Agniveer Army GD 9th 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. In which State is the Sundarban delta located ?

(a) Assam
(b) Odisha
(c) Bihar
(d) West Bengal

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 the Constitution of India the Fundamental Duties are enshrined?

(a) Part V
(b) Part II
(c) Part IV A
(d) Part VI

Q4. Who became the second Indian woman and fourth player globally to score 10,000 runs in international cricket during the 4th T20I against Sri Lanka in December 2025?

(a) Mithali Raj
(b) Smriti Mandhana
(c) Suzie Bates
(d) Harmanpreet Kaur

Q5. Where is the Indian Air Force Academy located?

(a) Hyderabad, Telangana
(b) Coimbatore, Tamil Nadu
(c) Jaisalmer, Rajasthan
(d) Dundigal, Telangana

Q6. Where is the headquarters of the Southern Naval Command of the Indian Navy located?

(a) Chennai
(b) Mangalore
(c) Trivandrum
(d) Kochi

Q7. After the Revolt of 1857, the British Parliament took away the power to govern India from East India Company and the title of Empress of India was assumed by:

(a) Queen Charlotte
(b) Queen Elizabeth
(c) Queen Isabella
(d) Queen Victoria

Q8. Who was the Mughal emperor during the Revolt of 1857?

(a) Aurangazeb
(b) Mir Qasim
(c) Bahadur Shah
(d) Sarfaraz Khan

Q9. Which of the following Indian States shares a border with Nepal, Bhutan and Bangladesh?

(a) West Bengal
(b) Arunachal Pradesh
(c) Assam
(d) Sikkim

Q10. Block Development Officer in India heads which of the following?

(a) Village Panchayat
(b) District Panchayat
(c) Justice Panchayat
(d) Panchayat Committee

Q11. Ottan Thullal is _____ of the Kerala.

(a) Dance
(b) Song
(c) Painting
(d) None of the above

Q12. The Harappans probably got copper from present-day of _____.

(a) Tamil Nadu
(b) Rajasthan
(c) Odisha
(d) Kerala

Q13. The financial year in India starts from 1^(st) April and ends on _____.

(a) 31st July
(b) 30th June
(c) 31st May
(d) 31st March

Q14. The scheme One Stop Center (Sakhi) is related with

(a) Providing facilities to women victims of violence
(b) Providing ration
(c) Self employment
(d) Skill and training

Q15. "Davis Cup" is associated with the game of

(a) Hockey
(b) Cricket
(c) Boxing
(d) D. Lawn Tennis

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GENERAL SCIENCE

Q16. The sexual reproductive part of the plant are _____.

(a) Flowers
(b) Stamens
(c) Pistil
(d) Zygote

Q17. Choose the correct option to complete the following reaction:

$Ca(OH)2(aq) + CO2(g) \rightarrow$ _____ $+ H2O(l)$

(a) CaCO(g)
(b) CaCO3(s)
(c) CaCO2(s)
(d) CaCO4(s)

Q18. If two unequal masses possess the same kinetic energy, then the heavier mass has:

(a) equal momentum
(b) lesser momentum
(c) greater momentum
(d) Can't say

Q19. The dimensional formula of surface tension is -

(a) $[M^1L^2T^0]$
(b) $[M^1L^1T^{-2}]$
(c) $[M^1L^1T^{-1}]$
(d) $[M^1L^0T^{-2}]$

Q20. If the blood group of both the parents is AB, then the possible blood group of their children will be:

(a) A, B, AB and O
(b) A, B and AB
(c) A and B
(d) A, B and O

Q21. Where is Malleus bone located in our body?

(a) Middle Ear
(b) Outer Ear
(c) Pinna
(d) None of the above

Q22. Which among the following pairs of 'animal - phylum of animal kingdom they belong' is incorrect?

(a) Liver fluke - Nematoda
(b) Sycon - Porifera
(c) Prawns - Arthropoda
(d) Starfish - Echinodermata

Q23. _____ promote(s) cell division.

(a) Abscisic acid
(b) Cytokinins
(c) Gibberellins
(d) Auxin

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Q24. When a ball is thrown upwards, then at what position will it's potential energy be maximum?

(a) At time of throwing
(b) At the ground
(c) Just before striking ground
(d) At topmost position

Q25. The work done by friction is NOT lost but is transferred as _____ energy.

(a) chemical
(b) frictional
(c) nuclear
(d) heat

Q26. Two lists are given below. List A contains S.I units, while B contains their value. Match the two correctly.

List A (S.I units)	List B (Value)
i. Newton	a. 1 kgm²s^(-3)
ii. Pascal	b. 1 kgm²s^(-2)
iii. Joule	c. 1 kgms^(-2)
iv. Watt	d. 1 kgm^(-1)s^(-2)

(a) i-c, ii-d, iii-b, iv-a
(b) i-a, ii-b, iii-d, iv-c
(c) i-b, ii-a, iii-c, iv-d
(d) i-d, ii-c, iii-a, iv-b

Q27. Which type of reaction is involved in the rusting of iron?

(a) Displacement
(b) Redox
(c) Combination
(d) Decomposition

Q28. Lemon fruit is a rich source of

(a) malic acid
(b) citric acid
(c) tartaric acid
(d) acetic acid

Q29. Rise in sugar levels in blood is detected by the

(a) Liver
(b) Gallbladder
(c) Kidney
(d) Pancreas

Q30. Chemical formula of washing soda _____.

(a) Na2CO3.10H2O
(b) Na2SO4
(c) NaOH
(d) NaHCO3

MATHEMATICS

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Q31. Find the value of 19 + 26 - 30 of (3/5) × 2 + 3 of 5.

(a) 20
(b) 24
(c) 30
(d) 36

Q32. Three numbers are in the ratio of 2 : 3 : 5 and their LCM is 90. Find their HCF.

(a) 9
(b) 1
(c) 6
(d) 3

Q33. If A : B = 3 : 5 and B : C = 2 : 3, then A : B : C is equal to:

(a) 6 : 15 : 10
(b) 3 : 8 : 6
(c) 6 : 10 : 15
(d) 3 : 7 : 3

Q34. The perimeter of a rhombus is 100 cm. If one of the diagonals measures 14 cm, then the area of the rhombus is:

(a) 48 cm^2
(b) 96 cm^2
(c) 336 cm^2
(d) 672 cm^2

Q35. A shopkeeper buys a bag for Rs. 850 and sells it for Rs. 1,020. Find his profit percentage.

(a) 20%
(b) 40%
(c) 30%
(d) 25%

Q36. The sum of two numbers is 64 and their ratio is 7 : 9. The sum of digits of these numbers is:

(a) 12
(b) 13
(c) 19
(d) 16

Q37. The volume of cube is 64 cm^3, then find the total surface area of cube is ?

(a) 96 cm^2
(b) 48 cm^2
(c) 84 cm^2
(d) 76 cm^2

Q38. A car moves at 25 km/h for a 100 km journey.
How long will it take?

(a) 2 hrs
(b) 3 hrs
(c) 5 hrs
(d) 4 hrs

Q39. The present population of a village is 28000. If it increases at the rate of 5% per annum, population after 2 years will be:

(a) 31000
(b) 30820
(c) 30870
(d) 30800

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Q40. The marks obtained by a student in five subjects are: 72, 68, 74, 70, and 76. What is the average marks of the student per subject?

(a) 75
(b) 72
(c) 70
(d) 74

Q41. A man buys magazines in bulk for Rs. 20 each. He sells them for Rs. 23 each. Find the profit percentage.

(a) 14%
(b) 12%
(c) 15%
(d) 10%

Q42. An book marked at Rs. 160 is sold for Rs. 136, What was the discount % of the book?

(a) 12%
(b) 15%
(c) 13%
(d) 22%

Q43. If the sum of Rs 900 is invested for 7 years at a rate of 8%, then what will be the Amount?

(a) Rs 1204
(b) Rs 1302
(c) Rs 1404
(d) Rs 1446

Q44. Evaluate (3 × 25) ÷ 5 - 20 × 4 + 75

(a) 20
(b) 30
(c) 6
(d) 10

Q45. Sum of square of two numbers is 74 and their product is 35, then the sum of both will be

(a) 15
(b) 12
(c) 25
(d) 20

LOGICAL REASONING

Q46. A series is given, with one number missing. Choose the correct alternative from the given ones that will complete the series.

1.14, 1.28, 1.42, ?, 1.70, 1.84

(a) 1.56
(b) 1.54
(c) 1.68
(d) 1.62

Q47. Select the option that is related to the fifth letter-cluster in the same way as the second letter-cluster is related to the first letter-cluster and the fourth letter-cluster is related to the third letter-cluster.

AZW : GFC :: LSM : RYS :: DMT : ?

(a) SJK
(b) MDP
(c) JSZ
(d) JSB

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Q48. Mihir and Rajnish are ranked 11^(th) and 28^(th) respectively from the top in a class of 62 students. What will be their respective ranks from the bottom in the class?

(a) 54^(th) and 35^(th)
(b) 46^(th) and 32^(nd)
(c) 52^(nd) and 35^(th)
(d) 42^(th) and 32^(nd)

Q49. In a certain code language, 'ABOVE' is coded as 'DERYH. What is the code for 'BELOW' in that code language?

(a) EHORZ
(b) FHOSY
(c) EHPRY
(d) EHORY

Q50. In the following question, select the odd word from the given alternatives.

(a) Tyre
(b) Speed
(c) Brake
(d) Gear

ANSWER KEY

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

SOLUTIONS

Q1. Answer: (d) West Bengal

The correct answer is West Bengal.

• The Sundarban delta is located in West Bengal.

Key Points

• Sundarbans is a mangrove area in the delta formed by the confluence of the Ganges, Brahmaputra, and Meghna Rivers in the Bay of Bengal.

• It is located across the South 24 Parganas and North 24 Parganas districts of West Bengal.

• It spans from the Hooghly River in India's state of West Bengal to the Baleswar River in Bangladesh's division of Khulna.

• Four protected areas in the Sundarbans are enlisted as UNESCO World Heritage Sites, viz. Sundarbans National Park, Sundarbans West, Sundarbans South and Sundarbans East Wildlife Sanctuaries.

Additional InformationWest Bengal

• State Formed: 1st November 1956.

• Job Charnok is the architect of Kolkata city.

• Capital: Kolkata.

• Chief Minister: Mamata Banerjee.

• Governor: Jagdeep Dhankhar.

• Official Language: Bengali.

• City of Palaces and City of Joy - Kolkata.

• The sorrow of Bengal: Damodar.

• India's first underground railway system and first metro train service were established in Kolkata.

• India's first IIT was set up at Kharagpur.

• The Himalayan Mountaineering Institute was established in Darjeeling.

• Largest Cantilever bridge in India - Howrah Bridge.
• The leading producer of Rice and Jute.
• Raniganj is the first coal mine in India.
• India's first telegraph line and telephone line were set up in Kolkata.
• The first post office in India was opened in Kolkata
• India's first fingerprint bureau was established in Kolkata.
• Bengal Bank is the first bank to introduce the Cheque system in India (1784).
• Eden Gardens stadium in Kolkata is known as the 'Lord's of Asia'.
• Kolkata is known as the 'Mecca of Indian Football.

Assam

• State Formed: 1st November 1956.
• Capital: Dispur.
• Chief Minister: Himanta Biswas Sarma.
• Governor: Jagdish Mukhi.
• Official Language: Assamese.
• Kamarupa is the old name of Assam.
• Assam is known as the 'Tea Garden of India'.
• Assam is the leading producer of tea in India.
• Assam is known as the 'Gateway to the North Eastern States of India'.
• Assam shares international boundaries with Bhutan and Bangladesh.
• Guwahati is known as the 'light of the east'.
• Guwahati High court is the largest jurisdiction in terms of states (4 states).
• Jorhat is the cultural capital of Assam.
• The Brahmaputra is known as Sorrow of Assam.
• Manas National Park is famous for Royal Bengal Tigers.
• Kaziranga National Park is famous for its one-horned rhinoceros.
• Orang National Park is known as the Mini Kaziranga.
• Dibru Saikhova in Assam is the smallest biosphere reserve in India.
• Majuli Island is the biggest riverine island in the world is situated in the river Brahmaputra.
• Bhupen Hazarika Bridge or Dhola Sadiya bridge is the longest bridge in India, over the River Lohit, in Assam.

Odisha

• State formed: 1st November 1956.
• Capital: Bhubaneswar.
• Chief Minister: Naveen Patnaik.
• Governor: Ganeshi Lal.
• Official Language: Odia.
• The old name of Odhisa was Kalinga.
• The tagline of Odhisa is "The soul of Incredible India".
• Bhubaneswar is the capital of Odhisa and is known as the 'Temple city' and 'Cathedral city of India'.
• Rourkela is the industrial capital of Odhisa.
• Cuttack is the cultural capital of Odhisa.
• Cuttack is known as 'Millenium city and Silver city'.
• The high court of Odhisa is situated in Cuttack
• Konark Sun Temple is known as 'Black Pagoda' is at Odhisa.
• Jaganatha Temple is situated at Puri in Odhisa.
• Chilka Lake is the largest saline water lake in India.
• Hirakud is the longest dam in the world built across the Mahanadi river.
• The Mahanadi is known as Sorrow of Odhisa.
• Nandankanan Tiger Reserve is famous for White Tigers.
• Paradip is the major seaport of Odhisa.

Bihar

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• State Formed: 1st November 1956.
• Capital: Patna.
• Chief Minister: Nitish Kumar.
• Governor: Phagu Chauhan.
• Official Language: Hindi.
• The old name of Bihar was Magadha.
• Pataliputra was the old name of Patna.
• Bihar is known as the "Land of Viharas".
• Bihar is the state with the lowest literacy rate.
• Bihar is the most densely populous state in India.
• Mahatma Gandhi Sethu is the second-longest river bridge in India.
• Nalanda University was founded by Kumaragupta I.
• Barauni oil refinery is located in Bihar.
• Asia's first Dolphin Research Center is in Patna.

Important Points

• Sundarban delta is the largest delta in the world.
• Largest Planetarium in India - Birla Planetarium in Kolkata.

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: (c) Part IV A

Indian Constitution gave Fundamental Rights it every citizen of the country.

• So, everyone must protect their constitution and country.
• Fundamental duties are the duties that need to be performed by each individual. However, it’s the right of a person if he wants to pursue fundamental duties.
• The main features of Fundamental Duties are as follows:
• It was recommended by Sardar Swaran Singh Committee.
• It was added to the Indian Constitution after the 42^(nd) Amendment also known as the Mini Constitution.
• It is 11 in numbers stated under Article 51-A in Part 4A.

Hence, we conclude that the Fundamental Duties are in part IV-A of the Indian Constitution.

Additional Information

The following are the fundamental duties stated in the Indian Constitution:

• to abide by the Constitution and respect its ideals and institutions, the National Flag and the National Anthem;

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• to cherish and follow the noble ideals which inspired our national struggle for freedom;

• to uphold and protect the sovereignty, unity and integrity of India;

• to defend the country and render national service when called upon to do so;

• to promote harmony and the spirit of common brotherhood amongst all the people of India transcending religious, linguistic and regional or sectional diversities; to renounce practices derogatory to the dignity of women;

• to value and preserve the rich heritage of our composite culture;

• to protect and improve the natural environment including forests, lakes, rivers and wildlife, and to have compassion for living creatures;

• to develop the scientific temper, humanism and the spirit of inquiry and reform;

• to safeguard public property and to abjure violence;

• to strive towards excellence in all spheres of individual and collective activity so that the nation constantly rises to higher levels of endeavour and achievement;

• parent or guardian provide opportunities for education to his child or, as the case may be, ward between the age of six and fourteen years.

Q4. Answer: (b) Smriti Mandhana

The correct answer is Smriti Mandhana.

In News

• Smriti Mandhana achieved the milestone of 10,000 international runs during the 4th Women's T20I against Sri Lanka at Thiruvananthapuram on December 28, 2025.

Key Points

• She became the second Indian woman after Mithali Raj and the fourth player globally to reach 10,000 international runs, joining Mithali Raj, Suzie Bates, and Charlotte Edwards.

• The milestone was achieved in the 4th Women's T20I at Greenfield International Stadium, Thiruvananthapuram.

• India recorded their highest-ever women's T20I total of 221/2 in the same match.

• Mandhana also finished as the highest ODI run-scorer of 2025, reflecting consistent performance across formats.

Additional Information

• Elite 10,000 Run Club

• Includes the world's leading women cricketers with 10,000+ international runs: Mithali Raj, Smriti Mandhana, Suzie Bates, and Charlotte Edwards.

• Represents consistent high performance across formats including Tests, ODIs, and T20Is.

• Greenfield International Stadium

• Located in Thiruvananthapuram, Kerala, it hosted the 4th Women's T20I where Mandhana reached her 10,000-run milestone.

• The stadium witnessed India's highest-ever women's T20I total of 221/2 in that match.

• Smriti Mandhana

• An opening batter for India, known for elegant stroke play and consistent scoring across all formats.

• Her performance in 2025, including being the highest ODI run-scorer, highlights her pivotal role in India's women's cricket team.

• Impact on Women's Cricket in India

• Mandhana's achievement underscores India's growing legacy in women's cricket and inspires aspiring female cricketers.

• Contributes to India's prominence in international women's cricket and demonstrates increasing competitiveness in global tournaments.

Q5. Answer: (d) Dundigal, Telangana

The correct answer is Dundigal, Telangana.

Key Points

• Indian Air Force Academy, Dundigal is a Defence Service training institute located in Medchal-Malkajgiri district in the Indian state of Telangana.

• The foundation stone of the Air Force Academy was laid by the then President of India Dr. Zakir Hussain on 11 October 1967. The academy was established in 1969 and started operations in 16 Jan 1971.

• The current Commandant of the Academy is Seethepalli Shrinivas.

Additional Information

• The Indian Air Force was officially established on 8 October 1932.

• Indian Air Force is headquartered in New Delhi.

• The Indian Air Force is divided into several commands: Western, Eastern, Central, South Western, Southern, Training, and

Maintenance Commands.

• Indian Air Force Day is celebrated on 8^(th) October every year.

Important Points

• The National Defence Academy is located in Khadakwasla, Pune.

• The Indian Naval Academy is located in Ezhimala, Kerala.

• The Officers Training Academy is located in Chennai, Tamil Nadu.

Q6. Answer: (d) Kochi

The correct answer is Kochi.

Key Points

• Southern Naval Command

• It is one of the three command-level formations of the Indian Navy.

• The Southern Naval Command is the Training Command of the Indian Navy and is responsible for the training of all its personnel, both officers as well as sailors, from basic to advanced stages.

• Headquarters: Kochi

• The Southern Naval Command is commanded by the Flag Officer Commanding-in-Chief, Vice Admiral M. A. Hampiholi.

• INS Dweeprakshak is a main naval base of the Southern Naval Command of the India Navy located on Kavaratti island of Lakshadweep.

Additional Information

• There are three commands in the Indian Navy.

• Eastern Navy Command - Headquartered at Visakhapatnam.

• Western Naval Command - Headquartered in Mumbai.

• Southern Naval Command - Headquartered at Kochi.

Force	Day	Motto	Chief
India Navy	4 December	May the Lord of Water be auspicious unto us	Admiral R. Hari Kumar
Indian Air Force	8 October	Touch the Sky with Glory	Air Chief Marshal A.P. Singh
Indian Army	15 January	Service before Self	General Upendra Dwivedi

Q7. Answer: (d) Queen Victoria

The correct answer is Queen Victoria.

• After the Revolt of 1857, the British Parliament took away the power to govern India from East India Company and the title of Empress of India was assumed by Queen Victoria.

Key Points

• The Revolt of 1857 AD:

• Occurred during the reign of Governor-General Lord Canning

• Causes of the Revolt:

• Political: Nana Sahib was refused pension, as he was the adopted son of Peshwa Baji Rao II.

• Avadh was annexed in 1856. On charges of mal-administration, Satara, Jhansi, Nagpur, and Sambalpur were annexed owing to the Doctrine of Lapse.

• Economic: Heavy taxation, forcibly evictions, discriminatory tariff policy against Indian products.

• Socio-religious: Abolition of sati in 1829 AD; legalization of widow remarriage in 1856 AD, etc.

• Military: Discrimination with Indian soldiers.

• Indian soldiers were paid low salaries.

• Immediate cause: The introduction of Enfield rifles, whose cartridges were said to have a greased cover made of beef and pork, sparked off the revolt.

• The Beginning and Spread of the Revolt: On March 29, 1857, AD, an Indian sepoy of 34 Native Infantry, Mangal Pandey, killed two British officers–Hugeson and Baugh on parade at Barrackpore (near Calcutta).

Important Points

• Impact of the Revolt of 1857 AD:

• In August 1857 AD, the British Parliament passed an Act that put an end to the rule of the Company.

• The control of the British Government in India was transferred to the British Crown.

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• Hence, Queen Victoria became the Empress of India
• A minister of the British Government called the Secretary of state for India was made responsible for the governance of India.
• The British Governor-General of India was now also given the title of Viceroy.
• The doctrine of Lapse was withdrawn.
• After the revolt, the British pursued the policy of divide and rule.

Q8. Answer: (c) Bahadur Shah

The correct answer is Bahadur Shah.

Key Point

• Bahadur Shah II (1837–1857)-
• Bahadur Shah II or Bahadur Shah Zafar (Zafar being his surname) was the last Mughal emperor.
• The Revolt of 1857 had made a futile attempt to declare him the Emperor of India.
• He was captured by the English and sent to Rangoon where he died in 1862.
• In legal terms, the Mughal Empire came to an end on November 1, 1858, with the declaration of Queen Victoria.

Important Points

• Aurangzeb 1658-1707
• His Campaigns against the Maratha chieftain Shivaji were initially successful.
• But Aurangzeb insulted Shivaji who escaped from Agra, who resumed his campaigns against the Mughals.
• After Prince Akbar's rebellion, Aurangzeb sent armies against the Deccan Sultanates.
• Bijapur was annexed by Aurangzeb in 1685 and Golconda in 1687.
• Mir Kasim
• After assuming power, Mir Kasim shifted the capital from Murshidabad to Munger in Bihar.
• The move was taken to allow a safe distance from the Company at Calcutta.
• The combined armies of Mir Kasim, the Nawab of Awadh, and Shah Alam II were defeated by the English forces under Major Hector Munro at the Battle of Buxar.
• Sarfaraz Khan -
• He was the incapable grandson of Murshid Quli Khan, who became the ruler in 1740.
• He was killed by Alivardi Khan.

Q9. Answer: (a) West Bengal

The correct answer is West Bengal.

Key Points

• West Bengal is the only state in India that shares its borders with Nepal, Bhutan, and Bangladesh. This geographical positioning makes it unique in terms of international borders.
• To the north, West Bengal shares its border with Bhutan, a Himalayan kingdom known for its rich biodiversity and cultural heritage.
• On the northwest, West Bengal shares its boundary with Nepal, another Himalayan nation, which has close cultural and historical ties with India.
• On the eastern side, West Bengal shares a significant border with Bangladesh. This border is notable for its length and cultural, economic, and historical significance.
• West Bengal serves as an important trade and transit hub for India's interactions with these neighboring countries due to its strategic location.

Additional Information

• Geographical Importance of West Bengal:
• West Bengal lies in the eastern part of India and is bordered by five Indian states: Odisha, Jharkhand, Bihar, Sikkim, and Assam.
• The Darjeeling Himalayas in northern West Bengal facilitate its boundary with Nepal and Bhutan.
• The Sundarbans in the southern part of West Bengal extend to Bangladesh, making it a shared ecological zone between the two countries.
• Border with Nepal:
• The northern districts of West Bengal, such as Darjeeling and Kurseong, share their borders with Nepal.
• This border region is culturally significant due to the presence of the Gorkha community and shared linguistic ties.
• Border with Bhutan:
• West Bengal's border with Bhutan is located in the Alipurduar and Jalpaiguri districts.

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• The region is known for its picturesque landscapes, tea gardens, and rich biodiversity.

• Border with Bangladesh:

• West Bengal shares a long international border of approximately 2,217 km with Bangladesh, making it one of the longest borders between two countries.

• Key border points include Petrapole (a major land port), which facilitates trade and transit between the two nations.

• The region has historical significance, as it was part of the partition during India's independence in 1947.

Important Points

• Strategic Importance:

• West Bengal acts as a gateway to the northeastern states of India, enhancing its strategic relevance.

• Its proximity to Nepal, Bhutan, and Bangladesh allows for enhanced trade, cultural exchange, and diplomatic relations.

• Economic Significance:

• Trade and transit through West Bengal's borders contribute significantly to India's economic ties with Bangladesh, Nepal, and Bhutan.

• The Tea industry in Darjeeling and Jalpaiguri regions has cross-border economic implications, especially with Nepal and Bhutan.

• Cultural Connections:

• The region has deep cultural and ethnic ties with Nepal and Bhutan, as seen in the shared traditions, festivals, and languages.

• The Bengali culture is strongly shared across the border with Bangladesh, making the region historically and culturally intertwined.

Q10. Answer: (d) Panchayat Committee

The correct answer is Panchayat Committee.

Key Points

• The Block Development Officer (BDO) is the executive head of the Panchayat Samiti (Panchayat Committee), which is the middle tier of the Panchayati Raj system.

• The BDO is responsible for implementing and supervising various development programs and schemes at the block level.

• The BDO plays a crucial role in coordinating with various departments to ensure the holistic development of the block.

• The BDO also acts as a link between the district administration and the Panchayat Samiti, ensuring smooth communication and execution of policies.

Additional Information

• Village Panchayat

• The Village Panchayat is the grassroots level of the Panchayati Raj system and is responsible for the administration of the village.

• It consists of elected members including the Sarpanch (head) and other panchs (members).

• The Village Panchayat handles local issues such as sanitation, water supply, and maintenance of village infrastructure.

• District Panchayat (Zila Parishad)

• The District Panchayat is the top tier of the Panchayati Raj system and operates at the district level.

• It oversees the activities of the Panchayat Samitis and coordinates development programs across the district.

• It is headed by a President, who is elected from among its members.

• Justice Panchayat

• The Justice Panchayat, also known as Nyaya Panchayat, deals with minor civil and criminal cases at the village level.

• It aims to provide a quick and cost-effective resolution of disputes within the community.

• The members of the Nyaya Panchayat are usually elected or nominated by the Village Panchayat.

• Panchayat Committee (Panchayat Samiti)

• The Panchayat Samiti is the intermediate level in the Panchayati Raj system and operates at the block level.

• It coordinates the development activities of the Village Panchayats within the block and implements various government schemes.

• The Panchayat Samiti is composed of elected representatives from the Village Panchayats and other nominated members.

• The Block Development Officer (BDO) is the key executive officer of the Panchayat Samiti, responsible for the execution of its decisions.

Q11. Answer: (a) Dance

The correct answer is Dance.

Key Points

• Ottan Thullal is a Kerala dance-drama performance art form developed by Kunchan Nambiar as a substitute for Chakyar koothu.

• Kunchan Nambiar used it to express his dissatisfaction with society's socio-political framework and prejudices at the time.
• It went on to become the most widely displayed folk art in Kerala temples.
• Ottanthullal is distinguished by the performer himself singing and playing the narrative, which is a difficult undertaking.
• The accompanying instruments for Ottanthullal are Mridangam and Idakka.

Q12. Answer: (b) Rajasthan

The correct answer is Rajasthan

Key Points

• The Harappans likely obtained copper from the present-day region of Rajasthan in India and areas of Oman.
• The Harappans sourced copper from the Khetri mines in Rajasthan, particularly from areas like Khetri and Ganeshwar.
• There is also evidence suggesting that the Harappans traded with Mesopotamia and regions in present-day Oman, from where they imported copper.
• Copper was a significant metal for the Harappans, used for making tools, utensils, and ornaments

Q13. Answer: (d) 31st March

The correct answer is 31st March

Key Points

• The financial year in India starts from 1st April and ends on 31st March of the following year.
• This period is used by the government and businesses for accounting and tax purposes.
• The financial year is crucial for the preparation of financial statements, budget reports, and for meeting various statutory requirements.
• Adhering to this financial year helps in maintaining uniformity and consistency in financial reporting.

Additional Information

• The concept of a financial year is not unique to India; many countries follow a similar system, although the specific dates may vary.
• For example, the financial year in the United States runs from 1st October to 30th September of the following year.
• Changing the financial year requires significant adjustments in accounting systems, financial planning, and statutory compliance.
• In India, the financial year is also referred to as the fiscal year.
• Income tax returns, annual financial statements, and other financial reports are typically prepared based on this financial year.

Q14. Answer: (a) Providing facilities to women victims of violence

The correct answer is Providing facilities to women victims of violence.

Key Points

• One-Stop Center (Sakhi):
• It is a Centrally Sponsored Scheme for setting up One Stop Centre,
• It is a sub-scheme of the Umbrella Scheme for the National Mission for Empowerment of women which includes the Indira Gandhi Mattritav Sahyaog Yojana, popularly known as Sakhi.
• The scheme is being implemented since 1st April 2015.
• The Centres are being established across the country to provide integrated support and assistance under one roof to women affected by violence, both in private and public spaces in a phased manner.
• Violence includes women facing physical, sexual, emotional, psychological and economic abuse, irrespective of age, class, caste, education status, marital status, race and culture.
• Women facing any kind of violence due to attempted sexual harassment, sexual assault, domestic violence, trafficking, honour-related crimes, acid attacks or witch-hunting will be facilitated with support and redressal.

Q15. Answer: (d) D. Lawn Tennis

The Correct answer is Lawn Tennis.

Key Points

• The Davis Cup is one of the most prestigious international team events in the game of lawn tennis.
• It is organized by the International Tennis Federation (ITF) and is contested annually by teams from various countries.
• The tournament was first held in the year 1900, initially as a competition between the United States and Great Britain.
• Over the years, the Davis Cup has grown to include more than 130 nations, making it the largest annual international team competition in sports.
• Players represent their countries, and the matches are played in a best-of-five format, including singles and doubles matches.
• Some of the most successful nations in Davis Cup history include United States, Australia, France, and Spain.

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Additional Information

• Hockey

• Hockey is a popular team sport played on a field or ice rink.

• The most prestigious international hockey tournament is the Hockey World Cup, organized by the International Hockey Federation (FIH).

• Another important event in hockey is the Olympic Games, where hockey has been a part of the competition since 1908.

• India and the Netherlands are among the most successful teams in field hockey history.

• Cricket

• Cricket is a bat-and-ball game played between two teams of 11 players each.

• The most prestigious international cricket tournaments include the ICC Cricket World Cup and the ICC T20 World Cup.

• Cricket originated in England and is most popular in countries like India, Australia, England, and South Africa.

• Boxing

• Boxing is a combat sport in which two participants throw punches at each other while wearing protective gloves.

• The most prestigious boxing events include the Olympics, World Boxing Championships, and various professional boxing titles like the WBA, WBC, IBF, and WBO.

• Boxing legends include Muhammad Ali, Mike Tyson, Floyd Mayweather, and Manny Pacquiao.

Q16. Answer: (a) Flowers

The correct answer is Flowers.

Key Points

• About Plant Reproduction:

• Sexual Reproduction is defined as the production of a new organism from two-parents by making use of their Gametes or Sex cells.

• Plants also have Male and Female sex organs are carried within the flower and the seeds which are inside a Fruit.

• These plants are called (Angiosperms or Flowering plants) as they reproduce by the Sexual reproduction method.

• Most of the plants contain Reproductive organs of both (Males and Females) in the same flowers.

• The Male organ part of a flower is called the Stamen and the Female organ part of a flower is called Carpel or pistil.

• The stamen helps in making the Male Gametes of the plant that is present in Pollen grains.

• The female gamete (egg cell) is found in the pistil

• The Male Gametes fertilize the Female Gametes.

• The fertilized Egg cells develop to become Seeds. When germinated, these Seeds started growing as new Plants.

Confusion Points

• Pistil and stamen both are reproductive parts of a plant.

• Stamen and pistil are part of the flower.

• The flower is the reproductive part of the plant.

• So, the flower is the most suitable answer.

Additional Information

• Image of the Plant Reproduction:

Important Points

• The discovery of Sex in Plants was noted by two-person {Camerarius and Koelreuter} in the year 1761.

Q17. Answer: (b) $CaCO_3(s)$

The correct answer is $CaCO_3(s)$.

Key Points

• Reaction Description: When calcium hydroxide ($Ca(OH)_2$) reacts with carbon dioxide (CO_2), it forms calcium carbonate ($CaCO_3$) as a precipitate and water (H_2O) as a by-product. The chemical equation is:

• $Ca(OH)_2(aq) + CO_2(g) \rightarrow CaCO_3(s) + H_2O(l)$.

• Nature of Calcium Carbonate: Calcium carbonate ($CaCO_3$) is a white, insoluble solid that precipitates out of the solution during the reaction.

• Relevance of the Reaction: This reaction is commonly used in various processes, such as detecting the presence of CO_2 gas. When CO_2 is bubbled into limewater (a diluted solution of calcium hydroxide), the solution turns milky due to the formation of $CaCO_3$.

• Stoichiometry: The reaction takes place in a 1:1 molar ratio, with 1 mole of CO_2 reacting with 1 mole of $Ca(OH)_2$ to yield 1 mole of $CaCO_3$ and 1 mole of H_2O.

• Correct Option: Option 2, CaCO3(s), is the correct answer as it represents the accurate product formed along with water in the reaction.

Additional Information

• Calcium Carbonate (CaCO3):

• It is a widely occurring compound found in rocks as minerals like limestone, chalk, and marble.

• CaCO3 is used in industries for making cement, lime, and glass, as well as in agriculture to neutralize acidic soils.

• It is also used as a dietary calcium supplement in the pharmaceutical industry.

• Role of Limewater (Ca(OH)2):

• It is an aqueous solution of calcium hydroxide and is used to test for the presence of CO2.

• The milky appearance caused by the formation of calcium carbonate confirms the presence of CO2 gas.

• Carbon Dioxide (CO2):

• It is a colorless, odorless gas that is slightly acidic in nature and is a major greenhouse gas.

• CO2 is released during respiration, combustion, and various industrial processes.

• Applications of the Reaction:

• This reaction is employed in water treatment to remove hardness caused by carbonates and bicarbonates.

• It is also used in the construction industry to produce building materials like lime mortar.

Important Points

• Incorrect Options:

• Option 1 (CaCO(g)) is incorrect as calcium carbonate is not formed in the gaseous state.

• Option 3 (CaCO2(s)) and Option 4 (CaCO4(s)) are incorrect as these formulas do not correspond to any known chemical compounds.

• Option 5 is invalid as it does not specify any product.

• Environmental Significance: The reaction of CO2 with limewater highlights its role in natural processes like the carbon cycle, where carbon dioxide is sequestered in the form of calcium carbonate in oceans and geological formations.

Q18. Answer: (c) greater momentum

CONCEPT:

• Kinetic energy (K.E): The energy possessed by a body by the virtue of its motion is called kinetic energy.

The expression for kinetic energy is given by:

$KE = 1/2mv^2$

Where m = mass of the body and v = velocity of the body

• Momentum (p): The product of mass and velocity is called momentum.

Momentum (p) = mass (m) × velocity (v)

The relationship between the kinetic energy and Linear momentum is given by:

As we know,

$KE = 1/2mv^2$

Divide numerator and denominator by m, we get

$KE = 1/2(m^2v^2)/m = 1/2((mv)^2)/m = 1/2(p^2)/m$ [p = mv]

Therefore $KE = 1/2(p^2)/m$

$p = \sqrt{2mKE}$

EXPLANATION:

Given that:

K.E1 = K.E2= K.E (let say)

The relation between the momentum and the kinetic energy is given by:

$P = \sqrt{(2m\ K.E)}$

But as K.E is same

Therefore P prop. to $\sqrt{m}$

Or, $P1/P2 = \sqrt{(m1/m2)}$

Here, if m1 > m2 then p1> p2

• If two unequal masses possess the same kinetic energy, then the heavier mass has greater momentum. So option 3 is correct.

Q19. 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]

Q20. Answer: (b) A, B and AB

The correct answer is A, B, and AB.

Key Points

• Blood is a body fluid.

• ABO blood grouping was given by Karl Landsteiner.

• The parent's blood group is AB.

• The blood group proteins are present in the 'I ' gene.

• The genotype of a parent is IA IB.

Gametes	IA	IB
IA	IAIA	IAIB
IB	IAIB	IBIB

• From the punnet square, we can see that,

• The Blood group can be A, AB, and B.

• The blood group shows codominance interaction.

• A and B are codominant over the O blood group.

• IAIA = A blood group as here only A allele is present on the I gene.

• IAIB= AB blood group as here A and B allele is present on the I gene.

• IBIB=B blood group as here B allele is present on the I gene.

• If the blood group of both parents is AB, then the possible blood group of their children will be A, B, and AB.

Additional Information

Blood Group	Antigens on RBC	Antibody in plasma	Donor Blood Group
A	A	anti-B	A, O
B	B	anti-A	B, O
AB	A, B	No ab	AB, A, B, O
O	No ag	anti-A, B	O

Q21. Answer: (a) Middle Ear

The correct answer is Middle Ear.

• The Malleus bone is located in our Middle Ear.

Key Points

• The malleus is the outermost and largest of the three small bones in the middle ear and reaches an average length of about eight millimetres in the typical adult.

• It is informally referred to as a hammer, owing to it being a hammer-shaped ossicle or small bone that is connected to the ear.

• It is composed of the head, neck, anterior process, lateral process, and manubrium.

• When sound reaches the tympanic membrane (eardrum), the malleus transmits these sound vibrations from the eardrum to the incus, and then to the stapes, which is connected to the oval window.

• In cases of atticoantral disease, an inflammatory disease of the middle ear, the ossicular chain (malleus, incus, and stapes) is

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often affected by abnormal skin growth, called cholesteatoma.

Additional Information

• Outer Ear:

• The medical term for the outer ear is the auricle or pinna. The outer ear is made up of cartilage and skin.

• There are three different parts to the outer ear; the tragus, helix, and lobule.

• Pinna:

• The auricle (pinna) is the visible portion of the outer ear. It collects sound waves and channels them into the ear canal (external auditory meatus), where the sound is amplified.

• Middle Ear:

• The middle ear is the portion of the ear internal to the eardrum, and external to the oval window of the inner ear.

• The mammalian middle ear contains three ossicles, which transfer the vibrations of the eardrum into waves in the fluid and membranes of the inner ear.

Important Points

Q22. Answer: (a) Liver fluke - Nematoda

The correct answer is Liver fluke - Nematoda.

Key Points

• Liver Fluke -

• The scientific name of liver fluke is Fasciola hepatica.

• The life history of liver fluke involves two hosts (Digenetic parasitic).

• Primary host - Sheep and goat

• Secondary host - Garden snail (Planorbis, Lymnea)

• Liver fluke belongs to the phylum Platyhelminthes, not Nematoda.

• Liver fluke is a parasitic flatworm that infects the liver of its primary host, which is usually a sheep or goat.

Additional Information

• Sycon - Porifera

• Sycon is a sponge that belongs to the phylum Porifera.

• The common name of the Sycon is Crown Sponge.

• All sponges have a canal system that consists of the Ostia, spongocoel, and osculum.

• Canal system is one of the most important features of sponges.

• The canal system is a network of canals that connect the spongocoel to the outside via ostia.

• It helps in nutrition, respiration, and excretion processes.

• Prawns - Arthropoda

• Prawn is a common name for small aquatic crustaceans with an exoskeleton and ten legs (i.e. a member of the order decapoda), some of which can be eaten.

• They belong to the kingdom Animalia and order Arthropoda.

• Starfish - Echinodermata

• Starfish belongs to the phylum Echinodermata group.

• Echinodermata are so named owing to their spiny skin (from the Greek “echinos” meaning “spiny” and “dermos” meaning “skin”).

• Echinodermata are exclusively marine organisms. Sea stars, sea cucumbers, sea urchins, sand dollars, and brittle stars are all examples of echinoderms.

Q23. Answer: (b) Cytokinins

The Correct Answer is Option 2 i.e Cytokinins.

Plant Hormones	Description
Abscisic acid	• It is a plant hormone. - It promotes dormancy in seeds and buds in plants.
Cytokinins	• It is a plant hormone. - It promotes cell division in plants.
Gibberellins	• It is a plant hormone. - It promotes stem elongation in plants.
Auxin	• It is a plant hormone. - It promotes cell elongation in plants.

Q24. Answer: (d) At topmost position

The Correct Answer is Option 4 i.e At topmost position.

Key Points

• When an object (ball) is thrown upwards its velocity will decrease as it goes upward due to deceleration by gravity.

• So its kinetic energy will decrease as it moves upward. But its potential energy will increase as it moves upward.

• Kinetic energy is zero and potential energy is maximum when the object reaches the topmost point.

• Kinetic energy is maximum just before striking the ground.

Q25. Answer: (d) heat

The correct answer is option 4 i.e heat.

Key Points

• The work done by friction is not lost but is transferred as heat energy.

• The Law of Conservation of Energy states that energy cannot be created or destroyed. It can only be transferred from one type to another.

• Energy is not lost when frictional forces occur. For example, when a bike applies its brakes and slows down, the kinetic energy of the bike is transformed into heat energy in the brakes.

Q26. Answer: (a) i-c, ii-d, iii-b, iv-a

Physical Quantity	S.I unit	Value
Force	Newton	1 kgms^(-2)
Pressure	Pascal	1 kgm^(-1)s^(-2)
Energy	Joule	1 kgm²s^(-2)
Power	Watt	1 kgm²s^(-3)

Q27. Answer: (b) Redox

The Correct answer is Redox.

Key Points

• Rusting of iron is a chemical process where iron reacts with oxygen and moisture to form iron oxides, commonly called rust.

• This reaction involves both oxidation and reduction, hence it is categorized as a redox reaction.

• The oxidation process involves the loss of electrons by iron (Fe) as it forms ferrous (Fe²^+) or ferric (Fe³^+) ions.

• The reduction process involves oxygen being reduced by gaining electrons to form hydroxide ions (OH^-) in the presence of water.

• The overall reaction can be written as:

4Fe + 3O2 + 6H2O → 4Fe(OH)3, which eventually dehydrates to form rust (Fe2O3·xH2O).

• Moisture and oxygen are crucial for the rusting process, which is why it occurs more rapidly in humid environments.

• The formation of rust weakens the iron structure, causing damage to its strength and durability.

Additional Information

• Displacement Reaction

• A displacement reaction occurs when a more reactive element displaces a less reactive element from its compound. For example, Zn + CuSO4 → ZnSO4 + Cu.

• Rusting is not a displacement reaction as no exchange or replacement of elements occurs during the process.

• Combination Reaction

• In a combination reaction, two or more substances combine to form a single product. For example, 2H2 + O2 → 2H2O.

• Rusting is not a combination reaction because multiple reactions occur simultaneously, and it is not limited to just combining reactants into one product.

• Decomposition Reaction

• A decomposition reaction involves the breakdown of a compound into two or more substances. For example, CaCO3 → CaO + CO2.

• Rusting is not a decomposition reaction, as it involves the formation of new compounds (iron oxides) rather than breaking down existing compounds.

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Q28. Answer: (b) citric acid

The correct answer is citric acid.

Important Points

• Lemon fruit is a rich source of citric acid.

• Citric acid is a weak organic acid.

• It is a six-carbon tricarboxylic acid.

• A manufactured form of citric acid is commonly used as an additive in food, cleaning agents, and nutritional supplements.

• Citric acid is mainly produced by fungal fermentation.

• Chemical synthesis of citric acid is possible, but it is expensive than fungal fermentation.

Additional Information

• Malic acid: It is found in many fruits, including apples. It contributes to the sour taste of fruits It is a dicarboxylic acid that is made by almost all living organisms.

• Tartaric acid: It occurs naturally in many fruits, most notably in grapes. The acidic monopotassium salt (commonly known as 'cream of tartar') is used in baking powders and leavening systems.

• Acetic acid: It is the most important of the carboxylic acids. A dilute (approximately 5 per cent by volume) solution of acetic acid produced by fermentation is called vinegar.

Q29. Answer: (d) Pancreas

• Rise in sugar levels in the blood is detected by the Pancreas.

• The pancreas detects the rise in blood glucose and starts to secrete insulin.

• The pancreas is a gland that is located in the abdomen of the body. It is part of the digestive system which produces insulin and other important enzymes and hormones that help in breaking down the foods.

• After eating something, the carbohydrates in food are broken down into glucose and passed into the bloodstream.

• In response to rising glucose in the bloodstream, insulin is released from the beta cells of the pancreas which regulate the body's glucose or sugar level.

• Any disorder in the pancreas leads to diabetes.

Q30. Answer: (a) Na2CO3.10H2O

The correct answer is Na2CO3.10H2O.

Key Points:

• Na2CO3.10H2O is the chemical formula for washing soda.

• It is a sodium carbonate inorganic hydrate.

• As a result of its extraction from plants growing in sodium-rich soils, it was given the moniker soda ash.

• It is a metal carbonate that is a white, crystalline solid and soluble in water.

• Here are the procedures involved in producing sodium carbonate:

• Brine purification.

• Sodium hydrogen carbonate production.

• Creation of sodium carbonate.

• Ammonia recovery.

Additional Information:

• Washing soda applications:

• Used in homes and businesses as cleaning agent.

• The paper industries ,textile industries ,soap industries ,and detergent industries all use it.

• It is a component of water softening process.

• It is employed in production of glass.

• One of the most crucial agents in laundries is washing soda.

Q31. Answer: (b) 24

Given:

19 + 26 - 30 of (3/5) × 2 + 3 of 5

Concept:

Follow the BODMAS rule according to the table given below:

Calculation:

19 + 26 - 30 of (3/5) × 2 + 3 of 5

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=> 45 - 18 × 2 + 15
=> 60 - 36
=> 24
Therefore The value is 24.

Q32. Answer: (d) 3

Shortcut Trick
Let the HCF be x.
Ratio of numbers = 2 : 3 : 5 (These are co-prime to each other).
LCM = Product of Ratios × HCF
90 = (2 × 3 × 5) × x
90 = 30x => x = 3.
Therefore The correct answer is 3.
Alternate Method
Given: Ratio of three numbers = 2 : 3 : 5 and their LCM = 90.
Let the numbers be 2x, 3x, and 5x, where x is the HCF.
The LCM of 2x, 3x, and 5x is the product of the HCF and the LCM of the remaining factors (2, 3, and 5).
=> LCM = x × LCM(2, 3, 5)
=> 90 = x × 30
=> x = 90 ÷ 30
=> x = 3
Therefore The correct answer is 3.
Additional Information
Relationship between two numbers
For two numbers A and B, Product of numbers (A × B) = HCF × LCM.
LCM of Fractions
LCM of fractions = LCM of Numerators ÷ HCF of Denominators.
HCF of Fractions
HCF of fractions = HCF of Numerators ÷ LCM of Denominators.

Q33. Answer: (c) 6 : 10 : 15

Shortcut Trick
Multiply the first ratio by the first term of the second ratio (2) and the second ratio by the last term of the first ratio (5) to equalize B.
A : B = 3 × 2 : 5 × 2 = 6 : 10
B : C = 2 × 5 : 3 × 5 = 10 : 15
Combining the terms gives A : B : C = 6 : 10 : 15.
Therefore The correct answer is 6 : 10 : 15.
Alternate Method
Given:
Ratio 1: A : B = 3 : 5
Ratio 2: B : C = 2 : 3
Calculations:
=> To combine, B must be the same in both ratios. LCM of 5 and 2 is 10.
=> A : B = (3 × 2) : (5 × 2) = 6 : 10
=> B : C = (2 × 5) : (3 × 5) = 10 : 15
=> A : B : C = 6 : 10 : 15
Therefore The correct answer is 6 : 10 : 15.
Additional Information
Compound Ratio
The compound ratio of (a : b) and (c : d) is (ac : bd). It is obtained by multiplying the corresponding terms.
Continued Proportion
Three quantities a, b, c are in continued proportion if a : b = b : c, which implies $b^2 = ac$.

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Duplicate Ratio

The duplicate ratio of a : b is $a^2 : b^2$. For example, duplicate ratio of 2 : 3 is 4 : 9.

Q34. Answer: (c) 336 cm²

Shortcut Trick

Side (s) = Perimeter ÷ 4 = 100 ÷ 4 = 25 cm.

One half-diagonal (d1/2) = 14 ÷ 2 = 7 cm.

The other half-diagonal (d2/2) = $\sqrt{(25^2 - 7^2)} = \sqrt{(625 - 49)} = 24$ cm.

Area of Rhombus = 2 × (d1/2) × (d2/2) = 2 × 7 × 24 = 336 cm².

Therefore The correct answer is 336 cm².

Alternate Method

Given:

Perimeter of rhombus = 100 cm

Diagonal 1 (d1) = 14 cm

Formula Used:

Perimeter (P) = 4 × side (s)

Area (A) = 1/2 × d1 × d2

Relation: $s^2 = (d1/2)^2 + (d2/2)^2$

s = 25 cm

d1/2 = 7 cm

d2/2 = 24 cm

A

B

C

D

Calculations:

=> Side (s) = 100 ÷ 4 = 25 cm

=> d1/2 = 14 ÷ 2 = 7 cm

=> $(25)^2 = (7)^2 + (d2/2)^2$

=> $625 = 49 + (d2/2)^2$

=> $(d2/2)^2 = 625 - 49 = 576$

=> d2/2 = √576 = 24 cm

=> d2 = 24 × 2 = 48 cm

=> Area = 1/2 × 14 × 48

=> Area = 7 × 48 = 336 cm²

Therefore The correct answer is 336 cm².

Additional Information

Area of Rhombus

The area can also be calculated as base × height, where base is the side of the rhombus.

Diagonal Property

The diagonals of a rhombus bisect each other at right angles (90°).

Relationship Between Side and Diagonals

The relationship is given by $4 \times side^2 = d1^2 + d2^2$.

Q35. Answer: (a) 20%

Shortcut Trick

Ratio of Cost Price (CP) to Selling Price (SP) = 850 : 1,020.

Dividing by 170: CP : SP = 5 : 6.

Profit = 6 − 5 = 1 unit.

Profit% = (1 ÷ 5) × 100 = 20%.

Therefore The correct answer is 20%.

Alternate Method

Given → CP = Rs. 850, SP = Rs. 1,020.
Formulas: Profit = SP − CP | Profit% = (Profit ÷ CP) × 100.
=> Profit = 1,020 − 850 = Rs. 170.
=> Profit% = (170 ÷ 850) × 100.
=> Profit% = (1 ÷ 5) × 100 = 20%.
Therefore The correct answer is 20%.
Additional Information
Profit and Loss Basics
Profit occurs when SP > CP. Loss occurs when CP > SP. Formula: Loss% = (Loss ÷ CP) × 100.
Selling Price Calculation
SP = CP × (100 + P%) ÷ 100 or SP = CP × (100 − L%) ÷ 100.

Q36. Answer: (c) 19

The sum of two numbers is 64 and their ratio is 7 : 9.
Let numbers be 7a and 9a, where 'a' is any constant
=> 7a + 9a = 64
=> 16a = 64
=> a = 4
Therefore Numbers are
7a = 28
9a = 36
Therefore Sum of digits of these numbers = 2 + 8 + 3 + 6 = 19

Q37. Answer: (a) 96 cm²

Given:
The volume of cube is 64 cm³
Formula used:
Volume of cube = side³
Total surface area = 6 × side²
Calculation:
Volume of cube = side³
=> side³ = 64 cm³
=> side = cbrt64
=> side = 4 cm
Total surface area = 6 × side²
=> 6 × 4 × 4
=> 96 cm2
Therefore The total surface area is 96 cm².

Q38. Answer: (d) 4 hrs

Shortcut Trick
Time is directly calculated as Distance divided by Speed.
Time = 100 ÷ 25
Time = 4 hr
Therefore The correct answer is 4 hr.
Alternate Method
Given:
=> Total Distance (D) = 100 km
=> Speed of the car (S) = 25 km/h
Formula Used:
Time (T) = Distance (D) ÷ Speed (S)
Calculations:
=> T = 100 ÷ 25

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=> T = 4 hr

Therefore The correct answer is 4 hr.

Additional Information

Fundamental Speed Formula

The relation between distance, speed, and time is given by Speed = Distance ÷ Time.

Unit Conversion (km/h to m/s)

To convert speed from km/h to m/s, multiply the value by 5/18.

Average Speed

For a journey with different speeds, Average Speed = Total Distance ÷ Total Time.

Q39. Answer: (c) 30870

Given:

Present population of village = 28000

Rate at which population increases = 5%

Time period = 2 years

Formula used:

$P_n = P(1 + R/100)^n$

Where, P_n = Population after n years

P = Present population

R = Rate of growth of population

n = time period (in years)

Calculations:

Population after 2 years,

=> $P2 = 28000(1 + 5/100)^2$

=> $P2 = 28000(21/20)^2$

=> $P2 = 28000(441/400)$

=> $P2 = 70 \times 441$

=> $P2 = 30870$

Therefore The population after 2 years will be 30870

Q40. Answer: (b) 72

Shortcut Trick

Take average around 72:

=> (72, 68, 74, 70, 76)

=> Deviations = 0, −4, +2, −2, +4 → sum = 0

=> Average = 72

Therefore Answer = 72

Alternate Method

Given:

Marks = 72, 68, 74, 70, 76

Concept Used:

Average = Total sum ÷ Number of observations

Calculation:

=> Total = 72 + 68 + 74 + 70 + 76

=> = 360

=> Number of subjects = 5

=> Average = 360 ÷ 5 = 72

Therefore Average marks = 72

Additional Information

Average Formula: Average = Sum ÷ Count

Assumed Mean: Take a central value to simplify calculations

Shortcut: If deviations cancel out, assumed mean is the average

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Tip: Use grouping around a central number for speed

Q41. Answer: (c) 15%

Shortcut Trick

Profit per magazine = Selling Price − Cost Price = 23 − 20 = 3.

Profit percentage = (Profit ÷ Cost Price) × 100.

Profit % = (3 ÷ 20) × 100 = 3 × 5 = 15%.

Therefore The correct answer is 15%.

Alternate Method

Given:

Cost Price (CP) of magazine = Rs. 20

Selling Price (SP) of magazine = Rs. 23

Formula: Profit% = [(SP − CP) ÷ CP] × 100

=> Profit = 23 − 20 = 3

=> Profit % = (3 ÷ 20) × 100

=> Profit % = 0.15 × 100 = 15%

Therefore The correct answer is 15%.

Additional Information

Profit and Loss Calculation

Profit occurs when Selling Price (SP) is greater than Cost Price (CP). Profit = SP − CP.

Percentage Basis

Profit or loss percentage is always calculated on the Cost Price (CP) unless stated otherwise in the problem.

Q42. Answer: (b) 15%

Given:

Marked Price = Rs.160

Selling Price = Rs. 136

Formula used:

Discount = M.P − S.P

Where, M.P = Marked Price

S.P = Selling Price

Discount% = [(Discount/M.P) × 100]

Calculation:

Discount = M.P − S.P

=> 160 − 136 = Rs.24

According to the question:

Discount% = [(Discount/M.P) × 100]

=> Discount% = [(24/160) × 100] = 15%

Therefore The discount % of the book is 15%.

Q43. Answer: (c) Rs 1404

Given:

Sum of amount, (P) = Rs.900

Rate of interest, (R) = 8%

Time period, (T) = 7 years

Formula required:

SI = PTR/100

Amount = P + SI

Here, SI → Simple interest, R → Rate, T → Time, P → Principal

Calculations:

Simple interest = (900 × 7 × 8)/100

=> 504

Amount = P + SI

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=> 504 + 900 = 1404

Therefore The amount after 7 years is Rs.1404

Q44. Answer: (d) 10

Simple multiplication 3 × 25 = 75. Bracket takes priority over division, multiplication, addition or subtraction.

Hence, (3 × 25) ÷ 5 - 20 × 4 + 75 = 75 ÷ 5 - 20 × 4 + 75 = 15 - 20 × 4 + 75.

Multiplication takes priority over addition or subtraction.

Hence, 15 - 20 × 4 + 75 = 15 - 80 + 75.

Addition takes priority over subtraction.

Hence, 15 - 80 + 75 = 90 - 80 = 10

Q45. Answer: (b) 12

Given:

Sum of square of two numbers = 74

Product of two number = 35

Formula:

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

Calculation:

$(a + b)^2 = 74 + 2 \times 35$

$\Rightarrow (a + b)^2 = 74 + 70$

$\Rightarrow (a + b)^2 = 144$

$\Rightarrow a + b = \sqrt{144}$

$\Rightarrow a + b = 12$

Therefore Sum of two numbers is 12.

Q46. Answer: (a) 1.56

The logic is:

Hence, ‘1.56’ is the correct answer.

Q47. Answer: (c) JSZ

This question is based on the concept of the positional value of alphabets.

The logic followed here is-

• AZW : GFC

A + 6 = G; Z + 6 = F; W + 6 = C

• LSM : RYS

L + 6 = R; S + 6 = Y; M + 6 = S

• DMT : JSZ

D + 6 = J; M + 6 = S; T + 6 = Z

Thus, 'option 3' is the correct answer.

Q48. Answer: (c) 52^(nd) and 35^(th)

According to the question:

Rank of Mihir from the top = 11^(th)

Rank from bottom = Total students - Rank of Mihir from top + 1

Rank of Mihir from the bottom = 62 - 11 + 1 = 52^(nd)

Rank of Rajnish from the top = 28th

Rank from bottom = Total students - Rank of Rajnish from top + 1

Rank of Mihir from the bottom = 62 - 28 + 1 = 35^(th)

Hence, "52nd and 35th" Is the correct answer.

Q49. Answer: (a) EHORZ

The logic followed here is:

ABOVE: DERYH

Similarly,

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BELOW: ?

Hence, the correct answer is "EHORZ".

Q50. Answer: (b) Speed

All the things except Speed can be touched physically.

Thus Speed is the odd word.

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