Agniveer Army GD 9th June 2026 (Shift 2) Memory-Based Paper (Previous Year Paper)

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

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GENERAL KNOWLEDGE

Q1. 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

Q2. In which movement did Mahatma Gandhi give the slogan 'Do or Die' to the people?

(a) Non-cooperation Movement
(b) Civil disobedience movement
(c) Champaran Movement
(d) Quit India Movement

Q3. On which of the following days, that is celebrated as a national festival, did India become a Sovereign, Democratic and Republic state?

(a) Republic Day
(b) Independence Day
(c) Martyr’s Day
(d) Gandhi Jayanti

Q4. Which of the following rivers flows through the Thar desert?

(a) Savitri
(b) Mutha
(c) Luni
(d) Girna

Q5. The country which has the longest border with India is _____.

(a) China
(b) Nepal
(c) Pakistan
(d) Bangladesh

Q6. Which one of the following amendment is related to Urban Local Government?

(a) 44^(th)
(b) 73^(rd)
(c) 24^(th)
(d) 74^(th)

Q7. Who was the famous female freedom fighter who participated in the first independence revolt of 1857?

(a) Kasturba Gandhi
(b) Bhikaji Cama
(c) Sarojini Naidu
(d) Begum Hazrat Mahal

Q8. Who founded the Arya Samaj in 1875?

(a) Swami Dayanand Saraswati
(b) Ishwar Chandra Vidyasagar
(c) Swami Vivekanand
(d) Pandita Ramabai

Q9. The Constitution of India was adopted on

(a) January 26, 1950
(b) January 26, 1949
(c) November 26, 1949
(d) December 31, 1949

Q10. Who among the following won the award of the best actor at the 71st National Film Awards?

(a) Ranbir Kapoor
(b) Vikrant Massey
(c) Shah Rukh Khan
(d) Ayushmann Khurrana

Q11. The Supreme Commander of the Armed Forces in India is

(a) Chief of Defence Staff
(b) The Prime Minster
(c) The President
(d) The Defence Minister

Q12. From which country is the preamble of the Indian Constitution borrowed?

(a) Italian Constitution
(b) Canadian Constitution
(c) French Constitution
(d) Constitution of USA

Q13. What was the main reason for the split in the Indian National Congress at Surat in 1907?

(a) Introduction of communalism into India politics by Lord Minto
(b) Extremists lack of faith in the capacity of the moderates to negotiate with the British Government
(c) Foundation of Muslim League
(d) Aurobindo Ghosh's inability to be elected as the President of the Indian National Congress

Q14. Which country is the smallest neighbouring country of India area wise?

(a) Nepal
(b) Bhutan
(c) Sri Lanka
(d) Maldives

Q15. Moti Masjid in the Red Fort, Delhi was constructed by

(a) Shershah
(b) Shahjahan
(c) Aurangzeb
(d) Bhahadurshah Zafar

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GENERAL SCIENCE

Q16. _____ is the process of supplying water to crops at regular intervals.

(a) Irrigation
(b) Planting
(c) Fertilizer
(d) Sowing

Q17. To help a person who may have stopped breathing, a ___ needs to be performed.

(a) MRI
(b) CPR
(c) X-Ray
(d) All of the above

Q18. The formation of water drops on the outer surface of a glass containing ice and water is due to

(a) Evaporation
(b) Condensation
(c) Transpiration
(d) Diffusion

Q19. What happens when a bulb gets fused

(a) Filament becomes cold
(b) Filament gets broken
(c) Filament becomes thick
(d) Filament becomes thin

Q20. The process of separating grains from the stalks is called _____

(a) Threshing
(b) Winnowing
(c) Hand picking
(d) Sieving

Q21. Which of the following is an example of a physical change? In this example, there is no change in chemical composition of matter.

A: Coal changing into coal ash on burning
B: Preparing a sweet drink by mixing sugar in water
C: White washing walls using a solution of lime and water
D: Mixing salt and lemon juice in a beaker

(a) Only A
(b) Only C
(c) Only D
(d) Only B

Q22. Food does not spoil for months if it is stored at

(a) -18°C
(b) 5°c
(c) 10°C
(d) Room temperature 25°C

Q23. What is the unit of speed?

(a) Meter per Second
(b) Kg per Cm^2
(c) Newton-Meter
(d) Newton

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Q24. What is the function of the growth hormone secreted by the pituitary gland?

(a) It stimulates growth in all organs.
(b) It regulates the blood sugar level.
(c) It regulates the menstrual cycle.
(d) It regulates metabolism for body growth.

Q25. After a hot sunny day, people sprinkle water on the roof or open ground because:

(a) large latent heat of vaporisation of water helps to heat the cold surface
(b) large latent heat of vaporisation of water does not help to cool the hot surface
(c) large latent heat of vaporisation of water helps to cool the hot surface
(d) less latent heat of vaporisation of water helps to cool the hot surface

Q26. During respiration O2is taken in and CO2 is released. The physical process that aids in this exchange is:

(a) Osmosis
(b) Adsorption
(c) Absorption
(d) Diffusion

Q27. What is the ray that comes back from the surface after reflection called?

(a) Incident ray
(b) Refracted ray
(c) Reflected ray
(d) Diffused ray

Q28. What happens when two forces act in the opposite directions on an object?

(a) The net force acting on the object is the difference between the two objects.
(b) The net force acting on the object is the difference between the two forces.
(c) The net force acting on the object is the total of the two forces.
(d) The net force acting on the object is the sum of the two objects.

Q29. What is the next step in the process of farming after drying the harvested crop?

(a) Earthing
(b) Threshing
(c) Peeling off
(d) Harvesting

Q30. Which of the following changes involves puberty in girls?

1. Social changes
2. Cognitive changes
3. Physical changes

(a) Only 1 and 2
(b) Only 2 and 3
(c) Only 1 and 3
(d) 1, 2 and 3

MATHEMATICS

Q31. The height of an equilateral triangle is 15 cm. The area of the triangle is

(a) 50√3 sq.cm.
(b) 70√3 sq.cm.
(c) 75√3 sq.cm.
(d) 150√3 sq.cm.

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Q32. An object travels 25 m in 3 seconds and then 15 m in 2 seconds. What is the average speed of the object?

(a) 6.67s^(–1)
(b) 6.67 ms^(–1)
(c) 8.0 ms^(–1)
(d) 8.0 m

Q33. If a train, 150 m. long crosses a pole in 12 seconds, then what is the speed of the train in km./hr.?

(a) 45
(b) 60
(c) 50
(d) 75

Q34. Find the value of '?' in the following question.

2 of 3 ÷ 9 × 18 + 1 (6 + 3) = ?

(a) 20
(b) 21
(c) 22
(d) 24

Q35. Two numbers are in the ratio of 6 : 5. If their HCF is 3, then what is the LCM of the two numbers?

(a) 64
(b) 110
(c) 90
(d) 80

Q36. Find the square of 19.

(a) 324
(b) 361
(c) 362
(d) 225

Q37. A man purchased an old bicycle for Rs. 1,200 and spent Rs. 1,800 on its repairing. He sold it for Rs. 2,400. What is his loss percentage?

(a) 30 Percent
(b) 40 Percent
(c) 20 Percent
(d) 10 Percent

Q38. Simplify the expression: 18 ÷ [6 × {4 - (8 - 6 + 3)}]

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

Q39. A car travels 40 km at 20 km/h and 40 km at 40 km/h.

Find its average speed.

(a) 26.6 km/h
(b) 25.6 km/h
(c) 28.6 km/h
(d) 30.6 km/h

Q40. If A, B and C share the profit in the ratio of 3 : 3 : 7. If the gain is Rs. 39000. Then find the share of C.

(a) 9000
(b) 21000
(c) 2000

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(d) 17500

Q41. If x : y = 5 : 4, then what will be the ratio of (x/y):(y/x) ?

(a) 25 : 16
(b) 16 : 25
(c) 4 : 5
(d) 5 : 4

Q42. The population of a town is 5 Lakh. If the annual birth rate is 8% and the annual death rate is 4%. Calculate the population after two years.

(a) 5,20,000
(b) 4,28,000
(c) 4,72,000
(d) 5,40,800

Q43. The marks obtained by a student in 5 subjects are : 72, 68, 75, 80 and 65. Find the average marks.

(a) 72
(b) 68
(c) 75
(d) 65

Q44. Find the market price, if selling price of a T.V. is Rs.2,550 after allowing two successive discounts if 15% and 75%.

(a) Rs.1200
(b) Rs 12,000
(c) Rs.14,000
(d) Rs.15,000

Q45. If $a + b = 9$ and $a^2 + b^2 = 53$, then find the value of ab.

(a) 20
(b) 8
(c) 14
(d) 18

LOGICAL REASONING

Q46. In a certain code language, 'COUNTY' is written as 'UOCYTN'. How will 'HOLDER' be written in that language?

(a) LOHRED
(b) LHORED
(c) LOHERD
(d) LOHDER

Q47. In a row of students, Anjali is 14^(th) from top and 23^(rd) from bottom. How many students are there in the row?

(a) 36
(b) 39
(c) 37
(d) 31

Q48. In the following question, select the odd word from the given alternatives.

(a) Chameleon
(b) Penguin
(c) Turtle
(d) Crocodile

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Q49. Select the related word from the given alternatives.

UWY : ZBD :: EGI : ?

(a) JKM
(b) JKN
(c) JLN
(d) JLM

Q50. Select the number that can replace the question mark (?) in the following series.

19, 33, 53, 85, 123, ?

(a) 173
(b) 163
(c) 183
(d) 193

ANSWER KEY

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

SOLUTIONS

Q1. 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.

Q2. Answer: (d) Quit India Movement

The correct answer is Quit India Movement.

Key Points

- Mahatma Gandhi launched the 'Quit India Movement' at Gowalia Tank Maidan in Mumbai on August 8, 1942.
- In this movement, Gandhiji gave the slogan 'Do or Die', which led to a movement for freedom among the people of India. Hence,

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this statement is correct.

• The 'Quit India Movement' was an important movement for India's independence against British rule.

• The main goal of this movement was for the British to leave India and for Indians to govern themselves.

• This declaration brought together a large number of people across the country and gave momentum to the freedom struggle.

Additional Information

• Importance of the 'Quit India Movement':

• The 'Quit India Movement' was the largest and most influential movement in the Indian freedom struggle.

• Mahatma Gandhi 's speech inspired millions of people.

• The British government imprisoned the protesters, but the movement continued.

• Importance of the slogan 'Do or Die':

• This declaration was intended to unite the Indian people and inspire them to fight for freedom to the end.

• People staged a large-scale Satyagraha against the British government.

• Information on other options:

• Non-Cooperation Movement: Started in 1920, in which non-cooperation was shown against the British government.

• Civil Disobedience Movement: In 1930, Mahatma Gandhi defied British laws by marching to Dandi.

• Champaran Movement: In 1917, Gandhiji won the rights of farmers against the British in Champaran, Bihar.

Important Points

• Results of the 'Quit India Movement':

• The Indian freedom struggle received international support.

• The British government began discussions for political reforms in India.

• This movement united the Indian people for freedom.

• Role of Mahatma Gandhi:

• Gandhiji led the movement on the principle of non-violence.

• He inspired the people to struggle and gave a new direction to the struggle.

Q3. Answer: (a) Republic Day

The correct answer is Republic Day.

Key Points

• Republic Day is celebrated every year on the 26th of January.

• It marks the day when the Constitution of India came into effect in 1950, replacing the Government of India Act (1935) as the governing document of India.

• On this day, India officially became a sovereign, democratic republic, and its people chose their own government.

• The Republic Day celebration in India is a grand event with various ceremonial parades, cultural performances, and the iconic Republic Day parade held at Rajpath in New Delhi.

• The President of India hoists the national flag, and various achievements of the nation are showcased during the celebrations.

Additional Information

• Historical Background: India gained independence from British colonial rule on August 15, 1947. However, it was on January 26, 1950, that India adopted its Constitution, becoming a fully sovereign and democratic republic.

• Adoption of the Constitution: The Constituent Assembly of India, under the leadership of Dr. B. R. Ambedkar, worked diligently to draft the Constitution of India, which took almost three years to complete. The Constitution was adopted on November 26, 1949, and came into effect on January 26, 1950.

• Purna Swaraj Declaration: Interestingly, January 26 has a historical significance even before the adoption of the Constitution. On January 26, 1930, the Indian National Congress declared the "Purna Swaraj" (Complete Independence) resolution, marking the demand for complete self-rule and freedom from British rule.

• Republic Day Celebrations: The Republic Day celebrations in India are marked by various events, with the main parade held in the national capital, New Delhi. The President of India takes the salute at the Republic Day parade, which showcases the country's military might, cultural diversity, achievements, and socio-economic progress.

• Chief Guest: Each year, a foreign head of state or a dignitary is invited as the chief guest for the Republic Day parade. This tradition symbolizes India's diplomatic ties and global friendships.

• Flag Hoisting and Celebrations: Republic Day is celebrated throughout the country with enthusiasm and patriotic fervor. The national flag is hoisted in schools, government offices, and public places. Cultural programs, flag hoisting ceremonies, and parades are organized in various cities and towns.

• Importance of the Constitution: Republic Day not only commemorates the adoption of the Constitution but also emphasizes the significance of the guiding principles and fundamental rights enshrined in it. The Constitution of India serves as the supreme law of

the country, ensuring justice, liberty, equality, and fraternity for all citizens.

Q4. Answer: (c) Luni

The correct answer is Luni.

• Luni is the river that flows through the Thar desert.

• Luni river originates in the Pushkar valley of the Aravalli Range, passes through the southeastern portion of the Thar Desert, and ends in the marshy lands of Rann of Kutch in Gujarat.

• In 1892, Maharaja Jaswant Singh of Jodhpur constructed Jaswant Sagar Dam in Pichiyak village of Jodhpur district on Luni river.

• The dams in the Luni river are:

• Sipu Dam.

• Dantiwada Dam.

• Jaswant Sagar Dam.

Key Points

• The Thar Desert, also known as the Great Indian Desert, is a large, arid region in the northwestern part of the Indian subcontinent.

• The Thar Desert is the world's 20th-largest desert and the world's 9th-largest hot subtropical desert.

• The total area of the Thar desert is 77,000 sq mi In about 85% of the Thar Desert is in India, and about 15% is in Pakistan.

• Saltwater lakes within the Thar Desert include the Sambhar, Kuchaman, Didwana, Pachpadra, and Phalodi in Rajasthan and Kharaghoda in Gujarat.

River Name	Source	Length in Km	Mouth
Luni	Aravalli Range	495	Rann of Kutch
Mutha	Pune	10	Bhima River
Savitri	Mahabaleshwar	110	Arabian Sea
Girna	Western Ghats	330	Tapi River

Q5. Answer: (d) Bangladesh

The Correct Answer is Option 4 i.e Bangladesh.

• India shares boundaries with 7 countries. They are

• Bangladesh 4,096.7 (Km)

• China 3,488 (Km)

• Pakistan 3,323 (Km)

• Nepal 1,751 (Km)

• Myanmar 1,643 (Km)

• Bhutan 699 (Km)

• Afghanistan 106 (Km)

• China: Five Indian states, namely Jammu and Kashmir, Himachal Pradesh, Uttarakhand, Sikkim, and Arunachal Pradesh shares a boundary with China.

• It is the second-longest border of India.

• Nepal: Uttarakhand, Uttar Pradesh, Bihar, West Bengal, and Sikkim are the Indian states that shares border with Nepal.

• Bangladesh: Assam, West Bengal, Mizoram, Meghalaya, and Tripura are the Indian states that share borders with Bangladesh.

• Bangladesh has the longest border of 4096 km with India

• Pakistan: Punjab, Rajasthan, Gujarat and Jammu and Kashmir share borders with Pakistan

Q6. Answer: (d) 74^(th)

The correct answer is 74th.

Key Points

• 74^(th) Constitutional Amendment Act, 1992

• It is related to the Urban Local Self Government. Hence, Option 4 is correct.

• It is also known as Nagarpalika Act for giving constitutional status to the municipalities and bringing them under the justifiable part of the constitution.

• The Act is aimed at strengthening effective democracy at the grass-root level by providing a framework for the structure and mandate of urban local bodies.

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• The constitution 74th Amendment Act 1992, relating to Municipalities (Urban local Government) was passed by the parliament in 1992.

Additional Information

• Some important Amendments in the Constitution:

Amendment Act	Description
73rd Amendment Act	• The 73rd Amendment envisages the Gram Sabha as the foundation of the Panchayat Raj System to perform functions and powers entrusted to it by the State Legislatures.
42nd Amendment Act	• It was made in 1976. - It is also known as the Mini Constitution of India. - Fundamental Duties were also added. - It added 'SOCIALIST, SECULAR and INTEGRITY' in the Preamble.
44th Amendment Act	• The Amendment aimed to undo several changes that had been made to the Constitution by the 42nd Amendment which had been enacted by the Indira Gandhi-led Indian National Congress during the Emergency.
24th Amendment Act	• The 24^(th) amendment was enacted as a reaction to the Golak Nath case, 1967. - The Golak Nath ruling led to increased parliamentary authority to amend the Constitution. Through the Amendment, Parliament restored to itself undisputed authority to amend the Constitution, including its repeal.

Q7. Answer: (d) Begum Hazrat Mahal

The correct answer is option 4 i.e. Begum Hazrat Mahal.

• Begum Hazrat Mahal also called as Begum of Awadh was the second wife of Nawab Wajid Ali Shah.

• She took over the reign at Lucknow where the rebellion broke out on June 4, 1857.

• She actively took part in the revolt of 1857 against the Doctrine of Lapse under which Dalhousie wanted her to surrender Lucknow.

• Sir Colin Cambell, commander in chief, supressed the revolt with the help of Gorkha regiments.

• In March 1858, the city was finally recovered by the Britishers, but guerrilla activity continued till September of the same year.

• She had to retreat to Nepal, where she was initially refused asylum by the Prime Minister Jung Bahadur but was later allowed to stay. She died there in 1879.

Q8. Answer: (a) Swami Dayanand Saraswati

The correct answer is Swami Dayanand Saraswati

Key Points

• The Samaj was founded by Dayanand Saraswati on 7 April 1875.

• It promoted values and practices based on the beliefs of the Vedas.

• People of this community believed in one god and rejected worshipping idols.

• It was probably the first Hindu Organization to introduce proselytization in Hinduism, which means converting to Hinduism.

Additional Information

• Ishwar Chandra Vidyasagar: Ishwar Chandra Vidyasagar born as Ishwar Chandra Bandyopadhyay, was an Indian educator and social reformer of the nineteenth century.

• He is considered the "Father of Bengali prose.

• Swami Vivekananda: Swami Vivekananda, born Narendranath Datta, was an Indian Hindu monk, philosopher and author.

• Vivekananda founded the Ramakrishna Math and the Ramakrishna Mission.

• Pandita Ramabai Sarasvati: Pandita Ramabai Sarasvati was an Indian social reformer.

• She was the first woman to be awarded the title of Pandita as a Sanskrit scholar. She founded Mukti Mission at Kedgaon village, Pune.

Q9. Answer: (c) November 26, 1949

The correct answer is November 26, 1949.

• The Constitution of India was adopted on 26 November 1949 by the Constituent Assembly of India.

• The provisions relating to citizenship, elections, provisional parliament, temporary and transitional provisions were given immediate effect from November 26, 1949.

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• The whole Constitution became effective on 26 January 1950.

• It is the longest written constitution of any country on earth.

• B. R. Ambedkar, chairman of the drafting committee, is widely considered to be its chief architect.

Additional Information

• The Drafting Committee had seven members:

• Alladi Krishnaswami Ayyar, N. Gopalaswami; B.R. Ambedkar, K.M Munshi, Mohammad Saadulla, B.L. Mitter and D.P. Khaitan.

Q10. Answer: (c) Shah Rukh Khan

The correct answer is Shah Rukh Khan.

Key Points

• Shah Rukh Khan was awarded the Best Actor at the 71st National Film Awards for his remarkable performance in his latest film.

• The National Film Awards are among the most prestigious awards in India, recognizing excellence in the Indian film industry across various categories.

• The 71st National Film Awards ceremony celebrated films released in the year 2023, with winners chosen by a distinguished jury comprising experts from the film industry.

• Shah Rukh Khan's performance was acknowledged for its depth, emotional range, and the ability to connect with audiences on a profound level.

• The award highlights Shah Rukh Khan as one of the most versatile actors in the Indian film industry, having consistently delivered stellar performances across different genres.

Additional Information

• National Film Awards:

• The National Film Awards were established in 1954 and are administered by the Directorate of Film Festivals, under the Ministry of Information and Broadcasting, Government of India.

• These awards aim to promote good cinema and recognize outstanding contributions to the Indian film industry.

• Categories include awards for acting, directing, cinematography, music, screenplay, and more.

• Shah Rukh Khan:

• Often referred to as the "King of Bollywood," Shah Rukh Khan is one of the most prominent and influential actors in the Indian film industry.

• He has appeared in over 80 films and has received numerous accolades, including 14 Filmfare Awards.

• Shah Rukh Khan is also known for his contributions to the global promotion of Indian cinema.

• Other Nominees:

• Ranbir Kapoor: Known for his versatile performances, Ranbir Kapoor has won critical acclaim and several awards for his work in films such as Barfi! and Sanju.

• Vikrant Massey: An emerging actor in Indian cinema, Vikrant Massey is known for his impactful performances in films and web series.

• Ayushmann Khurrana: A critically acclaimed actor and singer, Ayushmann Khurrana is known for choosing socially relevant and unconventional scripts.

• Significance of the Award:

• The National Film Awards are considered the highest honor in Indian cinema and hold immense prestige in the industry.

• Winning this award solidifies an actor's reputation and acknowledges their contribution to Indian cinema.

Q11. Answer: (c) The President

The correct answer is The President.

• The President of India is the supreme commander of the defense forces of India. He is the commander-in-chief of the armed forces of the country.

Important Points

• Article 53 of the Constitution of India provides specifically the position of the President.

• As a supreme commander, he enjoys all the trapping of military pomp and ceremony.

• He has a grand mounted bodyguard, a serving general officer as his military secretary, a number of tri-services aides-de-camp, and other staff members.

• The President can declare war or conclude peace on the advice of the Union Council of Ministers headed by the Prime Minister.

• All important treaties and contracts are made in the President's name.

• He appoints chiefs of all branches of armed forces.

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Q12. Answer: (d) Constitution of USA

The correct answer is Constitution of USA.

Key Points

• The Preamble of the Indian Constitution has been inspired by the Preamble to the Constitution of the United States of America.

• The Indian Preamble starts with the words “We, the People,” similar to the US Preamble, reflecting the idea of popular sovereignty.

• The US Constitution is the first written Constitution in the world, and its Preamble became a model for many other nations, including India.

• Key elements of the US Preamble, such as justice, liberty, equality, and fraternity, have been adopted in the Indian Preamble to represent the nation's guiding principles.

• The Indian Preamble further expands these principles by including concepts like socialism, secularism, and democratic republic to reflect India's unique socio-political context.

Additional Information

• Preamble of the Indian Constitution:

• It serves as the introductory statement to the Constitution, highlighting its objectives and philosophy.

• The Preamble declares India to be a Sovereign, Socialist, Secular, Democratic Republic and promises to secure Justice, Liberty, Equality, and Fraternity for all its citizens.

• The Preamble was adopted on 26th November 1949, along with the Constitution itself.

• Though non-justiciable, the Preamble plays a vital role in interpreting the Constitution and understanding its intent.

• Constitution of the USA:

• The US Constitution was adopted in 1787 and is the oldest written national Constitution still in use.

• The Preamble of the US Constitution begins with the famous words: "We the People of the United States, in Order to form a more perfect Union...”

• The US Constitution emphasizes individual rights, federalism, and separation of powers, which have influenced many other nations.

• The US Preamble outlines the fundamental purposes of the government, such as establishing justice, ensuring domestic tranquility, providing for the common defense, promoting general welfare, and securing liberty for its citizens.

• Other Constitutions and Their Contributions to India:

• Italian Constitution: It inspired the Directive Principles of State Policy in the Indian Constitution.

• Canadian Constitution: It influenced the adoption of a federal structure with a strong center in India.

• French Constitution: The ideals of liberty, equality, and fraternity were borrowed from the French Revolution and incorporated into the Indian Preamble.

• Government of India Act, 1935: This act served as a blueprint for several parts of the Indian Constitution, such as the federal structure and administrative framework.

• Important Points:

• While the US Constitution inspired the Indian Preamble's form and ideals, the Indian Constitution is unique due to its inclusiveness and detailed provisions addressing India's diverse challenges.

• The words “Socialist” and “Secular” were added to the Indian Preamble through the 42nd Amendment Act, 1976.

• The Preamble has been described as the “Identity Card of the Constitution” by Dr. B.R. Ambedkar, the chief architect of the Indian Constitution.

Q13. Answer: (b) Extremists lack of faith in the capacity of the moderates to negotiate with the British Government

The correct answer is Extremists lack of faith in the capacity of the moderates to negotiate with the British Government.

• Rash Behari Ghosh was the president of the Surat session of Congress in 1907.

• Indian National Congress split into two groups i.e. moderates and extremists at the Surat in 1907.

• The two main objectives placed by the extremists in the 1907 surat session were:

• Lala Lajpat Rai to be made the President of the INC and Demand for the resolution of Swaraj and these two demands were not accepted by the moderates.

• Instead of Lala Lajpat Rai, the moderates supported the idea of Rash Behari Ghosh as the President of the 1907 INC session of Surat.

• Extremist's lack of faith in the capacity of the moderates to negotiate with the British Government was the main reason for the split in the Indian National Congress at Surat in 1907.

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Q14. Answer: (b) Bhutan

The correct answer is Bhutan.

Key Points

• Bhutan is the smallest neighbouring country of India area wise.
• Bhutan has an area of 38,394 square kilometers.
• Bhutan is located in the eastern Himalayas and is known for its stunning natural beauty.
• Bhutan is a landlocked country and shares borders with India, China, and Nepal.

Additional Information

• Nepal is located in the Himalayas and shares a border with India to the north.
• It has an area of 147,181 square kilometers.
• Sri Lanka is an island nation located in the Indian Ocean.
• It has an area of 65,610 square kilometers and is separated from India by the Palk Strait.
• Maldives is an island nation located in the Indian Ocean and has an area of 300 square kilometers.
• It is located south of India and is not a contiguous neighbour.

Q15. Answer: (c) Aurangzeb

The correct answer is Aurangzeb

Mistake Points

• The Moti Masjid inside the Red Fort complex in Delhi was built by the Mughal emperor Aurangzeb.
• The Moti Masjid in Lahore Fort was built by Mughal emperor Jahangir.
• The Moti Masjid is located within the Agra Fort a UNESCO World Heritage Site was built by Mughal Emperor Shah Jahan.

Confusion Points

• The Moti Masjid in Agra was built by Mughal ruler Shah Jahan.
• It is located in Agra in Uttar Pradesh.
• Shah Jahan constructed the Moti Masjid for his members of the royal court.
• Shah Jahan was the fifth Mughal emperor who reigned the dynasty from 1628 to 1658.
• The historical structures built during the reign of Shah Jahan are:
• Taj Mahal.
• Red Fort.
• Jama Masjid.
• Shalimar Garden in Lahore.
• French travelers Bernier and Tavernier visited India during the reign of Shah Jahan.
• The Afghan noble Khan Jahan Lodi rebelled and was defeated by Shah Jahan.
• Shah Jahan was imprisoned by his son Aurangzeb in 1658 in Agra.

Additional Information

• The historical structures built during the reign of Akbar are:
• Agra Fort.
• Lahore Fort.
• Fathepur Sikri.
• Allahabad Fort.
• Buland Darwaza.

Emperor	Monuments	Place
Akbar	Agra Fort	Agra
Panch Mahal – build on the pattern of a Buddhist Vihara	Fatehpur Sikri	
Jama Masjid with gateway Buland Darwaza	Fatehpur Sikri	
Humayun Tomb	Delhi	
Jahangir	Shalimar Bagh	Srinagar
Akbar’s Tomb	Agra	

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Shahjahan	Red Fort	Delhi
Jama Masjid using Red stone	Delhi	
Moti Masjid	Agra	
Aurangzeb	Pinjore Garden	Lahore
Moti Masjid with white marble	Delhi	

Q16. Answer: (a) Irrigation

The correct answer is Irrigation.

Key Points

• Irrigation is the process of supplying water to crops at regular intervals.

• The main purpose of irrigation is to assist in the growth of agricultural crops, maintenance of landscapes, and re-vegetation of disturbed soils in dry areas and during periods of inadequate rainfall.

• Irrigation helps in enhancing the productivity of crops by ensuring that they receive an adequate amount of water.

• There are various methods of irrigation, including surface irrigation, drip irrigation, and sprinkler irrigation.

• Irrigation is crucial in areas where rainfall is insufficient to meet the water needs of crops.

• It also helps in maintaining the moisture level of the soil, which is essential for the proper growth of plants.

Additional Information

• Planting

• Planting refers to the process of placing seeds or young plants into the soil to grow crops or other vegetation.

• It is a crucial step in agriculture but does not specifically involve the supply of water to crops.

• Fertilizer

• Fertilizer is a chemical or natural substance added to soil or land to increase its fertility.

• It helps in providing essential nutrients to the plants but does not involve the supply of water.

• Sowing

• Sowing is the process of planting seeds in the soil.

• This is a preliminary step in crop production and does not pertain to the regular supply of water.

Q17. Answer: (b) CPR

Explanation:

Cardio-Pulmonary Resuscitation

To help a person who may have stopped breathing, a CPR needs to be performed quickly.

Following steps can be used:

1. Perform external chest compressions by placing the heel of one palm at the lower half of the breast bone and keeping fingers off the ribs. Cover this hand with the heel of the other hand.

2. Keep arms straight and push down vertically about 4 to 5 cm and then release. Do not lift hands off the chest between compressions. Complete 30 compressions in 18 seconds.

3. After one cycle of compressions tilt head back, pinch nose and give two short breaths of mouth-to-mouth respiration.

4. Complete 5 cycles of this routine (compressions and mouth-to-mouth) within 2 minutes. Check pulse after every 5 cycles.

5. Stop compressions as soon as pulse returns and check for breathing. If there is no breathing continue mouth-to-mouth respiration until natural breathing is restored.

6. Cover your mouth with clean cloth/ handkerchief to prevent transmitting infections when giving mouth to mouth rescue breathing.

7. Continue CPR till you are completely exhausted, or someone takes over. Never leave the victim alone. To perform CPR with proper CPR techniques and procedures one should undergo CPR training.

Q18. Answer: (b) Condensation

Concept:

Humidity:

• Water vapour present in the air is known as humidity.

• The actual amount of water vapour present in the atmosphere is known as absolute humidity.

Explanation:

Condensation:

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• The transformation of water vapour into liquid is known as condensation.

• Either the air is cooled to its dew point or it becomes so saturated with water vapour that it can no longer hold any more water, which leads to condensation.

• When a cold water glass field with ice and water makes contact with the water vapour in the atmosphere, it undergoes condensation.

• Because of it, we see water droplets on the outer surface of the glass.

• The same process happens during rainfall.

Thus, the formation of water drops on the outer surface of a glass containing ice and water is due to condensation.

Additional InformationEvaporation:

• On the surface of a liquid when it transitions into the gas phase, evaporation is a sort of vaporisation that takes place.

Transpiration:

• Transpiration is the evaporative loss of water by plants.

• It occurs mainly through stomata.

• Besides the loss of water vapour in transpiration, the exchange of oxygen and carbon dioxide in the leaf also occurs through these stomata.

Diffusion:

• Diffusion is the movement of molecules from a higher region to a lower region concentration.

Q19. Answer: (b) Filament gets broken

When the filament inside the bulb gets heated beyond its tolerance or when the temperature exceeds its melting point, the filament gets melted and hence broken. In this case, the bulb is said to be fused. The filament in the bulbs is usually made up of Tungsten because of its high melting point.

Q20. Answer: (a) Threshing

The correct answer is Threshing.

Key Points

• Threshing is the process of separating grains or seeds from the stalks and husks.

• This process is typically done after harvesting and is an essential step in grain production.

• Threshing can be performed manually, using tools, or with the help of mechanical devices such as threshers.

• It is commonly used for crops like wheat, rice, barley, and other cereals to ensure clean grains are obtained for storage and consumption.

Additional Information

• Winnowing:

• It is the process of separating lighter particles, such as husk, from heavier grains using wind or air currents.

• Winnowing is often performed after threshing to further purify the grains.

• It is a traditional method used widely in rural areas.

• Hand Picking:

• This method involves manually picking out impurities or unwanted materials from the produce.

• It is suitable for separating large-sized impurities like stones or weeds from grains.

• Sieving:

• Sieving is the process of using a sieve to separate particles based on size.

• It is commonly used for separating flour, sand, or grains from larger impurities.

Q21. Answer: (d) Only B

The correct answer is 4 - Only B: Preparing a sweet drink by mixing sugar in water.

Key Points

• Physical Change: A physical change is a type of change in which the form of matter is altered, but its chemical composition remains unchanged.

• Dissolving sugar in water is a physical change because the sugar molecules disperse in the water without forming a new substance.

• The process is reversible; the sugar can be retrieved by evaporating the water, leaving the chemical composition of the sugar intact.

• In this example, no chemical bonds are broken or formed, and the sugar retains its chemical identity.

• Other examples of physical changes include melting, freezing, condensation, and breaking a material into smaller pieces.

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Additional Information

• Chemical Change: A chemical change involves a transformation where the chemical composition of a substance changes, resulting in the formation of new substances.

• Example of Chemical Change: Burning coal to form coal ash is a chemical change because the carbon in coal reacts with oxygen, producing carbon dioxide and ash, substances with different chemical compositions.

• Reversibility: Physical changes are generally reversible, while chemical changes are often irreversible under normal conditions.

• Indicators of Chemical Changes: Common indicators include the emission of gas, change in temperature, formation of a precipitate, or a change in color.

• Whitewashing: In whitewashing (lime and water), slaked lime reacts chemically with carbon dioxide in the air to form calcium carbonate, a chemical change.

Q22. Answer: (a) -18°C

The correct answer is -18°C.

Key Points

• Food products should not spoil for months, for this food should be stored at a temperature of -180C.

• Generally, to keep the food in the fridge for a long time, its temperature should be from 00C to 4^0C.

Additional Information

• Keeping food in the fridge does not spoil quickly whereas food kept outside starts spoiling very quickly.

• That's why food items are kept in the fridge to keep them safe and are used as per the requirement in a fixed time.

• Bacteria grow in the outside temperature and spoil the food.

• The refrigerator temperature is lower than the outside temperature.

• Due to this bacteria do not thrive in the low temperature inside the fridge.

• Because of this, the food kept in the fridge remains safe for a certain time.

Q23. Answer: (a) Meter per Second

Explanation:

Unit of Speed

Definition: Speed is defined as the rate at which an object covers distance with respect to time. It is a scalar quantity, meaning it only has magnitude and no direction. Mathematically, speed can be expressed as:

Speed = Distance / Time

The SI (International System of Units) unit of speed is derived from the formula above. Since distance is measured in meters (m) and time is measured in seconds (s), the unit of speed is meters per second (m/s).

Correct Option Analysis:

The correct option is:

Option 1: Meter per Second

The unit "Meter per Second" (m/s) is the standard SI unit of speed. For example, if an object covers 20 meters in 4 seconds, its speed is calculated as:

Speed = Distance ÷ Time = 20 m / 4 s = 5 m/s

This unit is universally accepted in scientific and engineering contexts and is used to measure the speed of objects in various fields, such as physics, mechanics, and transportation.

Additional InformationTo further understand the analysis, let’s evaluate the other options:

Option 2: Kg per Cm^2

This unit, kilograms per square centimeter (kg/cm^2), is a unit of pressure, not speed. It represents the force exerted per unit area and is commonly used in pressure measurement applications, such as tire pressure or hydraulic systems. Since it has no relation to distance or time, it cannot be the unit of speed.

Option 3: Newton-Meter

Newton-meter (N·m) is a unit of torque or work, not speed. Torque refers to the rotational force applied to an object, while work represents the energy transferred when a force is applied over a distance. For example, when a wrench is used to tighten a bolt, the torque applied is measured in Newton-meters. This unit is unrelated to the measurement of speed.

Option 4: Newton

A Newton (N) is the SI unit of force, defined as the force required to accelerate a one-kilogram mass by one meter per second squared ($1\ N = 1\ kg \cdot m/s^2$). While force plays an essential role in motion, it is not the unit of speed. Force describes the cause of motion, whereas speed describes the rate of motion.

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Q24. Answer: (a) It stimulates growth in all organs.

The correct answer is It stimulates growth in all organs.

Key Points

• The growth hormone, also known as somatotropin, is secreted by the anterior pituitary gland.

• Its primary function is to stimulate growth in all organs and tissues of the body, including bones and muscles.

• It plays a crucial role in the regulation of body composition, body fluids, muscle and bone growth, sugar and fat metabolism, and possibly heart function.

• Growth hormone stimulates the liver to produce an insulin-like growth factor (IGF-1), which is a key player in muscle growth and repair.

• The hormone is most active during childhood and adolescence, which are critical periods for growth and development.

Additional Information

• It regulates the blood sugar level

• The regulation of blood sugar levels is primarily controlled by hormones such as insulin and glucagon, which are secreted by the pancreas.

• While growth hormone does have some influence on metabolism, its direct role in blood sugar regulation is limited compared to insulin.

• It regulates the menstrual cycle

• The menstrual cycle is regulated by a complex interaction of hormones including estrogen, progesterone, luteinizing hormone (LH), and follicle-stimulating hormone (FSH).

• These hormones are primarily produced by the ovaries and the pituitary gland, but the growth hormone does not play a direct role in this process.

• It regulates metabolism for body growth

• While growth hormone does influence metabolism, its primary function is to stimulate growth in all organs rather than solely regulating metabolism.

• Other hormones like thyroid hormones, insulin, and adrenal hormones also play significant roles in regulating metabolism.

Q25. Answer: (c) large latent heat of vaporisation of water helps to cool the hot surface

The correct answer is large latent heat of vaporisation of water helps to cool the hot surface.

Key Points

• When water is sprinkled on a hot surface, it absorbs a large amount of heat from the surface to evaporate due to its high latent heat of vaporization.

• The process of evaporation requires energy, which is taken from the hot surface, resulting in cooling.

• Latent heat of vaporization of water is approximately 2260 kJ/kg, making it effective for cooling purposes.

• This principle is widely used in various cooling processes and systems, including air conditioning and industrial cooling.

Additional Information

• Latent Heat:

• It is the heat required to change the state of a substance without changing its temperature.

• Common types include latent heat of fusion (solid to liquid) and latent heat of vaporization (liquid to gas).

• Evaporation:

• It is the process by which molecules transition from a liquid to a gas at temperatures below boiling point.

• Evaporation occurs at the surface of a liquid and results in cooling.

• Cooling Techniques:

• Sprinkling water on surfaces is a traditional method to cool hot surfaces.

• Modern cooling systems use refrigerants and evaporative coolers for efficient temperature control.

• Applications:

• The principle of high latent heat of vaporization is used in air conditioning, refrigeration, and cooling towers.

• It is also utilized in thermal management of electronic devices and industrial equipment.

Q26. Answer: (d) Diffusion

The correct answer is Diffusion.

• Gas exchange is the process by which oxygen and carbon dioxide move between the bloodstream and the lungs.

Key Points

• It is the primary function of the respiratory system and is essential for ensuring a constant supply of oxygen to tissues, as well as removing carbon dioxide.

• During respiration, O2 is taken in and CO2 is released.
• The physical process that aids in this exchange is Diffusion.
• Diffusion is the spontaneous movement of gases, without the use of any energy or effort by the body.
• It occurs between the gas in the alveoli and the blood in the capillaries in the lungs.
• During the process of diffusion, the gases move from an area of high pressure to low pressure.

Q27. Answer: (c) Reflected ray

The correct answer is A reflected ray.

Key Points

• Reflection-
• When the light rays fall on the plane surface it deviates from its path in the same medium.
• or When a ray of light is incident on the plane surface is reflected back into the same medium it is termed as Reflection.
• Example - Plane Mirror.
• A reflected ray: The ray of light that bounces back from the surface of reflection is called the reflected ray. All the rays of the incident, normal and reflected lie on the same plane.

Q28. Answer: (b) The net force acting on the object is the difference between the two forces.

The correct answer is The net force acting on the object is the difference between the two forces..

Key Points

• When two forces act in opposite directions on an object, the net force is the difference between the two forces.
• The direction of the net force is in the direction of the larger force.
• If the forces are equal in magnitude but opposite in direction, they cancel each other out, resulting in a net force of zero.
• The concept of net force is crucial in understanding how forces influence the motion of objects according to Newton's Laws of Motion.

Additional Information

• Force
• A force is a push or pull upon an object resulting from its interaction with another object. Forces can cause objects to accelerate, decelerate, remain in place, or change shape.
• Forces are vector quantities, meaning they have both magnitude and direction.
• Forces can be categorized into contact forces (e.g., friction, tension) and action-at-a-distance forces (e.g., gravitational, electromagnetic).
• Net Force
• The net force is the vector sum of all the forces acting on an object.
• It determines the overall effect of all the forces on the motion of the object.
• According to Newton's Second Law of Motion, the net force acting on an object is equal to the mass of the object multiplied by its acceleration (F = ma).
• Newton's Laws of Motion
• First Law (Law of Inertia): An object will remain at rest or in uniform motion in a straight line unless acted upon by a net external force.
• Second Law (Law of Acceleration): The acceleration of an object is directly proportional to the net force acting on it and inversely proportional to its mass (F = ma).
• Third Law (Action and Reaction): For every action, there is an equal and opposite reaction.
• Equilibrium
• An object is in equilibrium when the net force acting on it is zero.
• In equilibrium, an object at rest stays at rest, and an object in motion continues to move at a constant velocity.
• Equilibrium can be static (object at rest) or dynamic (object moving with constant velocity).

Q29. Answer: (b) Threshing

The correct answer is 'Threshing'

Key Points

• Threshing:
• Threshing is the process of separating the edible part of the grain from the chaff and straw.
• It is typically done after the crops are harvested and dried to ensure that the grains can be efficiently processed and stored.
• This step is crucial as it prepares the grain for further processing, storage, and eventual sale or consumption.

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• Threshing can be done manually using traditional methods or with the help of machines for larger scale operations.

Additional Information

• Earthing:

• Earthing is a technique used in the cultivation of certain crops, such as potatoes, where soil is piled up around the base of the plant to encourage tuber growth and protect them from pests.

• It is not related to the immediate post-harvest processes of grain crops.

• Peeling off:

• Peeling off refers to the removal of outer layers from certain crops, such as the skin from fruits or vegetables.

• This process is not applicable to grain crops and is not a step in the post-harvest process of grains.

• Harvesting:

• Harvesting is the process of cutting and gathering mature crops from the fields.

• It is the step that precedes drying and threshing in the agricultural cycle.

Q30. Answer: (d) 1, 2 and 3

The correct answer is 'Changes involving puberty in girls include social changes, cognitive changes, and physical changes.'

Key Points

• Puberty in girls:

• Puberty is a natural process of physical, emotional, and psychological changes that mark the transition from childhood to adulthood.

• It is triggered by hormonal changes in the body, primarily involving estrogen and progesterone in girls.

• The changes during puberty can be categorized as physical, cognitive, and social.

• Physical changes:

• Girls experience significant physical changes during puberty, such as the development of secondary sexual characteristics.

• These include breast development, the onset of menstruation, growth of pubic and underarm hair, and changes in body shape.

• Physical growth also accelerates, with height and weight increasing during this period.

• Cognitive changes:

• The brain undergoes development during puberty, leading to improved cognitive abilities like abstract thinking, decision-making, and problem-solving.

• Girls may begin to explore their identity, values, and beliefs more deeply as they mature intellectually.

• These cognitive changes also play a role in emotional regulation and understanding complex social situations.

• Social changes:

• Puberty brings shifts in social interactions, as girls become more aware of their relationships and social roles.

• They may develop a stronger sense of independence and start forming deeper friendships and peer relationships.

• Social changes also include increased interest in romantic relationships and awareness of societal expectations and norms.

Additional Information

• Incorrect Options:

• The option that includes only social and cognitive changes excludes physical changes, which are a primary aspect of puberty.

• The option that includes only cognitive and physical changes omits social changes, which are equally significant during puberty.

• The option that includes only social and physical changes neglects cognitive development, which is a vital part of the changes experienced during puberty.

• Importance of understanding puberty holistically:

• Recognizing the interplay of physical, cognitive, and social changes helps parents, educators, and caregivers support girls during this critical developmental phase.

• Addressing each aspect ensures a balanced approach to their emotional and psychological well-being.

Q31. Answer: (c) 75√3 sq.cm.

We know that each angle in an equilateral triangle is 60°.

So, applying trigonometric formulae in this question we get,

In ΔABD,

tan 60° = AD/BD

=> √3 = 15/BD

=> BD = 5 √3 cm.

Since, AD is the height of an equilateral triangle; it divides BC into two equal parts, so,

BC = 2 × BD
=> BC = 10 √3
Now Area of a Triangle = ½ × Base × Height
=> Area = ½ × BC × AD
=> Area = ½ × 10 √3 × 15
=> Area = 75 √3 cm²

Q32. Answer: (c) 8.0 ms^(−1)

Shortcut Trick
Average Speed = Total Distance ÷ Total Time
Total Distance = 25 m + 15 m = 40 m
Total Time = 3 s + 2 s = 5 s
Average Speed = 40 ÷ 5 = 8.0 ms^(−1)
Therefore The correct answer is 8.0 ms^(−1).
Alternate Method
Given:
Distance 1 (d1) = 25 m, Time 1 (t1) = 3 s
Distance 2 (d2) = 15 m, Time 2 (t2) = 2 s
Formula Used:
Average Speed = (d1 + d2) ÷ (t1 + t2)
Calculations:
=> Total Distance = 25 + 15 = 40 m
=> Total Time = 3 + 2 = 5 s
=> Average Speed = 40 ÷ 5
=> Average Speed = 8.0 ms^(−1)
Therefore The correct answer is 8.0 ms^(−1).
Additional Information
Average Speed Formula
For unequal distances, Average Speed = Total Distance ÷ Total Time. It is a scalar quantity.
Special Case: Equal Distances
If an object covers two equal distances at speeds v1 and v2, the average speed is 2v1v2 ÷ (v1 + v2).
Units of Speed
The SI unit of speed is m/s or ms^(−1). To convert km/h to m/s, multiply by 5/18.

Q33. Answer: (a) 45

Speed = distance/time
Given, a train, 150 m. long crosses a pole in 12 seconds
Thus a train has to travel its own length to cross a pole.
Therefore Speed of train = 150/12 = 12.5 m/s
Speed of train in km/hr = 12.5 × 18/5 = 45 km/hr

Q34. Answer: (b) 21

Concept Used:
Follow the BODMAS rule to solve this question, as per the order given below:
Now,
Calculations:
Considering the question
2 of 3 ÷ 9 × 18 + 1 (6 + 3) = ?
=> 6 ÷ 9 × 18 + 1 × 9
=> 12 + 9
=> 21

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Q35. Answer: (c) 90

Given:

Two numbers are in the ratio of 6 : 5.

Their HCF is 3.

Concept used:

1. If P is the HCF of A and B then A = P × m & B = P × n. (Where m and n are arbitrary positive integers and they are co-prime to each other)

2. LCM is the smallest common multiple of two or more numbers.

Calculation:

First number = 6 × 3 = 18

Second number = 5 × 3 = 15

LCM (18, 15) = 3 × 6 × 5 = 90

Therefore Their LCM is 90.

Q36. Answer: (b) 361

Shortcut Trick

To find the square of 19, use the base 20 method.

19 is 1 less than 20. Square of 20 is 400.

$19^2 = (20 - 1)^2 = 400 - 40 + 1 = 361$.

Therefore The correct answer is 361.

Alternate Method

Given:

Number = 19

Formula Used:

Square of n = n × n

Calculations:

=> $19^2 = 19 \times 19$

=> 19 × (10 + 9)

=> 190 + 171

=> 361

Therefore The correct answer is 361.

Additional Information

Square Identity

The algebraic identity $(a - b)^2 = a^2 - 2ab + b^2$ is useful for calculating squares of numbers close to multiples of 10.

Unit Digit Property

If a number ends in 9, its square always ends in 1 because 9 × 9 = 81.

Perfect Square Root

The square root of 361 is √361 = 19, which is a prime number.

Nearby Squares

$17^2 = 289$, $18^2 = 324$, $20^2 = 400$, $21^2 = 441$.

Q37. Answer: (c) 20 Percent

Given:

Cost of bicycle = Rs. 1,200

Repairing cost = Rs. 1,800

Selling price = Rs. 2,400

Concept:

Loss % = ((Cost - Selling Price) / Cost) × 100

Calculation:

Total cost = 1200 + 1800 = Rs. 3000

Loss = Total cost - Selling price = 3000 - 2400 = Rs. 600

Loss % = (600 / 3000) × 100 = 20%

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Therefore, the loss percentage is 20%.

Q38. Answer: (a) -3

Given:

The expression is 18 ÷ [6 × {4 - (8 - 6 + 3)}]

Concept Used:

Follow the BODMAS rule according to the table given below:

Calculation:

=> 18 ÷ [6 × {4 - (8 - 6 + 3)}]

=> 18 ÷ [6 × {4 - 5}]

=> 18 ÷ (6 × -1)

=> 18 ÷ (-6) = -3

Therefore The required result is -3.

Q39. Answer: (a) 26.6 km/h

Shortcut Trick

When the distances traveled are equal, the Average Speed is the harmonic mean of the speeds.

Average Speed = (2 × v1 × v2) ÷ (v1 + v2)

Average Speed = (2 × 20 × 40) ÷ (20 + 40) = 1600 ÷ 60 = 80 ÷ 3

Average Speed ≈ 26.66 km/h

Therefore The correct answer is 26.6 km/h.

Alternate Method

Given:

First distance (d1) = 40 km, Speed (v1) = 20 km/h

Second distance (d2) = 40 km, Speed (v2) = 40 km/h

Formula Used:

Average Speed = Total Distance ÷ Total Time

Calculations:

=> Time taken for first part (t1) = Distance ÷ Speed = 40 ÷ 20 = 2 hours

=> Time taken for second part (t2) = Distance ÷ Speed = 40 ÷ 40 = 1 hour

=> Total Time = t1 + t2 = 2 + 1 = 3 hours

=> Total Distance = 40 + 40 = 80 km

=> Average Speed = 80 ÷ 3 = 26.666... km/h

Therefore The correct answer is 26.6 km/h.

Additional Information

General Average Speed Formula

For unequal distances d1, d2, ... and times t1, t2, ..., Average Speed = (d1 + d2 + ...) ÷ (t1 + t2 + ...).

Unit Conversion

To convert km/h to m/s, multiply by 5/18. To convert m/s to km/h, multiply by 18/5.

Equal Time Intervals

If a car travels at different speeds for equal time intervals, the average speed is the Arithmetic Mean: (v1 + v2) ÷ 2.

Q40. Answer: (b) 21000

Shortcut Trick

Total Ratio parts = 3 + 3 + 7 = 13 units

Total Gain (13 units) = Rs. 39000

Value of 1 unit = 39000 ÷ 13 = Rs. 3000

Share of C = 7 units = 7 × 3000 = Rs. 21000

Therefore The correct answer is Rs. 21000.

Alternate Method

Given: Ratio of profit A : B : C = 3 : 3 : 7. Total gain = Rs. 39000.

Formula Used: Share of a partner = (Partner ratio ÷ Sum of ratios) × Total profit.

A (3)

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B (3)
C (7)
Total Parts = 13
Total Profit = Rs. 39000
Share C = 7/13 × 39000
=> Sum of ratios = 3 + 3 + 7 = 13
=> Total gain = Rs. 39000
=> Share of C = (7 ÷ 13) × 39000
=> Share of C = 7 × 3000
=> Share of C = Rs. 21000
Therefore The correct answer is Rs. 21000.
Additional Information
Partnership Profit Ratio
Profit is distributed in the ratio of (Investment × Time). If time is same, profit ratio = investment ratio.
Ratio to Value Conversion
To find the value of a part: Value = (Specific Ratio ÷ Sum of all Ratios) × Total Value.
Types of Partners
Active partners manage the business and may receive salary; Sleeping partners only invest capital and share profit.

Q41. Answer: (a) 25 : 16

Shortcut Trick
The required ratio is (x/y) : (y/x), which simplifies to (x/y) ÷ (y/x) = (x/y) × (x/y) = $(x/y)^2$.
Given x : y = 5 : 4, substitute the values directly into the squared form.
Required Ratio = $(5/4)^2$ = 25/16.
Therefore The correct answer is 25 : 16.
Alternate Method
Given:
The ratio x : y = 5 : 4
Formula Used:
Ratio of a : b is written as a/b. To simplify (a/b) : (c/d), we cross-multiply to get (a × d) : (b × c).
Calculations:
=> x/y = 5/4
=> y/x = 4/5
=> Required Ratio = (x/y) : (y/x)
=> Required Ratio = (5/4) : (4/5)
=> To remove fractions, multiply both sides by the LCM of 4 and 5 (which is 20):
=> (5/4 × 20) : (4/5 × 20)
=> 25 : 16
Therefore The correct answer is 25 : 16.
Additional Information
Duplicate Ratio
The duplicate ratio of two numbers a : b is the ratio of their squares, which is $a^2 : b^2$.
Inverse Ratio
The inverse ratio of a : b is 1/a : 1/b, which simplifies directly to b : a.
Compounded Ratio
The compounded ratio of a : b and c : d is (a × c) : (b × d).

Q42. Answer: (d) 5,40,800

Given:
The population of a town is 5 Lakh
The annual birth rate is 8%
The annual death rate is 4%

Calculation:
First of all, we will calculate the net change in rate in population by finding the difference in birth rate and death rate
Net change = 8% - 4% = 4% (since the birth rate > death rate, population will increase)
Now, Increase after one year = 4% of 5,00,000
=> 4/100× 500000 = 20000
Then, population after one year = 20000 + 500000 = 5,20,000
Now, Increase after two years = 4% of 5,20,000
=> 4/100× 520000 = 20800
Then, population after two year = 20800 + 520000 = 5,40,800

Q43. Answer: (a) 72

Shortcut Trick
Assumed average = 70
Calculate deviations from 70: (72−70), (68−70), (75−70), (80−70), (65−70)
Deviations = +2, −2, +5, +10, −5
Net deviation = 2 − 2 + 5 + 10 − 5 = +10
Average = Assumed average + (Net deviation ÷ Count) = 70 + (10 ÷ 5) = 72
Therefore The correct answer is 72 marks.
Alternate Method
Given:
Marks in 5 subjects = 72, 68, 75, 80, 65
Number of subjects = 5
Formula Used:
Average = (Sum of all observations) ÷ (Total number of observations)
Calculations:
=> Total Marks = 72 + 68 + 75 + 80 + 65
=> Total Marks = 360
=> Average = 360 ÷ 5
=> Average = 72
Therefore The correct answer is 72 marks.
Additional Information
Arithmetic Mean
The most common type of average, calculated by dividing the sum of values by the total count of values.
Weighted Average
Used when different values have different levels of importance: Average = (w1x1 + w2x2 + ...) ÷ (w1 + w2 + ...).
Average of Consecutive Numbers
For an arithmetic progression, the average is simply the middle term or (First term + Last term) ÷ 2.

Q44. Answer: (b) Rs 12,000

Given
Selling price of a T.V. = Rs 2,550
Discounts = 15% and 75%
Concept
If two discounts and selling price is given, then formula for find the market price will be as follows:
Selling Price = Market price[(100 - Discount1)/100] [(100 - Discount2)/100]
Calculation
Let the market price is Rs.x
2,550 = x[(100 - 15)/100][(100 - 75)/100]
=> 2550 = x(85/100)(25/100)
=> (2550 × 100 × 100)/(85 × 25) = x
=> Rs.12,000 = x
Therefore The market price of T.V. is Rs 12,000.

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Q45. Answer: (c) 14

Shortcut Trick

Use the algebraic identity: $2ab = (a + b)^2 - (a^2 + b^2)$

Substitute the given values into the formula:

$2ab = 9^2 - 53$

$2ab = 81 - 53 = 28$

$ab = 28 \div 2 = 14$

Therefore The correct answer is 14.

Alternate Method

Given:

Sum of two variables $(a + b) = 9$

Sum of their squares $(a^2 + b^2) = 53$

Formula Used:

The standard expansion of the square of a binomial is $(a + b)^2 = a^2 + b^2 + 2ab$

Calculations:

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

$\Rightarrow (9)^2 = 53 + 2ab$

$\Rightarrow 81 = 53 + 2ab$

$\Rightarrow 2ab = 81 - 53$

$\Rightarrow 2ab = 28$

$\Rightarrow ab = 28 \div 2$

$\Rightarrow ab = 14$

Therefore The correct answer is 14.

Additional Information

Square of Difference

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

Difference of Two Squares

The product of the sum and difference of two numbers is given by $(a + b)(a - b) = a^2 - b^2$.

Relationship between Sum and Difference

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

Q46. Answer: (a) LOHRED

The logic followed here is:

• Similarly,

• Hence, 'LOHRED' is the correct answer.

Q47. Answer: (a) 36

Total students: Top + Bottom - 1

14 + 23 - 1 = 37 - 1 = 36.

Hence, answer is 36.

Q48. Answer: (b) Penguin

Here, Chameleon, Turtle and Crocodile are reptiles while Penguin is a Bird.

Thus Penguin is the odd one.

Q49. Answer: (c) JLN

The logic is:

Similarly,

Hence, 'JLN' is the correct answer.

Q50. Answer: (a) 173

The pattern followed here is:

Hence, ‘173’ is the correct answer.

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