, just at or below the waist.

Q23. Answer: (d) Glycogen

The correct answer is Glycogen.

Key Points

• Energy is stored in the liver and muscles in the form of Glycogen.

• Glycogen:

• Glycogen is a polysaccharide of glucose that serves as a form of energy storage in fungi and animals.

• The polysaccharide structure of glucose shows the primary storage form of glucose in the body.

• Glycogen is made and stored in the cells of the liver and muscles that are hydrated with the four parts of water.

• It acts as the secondary long-term energy storage.

• Muscle glycogen is quickly converted into glucose by muscle cells and liver glycogen that converts into glucose for use throughout the body which includes the central nervous system.

Additional Information

• Carbohydrate:

• Carbohydrate is a class of naturally occurring compounds and derivatives formed from them.

• In the early part of the 19^(th) century, substances such as wood, starch, and linen were found to be composed mainly of molecules containing atoms of carbon (C), hydrogen (H), and oxygen (O) and to have the general formula C6H12O6.

• Other organic molecules with similar formulas were found to have a similar ratio of hydrogen to oxygen.

• The general formula C_x(H2O)_y is commonly used to represent many carbohydrates, which means “watered carbon.”

• Fat:

• Fat, any substance of plant or animal origin that is nonvolatile, insoluble in water, and oily or greasy to the touch.

• Fats are usually solid at ordinary temperatures, such as 25 °C (77 °F), but they begin to liquefy at somewhat higher temperatures.

• Chemically, fats are identical to animal and vegetable oils, consisting primarily of glycerides, which are esters formed by the reaction of three molecules of fatty acids with one molecule of glycerol.

• Protein:

• Protein is a highly complex substance that is present in all living organisms.

• Proteins are of great nutritional value and are directly involved in the chemical processes essential for life.

• The importance of proteins was recognized by chemists in the early 19^(th)century, including Swedish chemist Jöns Jacob Berzelius, who in 1838 coined the term protein, a word derived from the Greek prōteios, meaning “holding first place.”

• Proteins are species-specific; that is, the proteins of one species differ from those of another species.

• They are also organ-specific; for instance, within a single organism, muscle proteins differ from those of the brain and liver.

Q24. Answer: (a) Oxalic acid

The correct answer is oxalic acid.

Key Points

• Oxalic acid is found in large quantities in spinach. It is naturally present in leafy vegetables like spinach, beets, rhubarb, etc.

• Oxalic acid is a type of organic acid that gives leafy greens a slightly astringent taste.

• Oxalic acid has the chemical structure COOH-COOH. This is why it is found in liquid or crystalline form.

• Like spinach, other leafy greens also contain this acid in the form of oxalate, which has been linked to the possibility of kidney stone formation.

• Due to its high oxalic acid content, spinach sometimes tastes bitter when eaten. Therefore, excessive consumption should be avoided.

• Medicinal uses: Oxalic acid is used in pharmaceuticals and in some industrial processes.

Additional Information

• Oxalic acid:

• Oxalic acid is a natural organic acid found mainly in leafy vegetables. It is found in high concentrations in spinach, beets, rhubarb, and other leafy vegetables.

• Oxalic acid is used in chemical processing, iron cleaning, textile dyeing, and the paper industry.

• Other options:

• Tartaric acid: This is an acid found in grapes, tamarind, and some other fruits. It is used in food and medicine.

• Ascorbic acid: It is known as vitamin C. It is found in sour fruits like oranges, lemons etc. It is used to boost the immune system.

• Acetic acid: Found in vinegar (sour water). It is mainly used to enhance the flavor of foods.

Important Points

• Side effects of oxalic acid:

• High levels of oxalic acid can be harmful to the body, increasing the risk of kidney stones.

• High levels of oxalates can cause calcium deficiency in the body.

• Benefits of eating spinach:

• Spinach is rich in iron, calcium, and vitamins (A, C, K), which are beneficial for health.

• Including it in the diet increases immunity and strengthens bones.

Q25. Answer: (c) An object that does not allow light to pass through it

CONCEPT:

Materials are classified into three types based on their ability to transmit light:

• Transparent: These materials allow light to pass through them completely, so objects on the other side can be seen clearly (e.g., clear glass, water).

• Translucent: These materials allow light to pass through them partially, but objects on the other side cannot be seen clearly (e.g., frosted glass, butter paper).

• Opaque: These materials do not allow any light to pass through them. Light is either reflected or absorbed by such objects (e.g., wood, metal, brick).

EXPLANATION:

• By definition, an opaque object is one that blocks the passage of light.

• When light rays strike an opaque surface, they cannot penetrate the material to reach the other side.

• This characteristic leads to the formation of shadows, as the object obstructs the path of light.

• Looking at the properties:

• Allowing light to pass through completely describes transparent objects.

• Reflecting light is a property of many surfaces (like mirrors), but it doesn't define the inability of light to pass through.

• Bending light refers to refraction, which typically occurs in transparent or translucent media.

• Not allowing light to pass through is the defining characteristic of an opaque object.

Therefore, an opaque object is an object that does not allow light to pass through it.

Q26. Answer: (c) Coal

The correct answer is Coal.

Key Points

• Natural Resources

• It can be defined as the resources that exist without any actions of humankind.

• Example: Air, Water, Wood, Oil, Coal, Iron, Petroleum, etc.

• It is usually categorized into Renewable and Non-Renewable Resources.

• Renewable resources refer to those resources that can renew themselves in time. Example: Wind, Water, Solar Energy.

• Non-Renewable resources are those that can no longer be available once exhausted.

• Coal

• It was formed from the remains of vegetation due to natural processes like flooding, the dense forest got buried under the soil.

• Over millions of years, the absence of air, high temperature, and high pressure transformed the dead vegetation into coal.

• It contains about 60-90% carbon or its compounds.

• it is processed in the industry to get useful products such as coke, coal gas, and coal tar by the process by destructive distillation.

• It is used as fuel in boilers, engines, and furnaces.

• It generally occurs in four varieties:

• Peat Coal: obtained in the first phase of extraction.

• Lignite Coal: also called brown coal.

• Bituminous Coal: most common very soft and is used for domestic purposes.

• Anthracite Coal: best coal, produce high heat with no smoke, obtained in the last phase of coal extraction.

Additional Information

• Gold

• It is a soft, bright yellow-colored lustrous metal.

• Its atomic number is 79 and its mass number is 197.

• It occurs in nature in free element form or in alluvial deposits or in the form of ores.

• It is used in making ornaments, coins, electroplating, and in the sugar and pharmaceutical industries.

• Silver

• It is a soft, white, lustrous transition metal.

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• It is found in the free element as well as in the combined state.
• Its atomic number is 47 and its mass number is 108.
• It is the best conductor of heat and electricity.
• Shale Gas
• Shale gas refers to natural gas that is trapped within the shale formation.
• Shales are fine-grained sedimentary rocks that can be rich sources of petroleum and natural gas.

Q27. Answer: (d) Fungus

The correct answer is Fungus.

Key Points

• Ergot disease is caused by a Fungus named Claviceps purpurea.
• This disease primarily affects grasses and cereal crops such as rye, wheat, barley, and oats.
• The fungus infects the floral parts of the host plant, replacing the seeds with dark, elongated fungal bodies called ergots.
• The disease is significant as ergot alkaloids produced by the fungus are toxic to humans and animals, leading to a condition called ergotism when contaminated grains are consumed.
• Ergot alkaloids can cause symptoms such as hallucinations, convulsions, gangrene, and even death in extreme cases.

Additional Information

• Claviceps purpurea:
• This is a parasitic fungus that infects flowering plants, particularly grasses and cereals.
• It forms fungal structures called sclerotia, which are the ergots observed in infected plants.
• The sclerotia contain ergot alkaloids, including ergometrine and ergotamine, which have pharmaceutical applications but are toxic in uncontrolled amounts.
• Ergotism:
• Ergotism is a condition caused by the consumption of grains contaminated with ergot alkaloids.
• Historically, ergotism was referred to as "St. Anthony's Fire" due to the severe burning sensations experienced by affected individuals.
• Symptoms include vasoconstriction (narrowing of blood vessels), hallucinations, convulsions, and necrosis of tissues.
• Outbreaks of ergotism were common in Europe during the Middle Ages due to the consumption of contaminated rye.
• Control Measures:
• Planting resistant varieties of crops is a key strategy to prevent ergot disease.
• Practicing crop rotation and ensuring proper field sanitation can minimize fungal infections.
• Removing infected plants and sclerotia during harvest reduces the risk of contamination.
• Application of fungicides can also help control the spread of Claviceps purpurea.
• Uses of Ergot Alkaloids:
• Though toxic, ergot alkaloids have pharmaceutical uses, particularly in the treatment of migraine, postpartum hemorrhage, and as labor-inducing agents.
• Medicinal compounds derived from ergot include ergometrine and ergotamine, which are used in controlled doses.
• Other Causes of Plant Diseases:
• Viruses: Cause diseases like Tobacco Mosaic Virus and Banana Bunchy Top Virus.
• Bacteria: Responsible for diseases like Fire Blight in apples and pears.
• High Temperature: Can lead to physiological disorders like sunscald in tomatoes.
• Fungi: Besides ergot, fungi cause diseases like Powdery Mildew and Rust.

Important Points

• Historical Impact: Ergotism caused several outbreaks during the Middle Ages, severely impacting communities due to contaminated food supplies.
• Scientific Advances: Research on ergot alkaloids has led to their controlled use in modern medicine.
• Current Status: Ergot disease is still a concern in agriculture, particularly in regions cultivating rye and other susceptible crops.
• Significance in Agriculture: Managing ergot disease is critical to ensuring food safety and preventing economic losses in cereal production.

Q28. Answer: (b) The power source, welding cables, electrode holder, workpiece, and electrode

The correct answer is The power source, welding cables, electrode holder, workpiece, and electrode.

Key Points

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• The Shielded Metal Arc Welding (SMAW) process involves an electric circuit that includes components necessary for the welding operation.
• The power source provides the necessary electrical energy for arc creation.
• Welding cables connect the power source to the electrode holder and the workpiece.
• The electrode holder holds the electrode, which melts to form the weld.
• The workpiece is the material being welded, completing the electrical circuit.

Additional Information

• Shielding Gas:
• Not used in SMAW; instead, the process relies on the flux coating on the electrode for shielding.
• Flux:
• The flux on the electrode creates a protective shield to prevent contamination of the weld.
• Cooling System:
• Not a part of the SMAW circuit; cooling is passive and occurs naturally during the process.
• Plasma Gas and Wire Feed System:
• These are components of other welding processes like plasma arc welding or gas metal arc welding, not SMAW.

Q29. Answer: (b) 40 m

The correct answer is 40m.

Key PointsInitial velocity(u) = 30m/s

Acceleration due to gravity(g)= 10 m/s2

Time (t) = 4 s

Using the equation,

$S = Ut + 1/2 \times a \times t^2$

$S = 30 \times 4 + 1/2 \times (-10) \times 4 \times 4$

$= 120 - 80$

$= 40$ m

Q30. Answer: (b) Zero acceleration

The correct answer is Zero acceleration.

Key Points

• When the net external force acting on a body is zero, it implies that the body is either at rest or moving with a constant velocity as per Newton’s First Law of Motion.
• If there is no net external force acting on the body, there is no change in its velocity over time, which indicates zero acceleration.
• Acceleration is defined as the rate of change of velocity. Therefore, zero net force results in no change in velocity, making acceleration zero.
• This principle is a direct consequence of Newton’s Second Law of Motion, which states that Force (F) = Mass (m) × Acceleration (a). If force is zero, acceleration (a) must also be zero.
• The state of zero acceleration can occur in two scenarios: the body is stationary, or it is in uniform motion (constant velocity).

Additional Information

• Zero time:
• The concept of "zero time" does not have any direct relevance in classical mechanics as time is always a measurable quantity and cannot be zero in practical situations.
• In certain theoretical contexts like initial conditions of a system, time may be referenced as "t = 0," but this is not related to the concept of external forces.
• Zero mass:
• Mass is a fundamental property of matter and cannot be zero for physical objects.
• In classical physics, zero mass is not applicable to any object as it would imply the non-existence of the object.
• In quantum mechanics, particles like photons have zero rest mass, but this concept is outside the scope of the given question.
• Non-zero acceleration:
• If there is a net external force acting on a body, it would result in non-zero acceleration as per Newton's Second Law of Motion (F = ma).
• A non-zero acceleration indicates that the velocity of the body is changing over time.
• Non-zero acceleration contradicts the condition of zero net external force, making this option incorrect.

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• Main Theme: The question revolves around the relationship between net external force and acceleration, as explained by Newton's Laws of Motion. It emphasizes the concept of equilibrium, where zero net force leads to zero acceleration, resulting in a state of rest or uniform motion.

Q31. Answer: (a) 60

Given:

4, 10, 24 and x

Formula Used:

a : b = c : d

a × d = b × c

Calculation:

=> 4 × x = 10 × 24

=> 4x = 240

=> x = 240 ÷ 4

=> x = 60

Therefore The correct answer is 60.

Q32. Answer: (a) 2.5

Shortcut Trick

SI = (P × R × T) / 100

1080 = (7200 × 6 × T) / 100

=> 1080 = 432T

=> T = 1080 / 432 = 2.5

Therefore Answer = 2.5 years

Alternate Method

Given:

Principal = 7200, SI = 1080, Rate = 6%

Formula used:

SI = (P × R × T) / 100

Calculation:

=> 1080 = (7200 × 6 × T) / 100

=> 1080 = 432T

=> T = 1080 ÷ 432

=> T = 2.5 years

Therefore The correct answer is 2.5 years.

Additional Information

Simple Interest Formula

SI = (P × R × T) / 100

Rearranged Formula

T = (SI × 100) / (P × R)

Units

Time is in years when rate is per annum

Shortcut Tip

Simplify numbers early to avoid large calculations

Q33. Answer: (a) 7

Shortcut Trick

Mode is the observation that appears most frequently in the data set.

Count the occurrences of each unique number:

Value 1 appears 2 times; Value 3 appears 2 times; Value 4 appears 2 times; Value 5 appears 1 time; Value 6 appears 1 time.

Value 7 appears 4 times; Value 8 appears 3 times.

Since 7 has the highest frequency, it is the mode.

Therefore The correct answer is 7.

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Alternate Method
Given: Observations = 7, 5, 6, 3, 3, 7, 1, 7, 8, 7, 1, 4, 8, 8, 4
Step 1: Arrange data in Ascending Order: 1, 1, 3, 3, 4, 4, 5, 6, 7, 7, 7, 7, 8, 8, 8
=> Frequency of 1 = 2
=> Frequency of 3 = 2
=> Frequency of 4 = 2
=> Frequency of 5 = 1
=> Frequency of 6 = 1
=> Frequency of 7 = 4
=> Frequency of 8 = 3
=> Highest Frequency = 4 (for the number 7)
Therefore The correct answer is 7.
Additional Information
Empirical Formula
The relationship between central tendencies is given by: Mode = 3 × Median − 2 × Mean.
Bimodal and Multimodal
If two observations have the same maximum frequency, the data set is Bimodal. If more than two, it is Multimodal.
Median for Discrete Data
For n observations, if n is odd, Median = ((n+1)/2)^(th) term. If n is even, Median = Average of (n/2)^(th) and (n/2 + 1)^(th) terms.

Q34. Answer: (a) 221.76 cm²

Shortcut Trick
Radius r = 8.4 cm
Area = π × r² = (22 ÷ 7) × 8.4 × 8.4
Area = 22 × 1.2 × 8.4 = 26.4 × 8.4 = 221.76 cm²
Quick Check: The result must be a multiple of 11 (2+1+6 = 9 and 2+7 = 9; 9−9 = 0).
Therefore The correct answer is 221.76 cm².
Alternate Method
Given:
Radius (r) = 8.4 cm
π = 22 ÷ 7
Formula Used:
Area of Circle = πr²
r = 8.4 cm Circle Area = π × (8.4)²
Calculations:
=> Area = (22 ÷ 7) × 8.4 × 8.4
=> Area = 22 × (8.4 ÷ 7) × 8.4
=> Area = 22 × 1.2 × 8.4
=> Area = 26.4 × 8.4
=> Area = 221.76 cm²
Therefore The correct answer is 221.76 cm².
Additional Information
Circumference of a Circle
The boundary length of a circle is calculated as C = 2 × π × r.
Area of a Semicircle
A semicircle is half of a circle, and its area is exactly half of the circle area: A = (π × r²) ÷ 2.
Area of a Sector
The area of a portion of a circle with central angle θ is given by A = (θ ÷ 360) × π × r².
Diameter of a Circle
The longest chord passing through the center is the diameter, where D = 2 × r.

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Q35. Answer: (d) 1368

Concept used:

Calculations:

1723 + 551 ÷ 19 - 12 × 32

= 1723 + 29 - 12 × 32

= 1723 + 29 - 384

= 1752 - 384

= 1368

Q36. Answer: (b) 2400

Given:

4% of x = 96

Formula Used:

Percentage formula: % × value = result

To find x: x = result ÷ (% ÷ 100)

Calculation:

=> 4 ÷ 100 = 0.04

=> x = 96 ÷ 0.04

=> x = 2400

Therefore The correct answer is 2400.

Q37. Answer: (d) 30

Shortcut Trick

From 3 Pens = 5 Pencils, the price ratio of Pen : Pencil = 5 : 3.

Total cost for 5 pens and 3 pencils = (5 × 5) + (3 × 3) = 34 units.

Given 34 units = Rs. 34, so 1 unit = Rs. 1.

Required price for 3 pens and 5 pencils = (3 × 5) + (5 × 3) = 30 units.

30 units = 30 × 1 = Rs. 30.

Therefore The correct answer is Rs. 30.

Alternate Method

Given:

Price of 3 Pens (P) = 5 Pencils (L)

Price of 5P + 3L = Rs. 34

Calculations:

=> Let the price of one pen be P and one pencil be L.

=> From the first condition: 3P = 5L => P = (5/3)L

=> Substitute P in the second equation: 5(5/3)L + 3L = 34

=> (25/3)L + 3L = 34

=> (25L + 9L) / 3 = 34

=> 34L / 3 = 34

=> L = 3

=> Now, substitute L in P = (5/3)L: P = (5/3) × 3 = 5

=> Cost of 3 pens and 5 pencils = 3P + 5L

=> 3(5) + 5(3) = 15 + 15 = 30

Therefore The correct answer is Rs. 30.

Additional Information

Linear Equations in Two Variables

These are equations of the form ax + by = c. They can be solved using substitution, elimination, or cross-multiplication methods.

Ratio and Proportion Method

If mA = nB, then the ratio A : B = n : m. This allows for unit-based calculation which is often faster than algebra.

Unitary Method

Finding the value of a single unit (1 part) first and then multiplying it to find the required quantity.

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Q38. Answer: (a) 1

Given:

Largest two-digit prime = 97

Find remainder when 97 ÷ 6

Formula used:

Remainder = Dividend − (Divisor × Quotient)

Calculations:

=> 97 ÷ 6 = 16 (quotient)

=> 6 × 16 = 96

=> Remainder = 97 − 96 = 1

Therefore Remainder = 1

Q39. Answer: (b) 25

Shortcut Trick

Apply the direct identity: $a^2 + b^2 = (a + b)^2 - 2ab$

Given: a + b = 7 and ab = 12

Substitute the values: $7^2 - 2(12)$

Calculation: 49 − 24 = 25

Therefore The correct answer is 25.

Alternate Method

Given: The sum of two variables is a + b = 7 and their product is ab = 12.

Formula Used: We use the standard algebraic identity for the square of a binomial: $(a + b)^2 = a^2 + b^2 + 2ab$

=> $(a + b)^2 = a^2 + b^2 + 2ab$

=> $(7)^2 = a^2 + b^2 + 2(12)$

=> $49 = a^2 + b^2 + 24$

=> $a^2 + b^2 = 49 - 24$

=> $a^2 + b^2 = 25$

Therefore The correct answer is 25.

Additional Information

Square of Difference

The identity for the square of a difference is $(a - b)^2 = a^2 + b^2 - 2ab$.

Difference of Squares

The factorization for the difference of two squares is $a^2 - b^2 = (a + b)(a - b)$.

Sum and Difference Relationship

The relationship between the sum and difference squares is $(a + b)^2 - (a - b)^2 = 4ab$.

Q40. Answer: (d) 256

Given:

Number = 16

Formula used:

Square = Number × Number

Calculation:

=> 16 × 16 = 256

Therefore Square of 16 = 256.

Q41. Answer: (c) 19

Shortcut Trick

The unit digit of 6859 is 9, so the unit digit of its cube root must be 9 (since $9^3 = 729$).

Splitting the number as (6 | 859), we look at the part before the last three digits, which is 6.

Since $1^3 = 1$ and $2^3 = 8$, and $1 < 6 < 8$, the tens digit of the cube root is 1.

Combining the tens digit 1 and the units digit 9, the cube root is 19.

Therefore The correct answer is 19.

Alternate Method

Given: Value = $\sqrt[3]{6859}$

=> Let us estimate using known cubes: $10^3 = 1000$ and $20^3 = 8000$.

=> Since $1000 < 6859 < 8000$, the value must be between 10 and 20.

=> Check the last digit of the given number: 6859 ends in 9.

=> In the range 11 to 19, only 19 ends in a digit whose cube results in a unit digit of 9.

=> Verification: $19 \times 19 \times 19 = 361 \times 19 = 6859$.

=> $\sqrt[3]{6859} = 19$.

Therefore The correct answer is 19.

Additional Information

Cube Root Unit Digit Rule

For perfect cubes, the unit digit of the number and its cube root match for digits 1, 4, 5, 6, 9, and 0. For others: 2 ↔ 8 and 3 ↔ 7.

Estimation Method

To find $\sqrt[3]{N}$, group digits in threes from the right. The first group gives the unit digit, and the remaining number helps identify the tens digit by finding the largest cube smaller than it.

Prime Factorization

Any perfect cube can be expressed as a product of triplets of prime factors. For 6859, the prime factorization is $19 \times 19 \times 19$.

Q42. Answer: (d) Rs. 17,435

Shortcut Trick

Average of ratio parts (7, 9, 11) = (7 + 9 + 11) ÷ 3 = 9 units.

Given average price = Rs. 14,265.

9 units = Rs. 14,265 => 1 unit = Rs. 1,585.

Price of the costliest item (11 units) = 11 × 1,585 = Rs. 17,435.

Therefore The correct answer is Rs. 17,435.

Alternate Method

Given: Average price of 3 items = Rs. 14,265; Ratio of prices = 7 : 9 : 11.

Formula Used: Sum of values = Average × Number of values.

7x

9x

11x

Total Ratio Parts = 27x

Average (9x) = Rs. 14,265

Costliest Item

=> Total Sum of prices = 14,265 × 3 = 42,795

=> Let the prices be 7x, 9x, and 11x.

=> 7x + 9x + 11x = 42,795

=> 27x = 42,795

=> x = 42,795 ÷ 27 = 1,585

=> Price of costliest item = 11x = 11 × 1,585 = 17,435

Therefore The correct answer is Rs. 17,435.

Additional Information

General Average Formula

Average = (Sum of all observations) ÷ (Total number of observations).

Ratio Distribution

To find a specific share in ratio a:b:c, use Share = [Total Sum × specific part] ÷ (a + b + c).

Arithmetic Progression Average

For terms in AP (like our ratio parts 7, 9, 11 with difference 2), the average is always the middle term.

Q43. Answer: (b) 2020

Solution:

Given:

1600 + 60 × 2 + 300 = ?

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Concept used:
Follow the BODMAS rule according to the table given below:
Calculation:
=> 1600 + 60 × 2 + 300
=> 1600 + 120 + 300
=> 2020
Therefore The simplified value of 1600 + 60 × 2 + 300 is 2020

Q44. Answer: (a) 38%

Given:
Cost price = Rs. 2150
Selling price = Rs. 1333
Formula used:
Profit = Selling price – Cost Price
Profit percentage = (Selling price – Cost price) × 100/Cost Price
Loss = Cost Price – Selling price
Loss percentage = (Cost Price – Selling price) × 100/Cost Price
Calculation:
Since, C.P. > S.P.
=> Loss percentage = (2150 – 1333) × 100/2150
=> Loss percentage = (817) × 100/2150
=> Loss percentage = 38%
Therefore The loss percentage is 38%.

Q45. Answer: (b) 18

Shortcut Trick
To find the smaller number when the sum (S) and difference (D) are given:
Smaller Number = (Sum − Difference) ÷ 2
=> (45 − 9) ÷ 2
=> 36 ÷ 2 = 18
Therefore The correct answer is 18.
Alternate Method
Given:
Let the larger number be x and the smaller number be y.
Sum: x + y = 45 --- (Equation 1)
Difference: x − y = 9 --- (Equation 2)
Calculations:
Subtracting (Equation 2) from (Equation 1):
=> (x + y) − (x − y) = 45 − 9
=> x + y − x + y = 36
=> 2y = 36
=> y = 36 ÷ 2
=> y = 18
Therefore The correct answer is 18.
Additional Information
Finding the Larger Number
The larger number can be found using the formula: (Sum + Difference) ÷ 2. Here, (45 + 9) ÷ 2 = 27.
Product of Two Numbers
If the sum (S) and difference (D) are known, the product is $(S^2 − D^2) ÷ 4$.
Ratio of Two Numbers
The ratio of the larger number to the smaller number is (Sum + Difference) : (Sum − Difference).

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Q46. Answer: (d) Third to the right of A

According to the given information;
Only two people sit to the right of C-
Only two people sit between B and C-
F sits fourth to the right of B-
E is an immediate neighbour of A and B-
According to the final seating arrangement, D sits third to the right of A.
Hence, option (4) is the correct answer.

Q47. Answer: (c) 18^(th)

Drawing diagram according to the given information,
Jigyasa is '18^(th)' from the top.
Hence, "18^(th)" is the correct answer.

Q48. Answer: (b) Scientist

A theatre is a place where actors performances are shown.
Similarly,
Laboratory is a room or building equipped for scientific experiments.
'Scientist' is related to the fourth term in the same way as the first term is related to the second term.
Hence, "scientist" is the correct answer.

Q49. Answer: (b) 3

According to the given information,
'GATE' is coded as '3579' →

G	A	T	E
3	5	7	9

'THIN' is coded as '4236' →

T	H	I	N
4	2	3	6

Here, we can see that the letter 'T' is common in both words. From, the coded numbers, 3 is common.
So, the code for 'T' is '3'.
Hence, the correct answer is "3".

Q50. Answer: (d) 9 - 7 ÷ 7 + 7 = 64

Using BODMAS rule as follows:
Decoding the given information:

Symbol	Stands For
•	×
•	÷
.	•
÷	•

Option 1: 5 ÷ 8 - 3.3 = 36
New equation after replacing symbols
=> 5 + 8 × 3 - 3
=> 5 + 24 - 3
=> 26 ≠ 36 (False)
Option 2: 9 + 3 - 1 ÷ 9 = 10
New equation after replacing symbols
=> 9 ÷ 3 × 1 + 9

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=> 3 × 1 + 9

=> 12 ≠ 10 (False)

Option 3: 15.2 - 3 + 3 = 39

New equation after replacing symbols

=> 15 - 2 × 3 ÷ 3

=> 15 - 2 × 1

=> 15 - 2

=> 13 ≠ 39 (False)

Option 4: 9 - 7 ÷ 7 + 7 = 64

New equation after replacing symbols

=> 9 × 7 + 7 ÷ 7

=> 9 × 7 + 1

=> 64 = 64 (Correct)

Hence the correct answer is "Option 4".

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