# RRB NTPC CBT-I Official Paper (Held On: 19 Jan 2021 Shift 2) (Previous Year Paper)

RRB NTPC • 2021 • 100 questions • 90 minutes • Answer key and solutions

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**Q1.** Udayin shifted the capital of Magadha from _____ to Patliputra.

**(a)** Sarnath
**(b)** Rajagrih
**(c)** Kaushambi
**(d)** Taxila

**Q2.** How is nacre, the technical term for an extract from the inside of a shell, better known as?

**(a)** Garnet
**(b)** Onyx
**(c)** Mother-of-pearl
**(d)** Opal

**Q3.** The number of rational numbers between 5 and 7 is:

**(a)** 2
**(b)** infinite
**(c)** 1
**(d)** 0

**Q4.** If the cost price of 15 shirts is equal to the selling price of 10 shirts, then what will be the gain or loss percent?

**(a)** 50% gain
**(b)** 50% loss
**(c)** 33 1/3 % loss
**(d)** 33 1/3 % gain

**Q5.** If a painting was sold for Rs. 5,225 after a discount of 5%, then what is the marked price of the painting?

**(a)** Rs. 5,200
**(b)** Rs. 5,575
**(c)** Rs. 5,550
**(d)** Rs. 5,500

**Q6.** Rani buys toys at 6 for a rupee and sells them at 3 for a rupee. Her profit is:

**(a)** 150%
**(b)** 20%
**(c)** 50%
**(d)** 100%

**Q7.** The value of 1 - sin 35° cos 55° is equal to:

**(a)** $Sec^2 55°$
**(b)** $Cosec^2 55°$
**(c)** $Cos^2 35°$
**(d)** $Sin^2 35°$

**Q8.** If the diagonal of a cube is $10\sqrt{3}$ cm long, then what is its volume?

**(a)** 500 $cm^3$
**(b)** 9000 $cm^3$
**(c)** 1000 $cm^3$
**(d)** 800 $cm^3$

**Q9.** As of October 2020, what percentage of stakes are owned by the Government of India in SAIL?

**(a)** 0.7
**(b)** 0.8
**(c)** 0.85
**(d)** 0.75

**Q10.** The mean of 100 observations is 50. If one observation 50 is replaced by 150, then what will be the new mean?

**(a)** 52
**(b)** 50.5
**(c)** 51
**(d)** 49.5

**Q11.** Who among the following has not been India's Finance Minister?

**(a)** Yashwant Sinha
**(b)** V K Krishna Menon
**(c)** Arun Jaitley
**(d)** T T Krishnamachari

**Q12.** Name the Indian classical dance form which is believed to be revealed by Lord Brahma to Bharata, a famous sage, who then codified this sacred dance in a Sanskrit text called 'Natya Shastra'.

**(a)** Odissi
**(b)** Kathak
**(c)** Bharatanatyam
**(d)** Kathakali

**Q13.** In certain code language, TRUNK is coded as YVXPL. How will GLOBE be coded in that language?

**(a)** LPRDF
**(b)** LPREF
**(c)** LPREG
**(d)** LPRDG

**Q14.** $(\sqrt{2} - \sqrt{3})^2$ is:

**(a)** a whole number
**(b)** a natural number
**(c)** a rational number
**(d)** an irrational number

**Q15.** Please read the information given below and answer the question

Six friends (A, B, C, D, E, F) are playing a game together, in which all are facing the center. E is to the left of D. C is between A and B. F is between E and A.

Who among the following is between D and F?

**(a)** E
**(b)** A
**(c)** C
**(d)** B

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**Q16.** A train 800 m long is travelling at a speed of 120 km/h. How much time will it take to cross a bridge 1200 m long?

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

**Q17.** Who received the Padma Bhushan for literature and education in 2020?

**(a)** Shri Narsingh Dev Jamwal
**(b)** Ms. Gita Mehta
**(c)** Shri Kailash Madbaiya
**(d)** Shri Manoj Das

**Q18.** The mean of 25 observations is 36. If the mean of its first 13 observations is 32 and the last 13 observations is 40, then what will be its 13^(th) observation?

**(a)** 23
**(b)** 38
**(c)** 36
**(d)** 40

**Q19.** What is MPLADS?

**(a)** A scheme launched by the government of India which enables Members of Parliament to do development work in their constituencies
**(b)** A scheme launched by the Madhya Pradesh government for the protection of ladies
**(c)** A scheme launched by the Maharashtra and Punjab governments for legal assistance to deprived sections
**(d)** A scheme launched by the Madhya Pradesh government for the protection of lions and other endangered species

**Q20.** Who was the Chairman of Atomic Energy Commission at the time of India's First nuclear Test at Pokhran in 1974?

**(a)** Rajagopala Chidambaram
**(b)** Homi Sethna
**(c)** Raja Ramanna
**(d)** APJ Abdul Kalam

**Q21.** Find the value of (√1.69 + √0.49) × √400 :

**(a)** 22
**(b)** 20
**(c)** 40
**(d)** 20.2

**Q22.** Prakash remembers that Danish's birthday comes in the last week of February. Rajesh confirms that Danish's birthday comes after 27^(th) February every year. What is Danish's probable date of birth?

**(a)** 26^(th) February
**(b)** 29^(th) February
**(c)** 27^(th) February
**(d)** 28^(th) February

**Q23.** Select the option that is related to the third term in the same way as the second term is related to the first term.

Cricket : 11 :: Kabaddi : ?

**(a)** 6
**(b)** 5
**(c)** 7
**(d)** 8

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**Q24.** A sells a radio to B at a gain of 10% and B sells it to C at a gain of 5%. If C pays Rs. 462 for it, then what did it cost A?

**(a)** Rs. 410
**(b)** Rs. 420
**(c)** Rs. 390
**(d)** Rs. 400

**Q25.** Slash and burn agriculture is known as Bewar in which state of India?

**(a)** Andhra Pradesh
**(b)** Jharkhand
**(c)** Madhya Pradesh
**(d)** Rajasthan

**Q26.** The decimal expansion of 31/2.5 will terminate after:

**(a)** three decimal places
**(b)** two decimal places
**(c)** more than three decimal places
**(d)** one decimal place

**Q27.** Who is the winner of 7^(th) MS Swaminathan award for the period 2017-2019?

**(a)** Sumanta Kundu
**(b)** V Praveen Rao
**(c)** C M Parihar
**(d)** J C Katyal

**Q28.** If tan 2θ = cot (θ + 6°) then θ is:

**(a)** 28°
**(b)** 12°
**(c)** 45°
**(d)** 24°

**Q29.** Where is the headquarters of the World Intellectual Property Organisation (WIPO) situated?

**(a)** Beijing
**(b)** Geneva
**(c)** Tokyo
**(d)** Paris

**Q30.** The SI unit of sound was named in honor of which physicist?

**(a)** Heinrich Rudolf Hertz
**(b)** Albert Einstein
**(c)** JC Maxwell
**(d)** Werner Karl Heisenberg

**Q31.** Select the number that can replace the question mark (?) in the following series.

5, 12, 26, 54, ?, 222, 446

**(a)** 110
**(b)** 108
**(c)** 116
**(d)** 112

**Q32.** Name the daughter of one of the most important rulers in early Indian history, Chandragupta II.

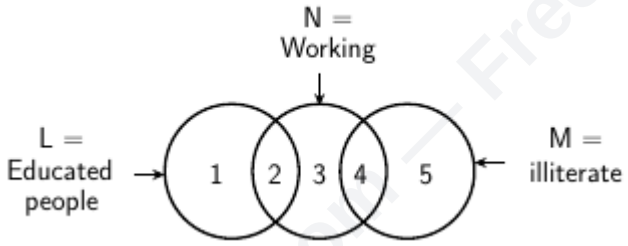
**(a)** Parvatigupta
**(b)** Rudrama Devi
**(c)** Prabhavatigupta
**(d)** Lopamudra

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**Q33.** The value of √8 + √18 is:

**(a)** 5√2
**(b)** 12
**(c)** 2(√2 + √3)
**(d)** √26

**Q34.** In the following diagram, L represents educated people, M represents illiterate people, N represents working people. Which number represents people who are working and illiterate?




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

**Q35.** Who received the Padma Vibhushan in the field of art in the year 2020?

**(a)** Shri Balwant Moreshwar Purandare
**(b)** Shri Budhaditya Mukherjee
**(c)** Shri Chhannulal Mishra
**(d)** Shri Mohanlal Viswanathan Nair

**Q36.** A terminating decimal is always:

**(a)** a rational number
**(b)** an integer
**(c)** a whole number
**(d)** a natural number

**Q37.** Rahul and Neha met on 24^(th) January 2011 at City Hall. After that, accidentally they met again on 23^(rd) January 2019 at the same place. After how many days did they meet the second time?

**(a)** 2921
**(b)** 2919
**(c)** 2922
**(d)** 2920

**Q38.** A tank has two inlets A and B which can fill it in 12 hours and 16 hours respectively. An outlet C can empty the full tank in 8 hours. If all three pipes are opened together when the tank is empty, then how much time will it take to fill the tank?

**(a)** 48 hours
**(b)** 36 hours
**(c)** 20 hours
**(d)** 40 hours

**Q39.** Which of the following is the shortcut for copying and pasting a file on the desktop?

**(a)** Right click on file and click on copy + right click and paste
**(b)** Ctrl X + Ctrl V
**(c)** Ctrl Z + Ctrl Y
**(d)** Ctrl C + Ctrl V

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**Q40.** The median of 4, 4, 5, 7, 6, 7, 7, 12, 3 is:

**(a)** 7
**(b)** 6
**(c)** 4
**(d)** 5

**Q41.** Which of the following has terminating decimal representation?

**(a)** 2 1/3
**(b)** 3 1/7
**(c)** 1 1/5
**(d)** 4 1/9

**Q42.** 'Champions of the Earth'-the UN's highest environmental honour, was awarded to which Indian in 2018?

**(a)** Piyush Goyal
**(b)** Harsh Vardhan
**(c)** CK Mishra
**(d)** Narendra Modi

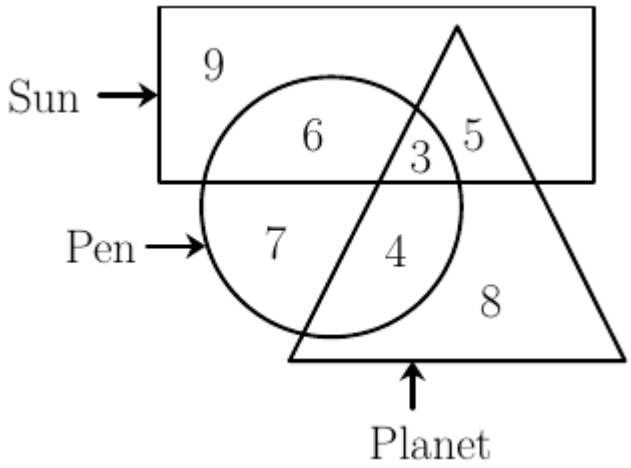
**Q43.** In which year did the Government of India approve ISRO's proposal for the first Indian Moon Mission, Chandrayaan-1?

**(a)** 2001
**(b)** 2003
**(c)** 2008
**(d)** 2013

**Q44.** What is the other name for Regur soil in India?

**(a)** Red and yellow soil
**(b)** Laterite soil
**(c)** Alluvial Soil
**(d)** Black soil

**Q45.** How many planets are not sun?




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

**Q46.** Which one of these is the parent company of Google?

**(a)** Calico
**(b)** GV
**(c)** Alphabet Inc.

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**(d)** Nest Labs

**Q47.** In the context of the Indian Constitution, which of the following is correctly matched?

**(a)** Part III - Citizenship
**(b)** Part III - Directive Principles of State Policy
**(c)** Part III - Fundamental Duties
**(d)** Part III - Fundamental Rights

**Q48.** As of October, 2020, who is the Economic Counsellor and Director of IMF's Research Department?

**(a)** Gita Gopinath
**(b)** Maurice Obstfeld
**(c)** Raghuram Rajan
**(d)** Christine Lagarde

**Q49.** The mean of the first ten odd natural numbers is:

**(a)** 8
**(b)** 9
**(c)** 10
**(d)** 11

**Q50.** Four words have been given out of which three are alike in some manner and one is different. Select the odd one.

**(a)** Air
**(b)** Field
**(c)** Mountain
**(d)** Valley

**Q51.** A map of a city is drawn on a scale of 1 : 50000. The distance between two cities A and B on this map is 12 cm. What will be the actual distance between the two cities?

**(a)** 9 km
**(b)** 15 km
**(c)** 12 km
**(d)** 6 km

**Q52.** Name the chemist who proved that the atomic number of an element is a more fundamental property than its atomic mass, which led to modification in Mendeleev's Periodic Law table?

**(a)** John Newlands
**(b)** Johann Dobereiner
**(c)** Dmitri Ivanovich Mendeleev
**(d)** Henry Moseley

**Q53.** If the radii of two cylinders are in ratio 2 : 3 and their respective heights are in ratio 5 : 3 then what is the ratio of their volumes?

**(a)** 17 : 27
**(b)** 10 : 17
**(c)** 20 : 37
**(d)** 20 : 27

**Q54.** Which city from the Harappan Civilization was almost exclusively devoted to crafting production including bead making, shell cutting, metalworking, seal making and weight make?

**(a)** Harappa
**(b)** Nageshwar
**(c)** Mohenjo Daro
**(d)** Chanhudaro

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**Q55.** In a certain code language, 'MRNQSL' is written as 'SZXWAV'. What is the code for 'STVZBQ' in that code language?

**(a)** YBGGJA
**(b)** YBGGJE
**(c)** YBFFJA
**(d)** YBFEJA

**Q56.** Select the number from among the given options that can replace the question mark (?) in the following series.

7, 17, 37, 77, ?

**(a)** 157
**(b)** 137
**(c)** 97
**(d)** 87

**Q57.** Which of the following is NOT a quadratic equation?

**(a)** $(x + 1)^2 = 2(x - 3)$
**(b)** $(x + 2)^2 = 2x(x + 1)$
**(c)** $x^2 + 3x + 1 = (x - 2)^2$
**(d)** $m(2m + 3) = m^2 + 1$

**Q58.** Under which scheme is pension provided to all people aged 60 years or above and belonging to a household below the poverty line?

**(a)** IGNOAPS
**(b)** NFBS
**(c)** IGNWPS
**(d)** IGNDPS

**Q59.** Which of the following tournaments of Tennis is played on a clay court?

**(a)** US Open
**(b)** Wimbledon
**(c)** Roland Garros
**(d)** Australian Open

**Q60.** What is meant by Epigraphy?

**(a)** Study of inscriptions
**(b)** Study of skeletons
**(c)** Study of maps
**(d)** Study of coins

**Q61.** $(\sqrt{2} + \sqrt{3})(\sqrt{2} - \sqrt{3})$ is equal to:

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

**Q62.** Name the scheme launched by the Government of India in April, 2005, that aims to provide accessible, affordable, accountable, effective and reliable primary health care especially to the poor and vulnerable sections of the population.

**(a)** NSAP
**(b)** NRHM
**(c)** ICDS
**(d)** AYUSH

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**Q63.** Which sub-atomic particle was discovered by J Chadwick?

**(a)** Proton
**(b)** Neutron
**(c)** Neuron
**(d)** Electron

**Q64.** In which country, is the Five-Hundred-Metre Aperture Spherical Telescope (FAST) for listening to alien life opened in 2020?

**(a)** Germany
**(b)** India
**(c)** USA
**(d)** China

**Q65.** Andaman Teal is an example of which category of animal species?

**(a)** Extinct species
**(b)** Normal species
**(c)** Endemic species
**(d)** Rare species

**Q66.** The product of $4\sqrt{6}$ and $3\sqrt{24}$ is:

**(a)** a negative number
**(b)** a prime number
**(c)** an irrational number
**(d)** a rational number

**Q67.** Name the caves found in western India on the Island of Gharapuris which received the UNESCO heritage site status in 1987.

**(a)** Ajanta Caves
**(b)** Elephanta Caves
**(c)** Khajuraho Caves
**(d)** Ellora Caves

**Q68.** The value of $4x^4 + 9y^2 - 12x^2y$ at $x = 5$ and $y = 2$ is:

**(a)** 1936
**(b)** 2536
**(c)** 1660
**(d)** 2500

**Q69.** Which one among the following is NOT associated with the White Revolution in India?

**(a)** Norman Borlaug
**(b)** Dr. Verghese Kurien
**(c)** Anand
**(d)** Amul

**Q70.** A can finish a piece of work in 25 days and B can finish it in 20 days. They work together for 5 days and then A leaves. In how many days will B finish the remaining work?

**(a)** 12 days
**(b)** 16 days
**(c)** 11 days
**(d)** 15 days

**Q71.** Hindustan Steel Limited (HSL) was initially designed to manage which of the following steel plants in India?

**(a)** Bhilai
**(b)** Rourkela
**(c)** Bokaro

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**(d)** Durgapur

**Q72.** Name the sodium compound which is used to permanently remove the hardness of water.

**(a)** Sodium hydroxide
**(b)** Sodium hydrogen carbonate
**(c)** Sodium carbonate
**(d)** Sodium chloride

**Q73.** Which Indian airport is the world's first fully solar powered airport?

**(a)** Indira Gandhi International Airport
**(b)** Chennai International Airport
**(c)** Chhatrapati Shivaji International Airport
**(d)** Cochin International Airport

**Q74.** If A : B = 2 : 3 and B : C = 4 : 5, then what is C : A?

**(a)** 15 : 8
**(b)** 8 : 5
**(c)** 5 : 18
**(d)** 5 : 8

**Q75.** select the option that is related to the third term in the same way as the second term is related to the first term.

Ranthambore : Rajasthan :: Kaziranga : ?

**(a)** Manipur
**(b)** Assam
**(c)** Nagaland
**(d)** Meghalaya

**Q76.** In selling 33 m cloth, Rani's profit is equal to the selling price of 11 m cloth, then what is her gain percent?

**(a)** 30% gain
**(b)** 20% gain
**(c)** 50% gain
**(d)** 60% gain

**Q77.** Which of the following is an audio file extension?

**(a)** MP5
**(b)** MOV
**(c)** WMV
**(d)** WMA

**Q78.** Six persons A, B, C, D, E and F are going to any one place among six different places Delhi, Mumbai, Punjab, Odisha, Goa and UP (not necessarily in the same order). No two persons are going to the same place. B is not going to Delhi. E is going to Odisha. F is not going to Delhi and Goa. D is going to Mumbai. A and C are not going to UP. A is not going to Delhi.

Who is going to Delhi?

**(a)** B
**(b)** A
**(c)** C
**(d)** E

**Q79.** If $x = \sqrt{3} + \sqrt{2}$, then the value of $x^2 + 1/(x^2)$ is:

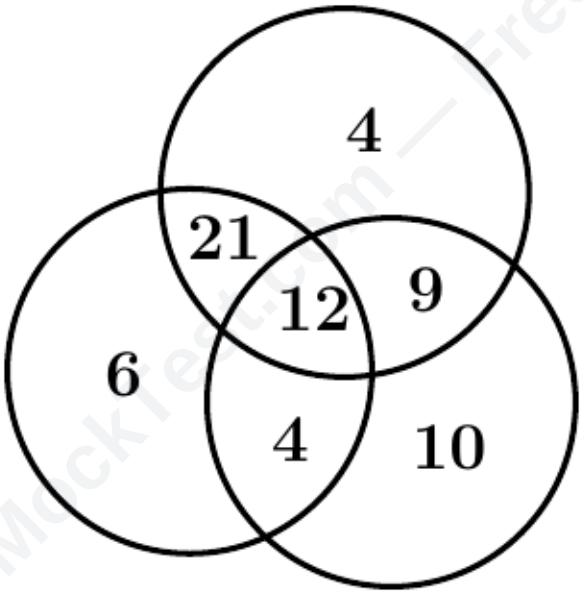
**(a)** 10
**(b)** $2\sqrt{3}$
**(c)** 14
**(d)** 12

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**Q80.** Panchpatmali in Koraput district, Odisha has large deposits of which mineral?

**(a)** Copper
**(b)** Manganese
**(c)** Bauxite
**(d)** Iron Ore

**Q81.** The circle positioned above represents people who like cricket. The circle to your left represents people who like volleyball and the circle to your right represents people who like basketball.




How many people like volleyball?

**(a)** 33
**(b)** 44
**(c)** 22
**(d)** 43

**Q82.** Name the leader whose opposition led to the disappearance of all hopes of compromise between the Congress and the Muslim League in 1928.

**(a)** Sir Muhammad Iqbal
**(b)** Muhammad Ali Jinnah
**(c)** MR Jayakar
**(d)** Jawaharlal Nehru

**Q83.** Select the option that is related to the third term in the same way as the second term is related to the first term.

Kind : Cruel :: Tall : ?

**(a)** Short
**(b)** Weak
**(c)** Strong
**(d)** Small

**Q84.** Which of the following is used to detect cracks and flaws in metal blocks?

**(a)** Sound Navigation and Ranging (SONAR)
**(b)** Echo
**(c)** Ultrasound
**(d)** Reverberation

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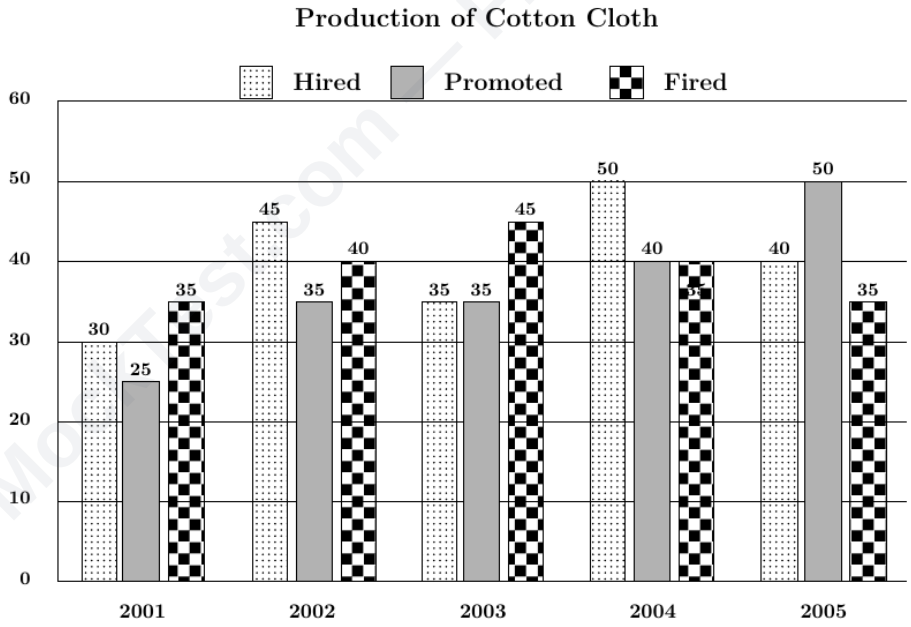
**Q85.** When was the Indian Election Commission set up?

**(a)** 26^(th) November, 1950
**(b)** 25^(th) January, 1950
**(c)** 25^(th) February, 1950
**(d)** 15^(th) August, 1950

**Directions**

Observe the graph and answer the question given below.

The bar graph represents a company's data about the number of employees hired, promoted and fired.




**Q86.** What is the difference between the number of employees who were fired in 2003 and the number of employees who were promoted in 2001?

**(a)** 10
**(b)** 20
**(c)** 5
**(d)** 15

**Q87.** What is the ratio of the average number of employees hired during 2003-2005 to that of those promoted?

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

**Q88.** Assume there was no change in employee numbers other than the Hire and Fire data provided above.

If the Employee strength in the company was 500 employees in 2001, what would be the approximate difference in the employees promoted, as a percentage of employee strength, for the years 2001 and 2004.

**(a)** 5%
**(b)** 15%
**(c)** 3%
**(d)** 8%

**Q89.** In which year was the number of employees fired highest as compared to the number of employees hired?

**(a)** 2001
**(b)** 2003
**(c)** 2004
**(d)** 2002

**Q90.** A question is given followed by two arguments. Decide which of the arguments is/are strong with respect to the question.

Question:

Should all criminals be given severe punishments?

Arguments:

1. Yes. It will induce fear in criminals and crime would reduce greatly.
2. No. Human life is precious, and criminals should also be given a chance to improve.

**(a)** Only argument 2 is strong.
**(b)** Neither argument 1 nor 2 is strong.
**(c)** Both arguments 1 and 2 are strong.
**(d)** Only argument 1 is strong.

**Q91.** In a certain code language, COLOUR is written as 51714172320. Which word will be written as 61714141720 in that code?

**(a)** TALLER
**(b)** TUTOR
**(c)** OSCOR
**(d)** DOLLOR

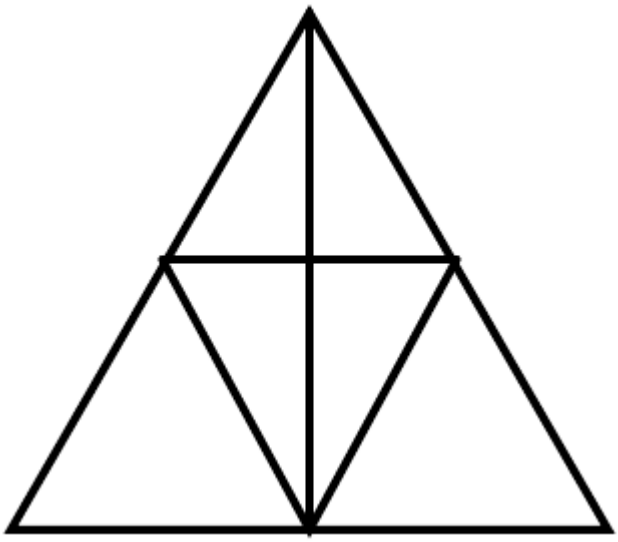
**Q92.** Out of the four numbers listed, three are alike in some manner and one is different. Select the odd one.

**(a)** 169
**(b)** 8
**(c)** 125
**(d)** 216

**Q93.** Four words have been given, out of which three are alike in some manner and one is different. Select the odd one.

**(a)** Punch
**(b)** Wrist
**(c)** Fist
**(d)** Palm

**Q94.** Find the number of triangles in the given figure.



**(a)** 9
**(b)** 13
**(c)** 7
**(d)** 11

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**Q95.** Please read the below equation and select an appropriate option from the following.

x + y = 10 ; y = x - 2

Quantity A is x.

Quantity B is y.

**(a)** Quantity B is greater.
**(b)** Impossible to determine.
**(c)** Quantity A is greater.
**(d)** Both quantities are equal.

**Q96.** Select the option that is related to the third term in the same way as the second term is related to the first term.

Gandhinagar : Ahmedabad :: Lucknow : ?

**(a)** Kanpur
**(b)** Gorakhpur
**(c)** Allahabad
**(d)** Varanasi

**Q97.** Read the given statement and conclusions carefully and decide which of the assumptions is implicit in the statement.

Statement:

"SAVE MONEY - BUY 1 GET 3" — Advertisement by a commercial brand.

Assumptions:

1. Brand sales increased profusely after the offer.
2. People are more attracted to buy if they are offered more than what they are already paying.

**(a)** Both assumptions 1 and 2 are implicit
**(b)** Only assumption 1 is implicit
**(c)** Only assumption 2 is implicit
**(d)** Neither assumption 1 nor 2 is implicit.

**Q98.** Sakshi attended to the following number of clients at the front desk during her internship for 15 days:

18, 20, 16, 17, 32, 17, 6, 16, 12, 13, 17, 28, 24, 45, 17.

Find the average of the mode and median of the given data.

**(a)** 18.25
**(b)** 17
**(c)** 34
**(d)** 19.5

**Q99.** If 8/15 members of the scout team are girls, then what is the ratio of boys to girls in the team?

**(a)** 7 : 8
**(b)** 15 : 7
**(c)** 8 : 7
**(d)** 7 : 15

**Q100.** In 8 years, Subhash will be 3 times as old as he is now. After how many years will Subhash be 5 times as old as he is now?

**(a)** 16
**(b)** 24
**(c)** 20
**(d)** 30

## ANSWER KEY

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | b | 2 | c | 3 | b | 4 | a | 5 | d | 6 | d | 7 | c | 8 | c | 9 | d | 10 | c |
| 11 | b | 12 | c | 13 | a | 14 | d | 15 | a | 16 | b | 17 | d | 18 | c | 19 | a | 20 | b |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 21 | c | 22 | d | 23 | c | 24 | d | 25 | c | 26 | d | 27 | b | 28 | a | 29 | b | 30 | a |
| 31 | a | 32 | c | 33 | a | 34 | a | 35 | c | 36 | a | 37 | a | 38 | a | 39 | d | 40 | b |
| 41 | c | 42 | d | 43 | b | 44 | d | 45 | d | 46 | c | 47 | d | 48 | a | 49 | c | 50 | a |
| 51 | d | 52 | d | 53 | d | 54 | d | 55 | c | 56 | a | 57 | c | 58 | a | 59 | c | 60 | a |
| 61 | b | 62 | b | 63 | b | 64 | d | 65 | c | 66 | d | 67 | b | 68 | a | 69 | a | 70 | c |
| 71 | b | 72 | c | 73 | d | 74 | a | 75 | b | 76 | c | 77 | d | 78 | c | 79 | a | 80 | c |
| 81 | d | 82 | c | 83 | a | 84 | c | 85 | b | 86 | b | 87 | b | 88 | c | 89 | b | 90 | c |
| 91 | d | 92 | a | 93 | a | 94 | b | 95 | c | 96 | a | 97 | c | 98 | b | 99 | a | 100 | a |

## SOLUTIONS

**Q1. Answer: (b) Rajagrih**

The correct answer is Rajagaha.

Key Points

• The city of Pataliputra was founded by Udayin at the confluence of two rivers, the Son and the Ganges.

• Because of Patliputra's pivotal location in the empire, he moved his capital from Rajgriha to Patliputra. It was named Rajagaha in the Pali language.

• Udayin (c. 460-444 BCE) was a monarch of Magadha in ancient India, also known as Udayabhadra. He was the son and heir of Haryanka king Ajatashatru, according to Buddhist and Jain sources.

• Udayin was Ajatashatru's favourite son, according to Buddhist tradition, and lived during the reign of his grandfather Bimbisara.

• He was a young prince when Ajatashatru met Gautama Buddha.

Important Points

• The old capital city of the Magadha Kingdom was Rajagaha (modern-day Rajgir) in the 7th century BCE.

• It was one of the most populous cities in the world during King Bimbisara's reign.

• King Bimbisara was an excellent administrator as well as a generous and spiritual man.

**Q2. Answer: (c) Mother-of-pearl**

The correct answer is Mother-of-pearl.

Key Points

• Nacre, commonly known as the mother of pearl, is an organic-inorganic composite substance formed as an inner shell layer by some molluscs; it is also the material that pearls are made of. It's tough, tenacious, and iridescent.

• Nacre can be found in some of the oldest bivalve, gastropod, and cephalopod lineages.

• Nacre makes up the outer layer of farmed pearls as well as the inner layer of pearl oyster and freshwater pearl mussel shells.

Important Points

• Garnets are a category of silicate minerals that have been used as gemstones and abrasives since the Bronze Age.

• The parallel banded variant of the silicate stone chalcedony is known as onyx.

• Opal is a hydrated amorphous form of silica with a water content ranging from 3 to 21% by weight, but most commonly 6 to 10%.

**Q3. Answer: (b) infinite**

You can say 5.1 is a rational number lying between 5 and 7.

More examples are 5.01, 5.001, 5.0001, 5.00001, and so forth.

There is no quota on the number of decimal places and thus the combination of numbers in these decimal places. As long as the number starts with 5 and has a definite end when expressed in decimals, this is an example of rational numbers.

So,

The number of rational numbers between 5 and 7 is infinite

Therefore Required answer is Option 2

**Q4. Answer: (a) 50% gain**

Given:

The cost price of 15 shirts is equal to the selling price of 10 shirts

Concept used:

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SP = CP + Profit
Profit % = (Profit/CP) × 100
Calculation:
Let CP of 15 shirts be Rs. 15x
So,
CP one shirt = 15x/15 = x
According to the question,
15x = SP of 10 shirts
So,
SP of 1 shirt = 15x/10 = 1.5x
Now,
Profit = 1.5x - x
=> Profit = 0.5x
Profit % = (0.5x/x) × 100
=> 50%
Therefore Required answer is 50% gain

**Q5. Answer: (d) Rs. 5,500**

Given:
Selling price of painting = Rs. 5225
Discount = 5%.
Concept used:
SP = MP - MP × Discount%
SP = Selling price
MP = Marked price
Calculation:
Let the marked price of the painting be Rs. x.
According to the question,
5225 = x − (5/100)x
=> 5225 = (100x − 5x)/100
=> 5225 = 95x/100
=> x = 5225 × 100/95
=> x = 55 × 100 = 5500
So the marked price of the painting is Rs. 5500.
Therefore The marked price of the painting is 5500.

**Q6. Answer: (d) 100%**

Given:
Rani buys toys at 6 for a rupee
Rani sells toys at 3 for a rupee
Concept used:
Profit = SP - CP
Profit % = Profit/CP × 100
Calculation:
Let she bought 6x toys
So, her total CP = 6x/6 = Rs. x
Now,
She sells 3 for a rupee
Total SP of 6x toys = 6x/3 = Rs. 2x
Profit = 2x - x
=> Profit = x
Profit % = (x/x) × 100

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=> 100%

Therefore Her profit is 100%

**Q7. Answer: (c) Cos²35°**

Given:

1 - sin 35° cos 55°

Concept used:

Sin²θ + Cos²θ = 1

Calculation:

1 - sin 35° cos 55°

=> 1 - sin 35° × cos (90° - 35°)

=> 1 - sin 35° × sin 35°

=> 1 - sin²35°

=> Cos235°

Therefore Required answer is Cos235°

**Q8. Answer: (c) 1000 cm³**

Given:

Length of diagonal is 10√3 cm

Formula Used:

Length of diagonal = √3 × Side

Volume of Cube = (Side)³

Calculation:

Length of diagonal = √3 × Side

=> 10√3 = √3 × Side

=> Side = 10

Volume of cube = 10³ = 1000 cm³

Therefore Volume of cube is 1000 cm3

**Q9. Answer: (d) 0.75**

The correct answer is 75%.

Key Points

• A minimum of 12.5 percent of equity shares has been retained for regular investors, while mutual funds and insurance firms would receive 25% of the offer shares. SAIL is owned by the government to the tune of 75%.

• In December 2014, it sold a 5% interest for the first time. The current sale is expected to bring in around Rs 2600 crore for the government.

• The proceeds will help the company come closer to its Rs 2.1 lakh crore divestiture target for FY 2020-21.

• With an annual capacity of almost 21 million tonnes, SAIL is India's largest steel producer (MTPA).

Important Points

• Steel Authority of India Limited, headquartered in New Delhi, India, is a government-owned steel producer.

• With annual revenue of INR 68,452 crore for the fiscal year 2020–21, it is owned by the Ministry of Steel of the Government of India.

• It was founded on 24 January 1973.

• CEO: Amarendu Prakash

**Q10. Answer: (c) 51**

Given:

Mean (100 observations) = 50

Formula used:

Mean = Sum of all observations/Number of observations

Calculation:

Sum of 100 observations = 100 × 50 = 5000

Let the sum of 99 observations which were not replaced be ‘x’

=> 100th observation = 5000 – x = 50

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=> x = 4950

Now,

Sum of all observations (new) = x + 150 = 4950 + 150 = 5100

New mean = 5100/100 = 51

Therefore The new mean will be 51

**Q11. Answer: (b) V K Krishna Menon**

The correct answer is V K Krishna Menon.

Key Points

• Vengalil Krishna Menon was a non-career diplomat, politician, and academic from India. Some called him India's second most powerful figure, behind Jawaharlal Nehru, the country's first Prime Minister.

• He was the architect of the Non-Aligned Movement and the one who invented the phrase.

• He wrote the first draft of the Preamble to the Constitution of India and initiated the idea of the Constituent Assembly of India.

Important Points

• Yashwant Sinha is a former Indian administrator and politician who served as Minister of Finance (1990–1991) and Minister of External Affairs (July 2002–May 2004) under Prime Minister Chandra Shekhar and Prime Minister Atal Bihari Vajpayee, respectively.

• From 2014 until 2019, Arun Jaitley was the Indian government's Minister of Finance and Corporate Affairs.

• Tiruvellore Thattai Krishnamachari was an Indian politician who held the position of Finance Minister from 1956 to 1958 and 1964 to 1966.

**Q12. Answer: (c) Bharatanatyam**

The correct answer is Bharatanatyam.

Key Points

• Bharatanatyam is India's oldest classical dance form, which developed in the Tanjore district of Tamil Nadu and is considered the mother of many other Indian classical dance forms.

• In Tamil, Bha- Bhavam (meaning expression), Ra- Ragam (means music), Ta- Talam (means beat or rhythm), and Natyam (means dance) are all terms used to describe Bharatnatyam dance.

• Bharatnatyam is a nearly 2,000-year-old Indian dance form. Lord Brahma is said to have given Bharatnatyam to Bharata, a great sage who codified the sacred dance in the Natya Shastra, a Sanskrit scripture.

• One of the most important treatises on Indian drama and aesthetics is the Natya Shastra.

Important Points

• Odissi is an ancient Indian classical dance that developed in the Hindu temples of Odisha, a state on India's eastern coast.

• Kathak is one of the eight major forms of Indian classical dance. The origin of Kathak is traditionally attributed to the traveling bards in the of ancient northern India known as Kathakars or storytellers. It is the principal dance of northern India, and is widely practised in Uttar Pradesh, Rajasthan, Delhi, Madhya Pradesh, and even parts of western and eastern India today.

• Kathakali is a popular genre of Indian classical dance. It comes from southwestern India, around the state of Kerala. Like Bharatanatyam, kathakali is a religious dance. It draws inspiration from the Ramayana and stories from Shaiva traditions.

**Q13. Answer: (a) LPRDF**

Similarly,

Hence, "option 1" is the correct answer.

**Q14. Answer: (d) an irrational number**

Given:

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

Concept used:

Irrational numbers are real numbers that cannot be represented as a simple fraction.

These cannot be expressed in the form of a ratio, such as p/q, where p and q are integers, q ≠ 0. It is a contradiction of rational numbers.

$(a - b)^2 = a2 + b2 - 2.ab$

Calculation:

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

$=> \sqrt{2}^2 + \sqrt{3}^2 - 2\sqrt{2}\sqrt{3}$

$=> 2 + 3 - 2\sqrt{6}$

=> 5 - 2√6

Therefore Required answer is Option 4

**Q15. Answer: (a) E**

Given that:-

• C is between A and B.

• F is between E and A.

• E is to the left of D. Due to this case 1 is eliminated.

• Thus, E is between D and F.

Hence, "option 1" is the correct answer.

**Q16. Answer: (b) 1 min**

Given:

Speed of train = 120 km/hr

Length of train = 800 m

Length of bridge = 1200 m

Concept used:

Time taken = Total length to be covered/Speed of train

Speed in m/sec = km/h × (5/18)

When a train crosses a bridge it has to cover a distance that is equal to its length plus an additional distance equal to the length of the bridge to cross it.

Calculation:

Total length to be covered = (1200 + 800) m

=> 2000 m

Speed in m/sec = 120 × (5/18) m/s

=> 100/3 m/s

Time taken = 2000 ÷ (100/3) seconds

=> 2000 × (3/100) seconds

=> 60 seconds or 1 minute

Therefore The time taken to cross the platform is 1 min

**Q17. Answer: (d) Shri Manoj Das**

The correct answer is Shri Manoj Das.

Key Points

• Manoj Das received the Saraswati Samman in 2000.

• In 2001, he received the Padma Shri, India's fourth-highest civilian honour, and in 2020, he received the Padma Bhusan, India's third-highest civilian award, for his contributions to literature and education.

• The Sahitya Akademi Prize Fellowship has been granted by Kendra Sahitya Akademi, which is also India's top literary award.

Important Points

• Narsingh Dev Jamwal is a Jammu-based Indian writer and playwright who has written 48 books, including 'Sanjhi Dharti Bakhle Mahnu', which was awarded the Sahitya Akademi Award in 1978.

• In 2019, Gita Mehta was nominated for India's fourth highest civilian honour, the Padma Shri, which she turned down due to political considerations.

• Shri Kailash Madbaiya was awarded the Padma Shri for Literature and Education by president Ramnath Kovind.

**Q18. Answer: (c) 36**

Given:

The mean of 25 observations is 36

The mean of its first 13 observations is 32

The mean of the last 13 observations is 40

Formula used:

Mean = sum of the observation/Number of the observation

Calculation:

Sum of the 25 numbers = 36 × 25 = 900

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Sum of the first 13 numbers = 13 × 32 = 416

Sum of the last 13 numbers = 13 × 40 = 520

So,

13th number = (Sum of the first 13 numbers + Sum of the last 13 numbers) - (Sum of the 25 numbers)

=> (416 + 520) - (900)

=> 936 - 900 = 36

Therefore Its 13th observation is 36

**Q19. Answer: (a) A scheme launched by the government of India which enables Members of Parliament to do development work in...**

The correct answer is A scheme launched by the government of India which enables Members of Parliament to do development work in their constituencies.

Key Points

• Members of Parliament Local Area Development Scheme (MPLADS) is a scheme established by the Government of India on December 23, 1993, that allows members of parliament (MP) to recommend developmental work in their constituencies with a focus on creating long-term community assets based on locally felt needs.

• Initially, the Ministry of Rural Development was in charge of this programme.

• The Ministry of Statistics and Programme Implementation (MOSPI) began investigating its operation in October 1994.

• Elected members of the Rajya Sabha, who represent the entire state, have the authority to choose works for implementation in one or more districts.

Important Points

• Under the Member of Parliament Local Area Development Scheme, the Ministry of Statistics and Programme Implementation has established a new scheme called "One MP – One Idea" (MPLADS).

• On the specific request of an MP to promote such a scheme in his or her constituency, an annual 'One MP – One Idea' Competition may be held in each Lok Sabha constituency to select the three best innovations for cash awards based on the innovative ideas received from the local people regarding developmental projects.

**Q20. Answer: (b) Homi Sethna**

The correct answer is Homi Sethna.

Key Points

• Homi Nusserwanji Sethna was an Indian nuclear scientist and chemical engineer who rose to international prominence as Chairman of the Atomic Energy Commission (India) during the 1974 Pokhran Test Range nuclear test, codenamed Smiling Buddha.

• A chemical engineer named Homi Sethna was instrumental in the development of weapon-grade plutonium, while Ramanna developed and built the entire nuclear device.

• The code name for India's first successful nuclear bomb test, which took place on May 18, 1974, was Operation Smiling Buddha.

• The Indian Army, under the supervision of several important Indian generals, detonated the bomb on the army facility Pokhran Test Range (PTR) in Rajasthan.

• Pokhran-I was also the first confirmed nuclear weapons test by a country that was not one of the UN Security Council's five permanent members.

• The Pokhran-II tests were a series of five nuclear bomb test explosions conducted by India at the Indian Army's Pokhran Test Range in May 1998. It was the second instance of nuclear testing conducted by India.

• The code name of the operation was Operation Shakti.

Important Points

• Raja Ramanna was an Indian scientist who was best recognised for his early involvement in India's nuclear programme.

• From 2002 to 2007, Avul Pakir Jainulabdeen Abdul Kalam, an Indian aerospace scientist, served as India's 11th president.

• Rajagopala Chidambaram is an Indian physicist who played a key role in India's nuclear weapons programme, coordinating the Pokhran-I and Pokhran-II test preparations.

**Q21. Answer: (c) 40**

Given:

(√1.69 + √0.49) × √400

Concept used:

0.ab = ab/100

Calculation:

(√1.69 + √0.49) × √400
=> (√(169/100) + √49/100) × √400
=> (13/10 + 7/10) × √400
=> ((13 + 7)/10)× 20
=> (20/10) × 20
=> 2 × 20
=> 40
Therefore Required answer is 40

**Q22. Answer: (d) 28^(th) February**

• From the first statement, Prakash remembers that Danish's birthday comes in the last week of February.
• It means the possible dates of his birthday are 22, 23, 24, 25, 26, 27, 28, or 29.
• Rajesh confirms that Danish's birthday comes after the 27th of February every year.
• It means the date of his birthday is 28th February or 29th February. But 29th February does not exist in every year. Thus, according to Rajesh's statement, the date of birth of Danish has to be 28th February.
Hence, "option 4" is the correct answer.

**Q23. Answer: (c) 7**

The logic followed here is:-
• In the Cricket game, there are 11 players in each team. So, 11 is related to cricket.
• Similarly, the Kabaddi game has 7 players in each team. So, 7 related to kabaddi.
Hence, "option 3" is the correct answer.

**Q24. Answer: (d) Rs. 400**

Given:
A sells a radio to B at a gain of 10%
B sells it to C at a gain of 5%
C paid Rs. 462
Concept used:
sp = cp + cp × gain%
Calculation:
Let cp of A is 100x
So, sp of A = 100x + 100x × 1/10
=> 110x = B's cp
Now,
B's sp = 110x + 110x × 1/20
=> 115.5x
According to the question,
115.5x = 462
=> x = 462/115.5
=> x = 4
So,
100x = 400
Therefore Cost price of A was Rs. 400

**Q25. Answer: (c) Madhya Pradesh**

The correct answer is Madhya Pradesh.
Key Points
• Slash and burn agriculture is known as Bewar or Dahiya in Madhya Pradesh.
• Slash and burn farming is a type of shifting agriculture in which the natural flora is cut down and burned to clear the ground for cultivation, and then the farmer moves to a new fresh plot and repeats the process when the plot becomes infertile.
• This procedure is repeated again and again. Because the rainforest's riches are in the trees, the earth loses its fertility. Everything is broken down by soil organisms as leaves fall or trees die, nutrients are returned to the soil, and tree roots take them up again.

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• As a result, regular recycling ensures that everything remains fertile and grows.

Important Points

• Slash and burn Agriculture is a frequently utilised method of food production in which forests or wildland are cleared and any residual flora is burned.

• The ash layer that forms offers a nutrient-rich layer to help fertilise crops on newly cleared soil.

• Different names of Slash and Burn farming in different states are:

| Name | Regions |
|---|---|
| Jhumming | Assam, Meghalaya, Mizoram and Nagaland |
| Pamlou | Manipur |
| Dipa | Bastar (Chhattisgarh) and Andaman & Nicobar Islands |
| Podu or Penda | Andhra Pradesh |
| Pama Dabi or Koman or Bringa | Orissa |
| Kumara | Western Ghats |
| Kuruwa | Jharkhand |
| Valre or Waltre | South eastern Rajasthan |

**Q26. Answer: (d) one decimal place**

Concept used:

Any rational number (that is, a fraction in the lowest terms) can be written as either a terminating decimal or a repeating decimal.

Just divide the numerator by the denominator.

If you end up with a remainder of 0, then you have a terminating decimal.

Calculation:

31/2.5 = 310/25

Now,

310/25 = 12.4

So, after one decimal place, decimal expansion will terminate

Therefore Required answer is Option 4

**Q27. Answer: (b) V Praveen Rao**

The correct answer is V Praveen Rao.

Key Points

• V Praveen Rao, Vice-Chancellor (VC) of Professor Jayashankar Telangana State Agricultural University, has won the 7th Dr M S Swaminathan Award for the 2017-19 academic year.

• The retired ICAR (Indian Council of Agricultural Research) Employees Association (RICAREA) and Nuziveedu Seeds Limited gave it as a biennial national award (every two years).

• It comes with a monetary prize of INR 2 lakh as well as a citation.

• He has received awards for his contributions to agricultural research, education, extension, and administration.

Important Points

• The famous M.S. Swaminathan Award was established in 2004 with the goal of honouring eminent individuals who have had a global influence in the field of agriculture, especially food security and farm sustainability in India.

• Dr. M.S. Swaminathan's exceptional contributions to India's agricultural revival are well-known around the world. He was the architect of the "Green Revolution."

• He is a brilliant dreamer and crusader. Dr. Swaminathan is a strong supporter of sustainable agriculture, which he believes will lead to the "Evergreen Revolution," which is required to ensure future food and nutritional security for households.

**Q28. Answer: (a) 28°**

Given:

$\tan 2\theta = \cot(\theta + 6°)$

Concept used:

Calculation:

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tan 2θ = cot (θ + 6°)

=> cot(90°- 2θ) = cot (θ + 6°)

=> 90° - 2θ = θ + 6°

=> 3θ = 84°

=> θ = 28°

Therefore θ is 28°

**Q29. Answer: (b) Geneva**

The correct answer is Geneva.

Key Points

• The World Intellectual Property Organization (WIPO) is established by the World Intellectual Property Organization (WIPO) Convention, which transforms BIRPI into WIPO.

• The newly founded World Intellectual Property Organization (WIPO) is a member-state-led international organisation with headquarters in Geneva, Switzerland.

• WIPO (World Intellectual Property Organization) is one of the United Nations' 15 specialised organisations (UN).

• WIPO was established in 1967 by the World Intellectual Property Organization (WIPO) Convention to promote and preserve intellectual property (IP) around the world via collaboration with countries and international organisations.

• When the convention went into effect on April 26, 1970, it commenced activities.

Important Points

• World Intellectual Property Organization (WIPO):

• Formation: 14 July 1967

• Type: United Nations specialised agency

• Headquarters: Geneva, Switzerland

• Membership: 193 member states

• Director-General: Daren Tang

**Q30. Answer: (a) Heinrich Rudolf Hertz**

The correct answer is Heinrich Rudolf Hertz.

Key Points

• The SI unit of sound was named in honour of physicist Heinrich Rudolf Hertz.

• Hertz, abbreviated as Hz, is the SI unit of sound or, more accurately, frequency.

• The sound intensity is defined as the sound of power per unit area, which is measured in watts per square metre ($W/m^2$) in the SI system.

• The difference between the pressure created by a sound wave and the ambient pressure of the medium it is passing through is the sound pressure.

• Pascal, designated by Pa in SI, is the SI unit for SOUND pressure.

• The decibel, abbreviated as dB, is a commonly used relative unit of measurement in acoustics.

Important Points

• Heinrich Rudolf Hertz was a German scientist who established the existence of electromagnetic waves predicted by James Clerk Maxwell's electromagnetism equations for the first time.

• In his honour, the frequency unit cycle per second was given the name "hertz."

**Q31. Answer: (a) 110**

The logic followed here is:-

Hence, "option 1" is the correct answer.

**Q32. Answer: (c) Prabhavatigupta**

The correct answer is Prabhavatigupta.

Key Points

• Chandragupta II's daughter, Prabhavati Gupta, was a powerful monarch in early Indian history.

• She married Rudrasena II of the Vakataka Dynasty and served as regent to her sons Divakarsena and Damodarsena after her husband died.

• After Ramgupta, Chandragupta II gained the throne and was given the title 'Vikramaditya.'

• His court was decked with Navaratnas, including Kalidasa, India's Shakespeare. He was the first Gupta ruler to use silver in his coinage.

Important Points

• Chandragupta II, commonly known as Vikramaditya, was one of the Gupta Empire's most powerful monarchs in India.

• Chandragupta II was the dynasty's second monarch to bear the name "Chandragupta," his grandfather Chandragupta I being the first.

• Rudrama Devi (or Maharani Rudramma Devi) was a Deccan Plateau queen who reigned from 1263 to 1289 (or 1295).

**Q33. Answer: (a) 5√2**

Given:

√8 + √18

Calculation:

√8 + √18

=> √(4 × 2) + √(9 × 2)

=> 2√2 + 3√2

=> √2(2 + 3) [Taking √2 common from both]

=> √2 × 5

=> 5√2

Therefore Required answer is 5√2

**Q34. Answer: (a) 4**

The Venn diagram is given below:-

The L represents educated people,

The M represents illiterate people.

The N represents working people.

• The shaded part shows represent people who are working and illiterate is 4.

Hence, "option 1" is the correct answer.

**Q35. Answer: (c) Shri Chhannulal Mishra**

The correct answer is Shri Chhannulal Mishra.

Key Points

• In 2020, Channulal Mishra, together with six others, received the country's second-highest civilian award, the Padma Vibhusan.

• In 2015, he was also named as one of the PM's 'Navratnas' for the Clean India Campaign.

• Sur Singar Sansad's 'Shiromani Award' has also been bestowed upon him.

Important Points

• Balwant Moreshwar "Babasaheb" Purandare was a Maharashtra-based Indian historian and theatre celebrity. On January 25, 2019, he was honoured with the Padma Vibhushan, India's second-highest civilian honour.

• Pandit Budhaditya Mukherjee is a master of the Imdadkhani gharana (school) of Indian classical sitar and surbahar. He is known for his nuanced vocalic playing and outstanding high-speed playing.

• Mohanlal Viswanathan is an Indian actor, film producer, playback singer, television personality, and film distributor who is most known for his work in Malayalam films, though he has also acted in Tamil, Telugu, Kannada, and Hindi films.

**Q36. Answer: (a) a rational number**

According to the definition of rational number,

The decimal expansion of a rational number always either terminates after a finite number of digit or begins to repeat the same finite sequence of digits over and over.

So, from this we can say option 1 should be the answer.

Therefore Correct answer is Option 1

**Q37. Answer: (a) 2921**

Given that:-

Rahul and Neha met on 24th January 2011 at City Hall. After that, accidentally they met again on 23rd January 2019 at the same place.

Now calculating after how many days did they meet the second time:-

• From 24th January 2011 to 24th January 2012 (Non-leap year) = 365 days

• From 24th January 2012 to 24th January 2013 (Leap year) = 366 days

• From 24th January 2013 to 24th January 2014 (Non-leap year) = 365 days

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• From 24th January 2014 to 24th January 2015 (Non-leap year) = 365 days
• From 24th January 2015 to 24th January 2016 (Non-leap year) = 365 days
• From 24th January 2016 to 24th January 2017 (Leap year) = 366 days
• From 24th January 2017 to 24th January 2018 (Non-leap year) = 365 days
• From 24th January 2018 to 23rd January 2019 (Non-leap year) = 364 days

Total number of days did they meet the second time = 365 + 366 + 365 + 365 + 365 + 366 + 365 + 364 = 2921

Hence, "option 1" is the correct answer.

**Q38. Answer: (a) 48 hours**

Shortcut Trick

Total capacity of the tank = LCM of 12, 16, and 8 = 48 units.

Net combined efficiency = A + B − C = (48 ÷ 12) + (48 ÷ 16) − (48 ÷ 8).

Net combined efficiency = 4 + 3 − 6 = 1 unit/hour.

Time taken to fill the tank = Total capacity ÷ Net efficiency = 48 ÷ 1 = 48 hours.

Therefore The correct answer is 48 hours.

Alternate Method

Given:

Time taken by inlet A to fill the tank = 12 hours

Time taken by inlet B to fill the tank = 16 hours

Time taken by outlet C to empty the tank = 8 hours

Formula Used:

Time taken = Total Capacity ÷ Net Efficiency

Note: Efficiency of an inlet is taken as positive and that of an outlet as negative.

| Pipe | Hours | Total Capacity | Efficiency |
|---|---|---|---|
| A | 12 | 48 | +4 |
| B | 16 | +3 | |
| C | 8 | −6 | |

Calculations:

=> Net combined efficiency = Efficiency of A + Efficiency of B + Efficiency of C

=> Net combined efficiency = 4 + 3 − 6

=> Net combined efficiency = 1 unit/hour

=> Time taken to fill the tank = Total Capacity ÷ Net efficiency

=> Time taken = 48 ÷ 1 = 48 hours

Therefore The correct answer is 48 hours.

Additional Information

Inlet vs Outlet Efficiency

An inlet pipe fills the tank, so its work (efficiency) is always taken as positive (+). An outlet pipe or leak empties the tank, so its work is taken as negative (−).

Leakage Problem Logic

A leak in the bottom of a tank acts identically to an outlet pipe. If an inlet takes x hours and an inlet + leak takes y hours, the efficiency of the leak is the difference of their individual efficiencies.

Pipes Opened Alternately

When pipes are opened in alternate hours, calculate the total units filled in a cycle of 2 hours. Be careful towards the end, as the inlet pipe might fill the tank completely before the outlet's turn comes.

**Q39. Answer: (d) Ctrl C + Ctrl V**

The correct answer is Ctrl C + Ctrl V.

Key Points

• Ctrl+C is often used to copy the highlighted text to the clipboard.
• Holding down the Ctrl key and pressing the V key pastes the contents of the clipboard into the current cursor location.

Important Points

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• Control + X is a keyboard shortcut that combines the control key with a key labelled "x" to cut selected text and save it to the clipboard, ready to paste elsewhere.

• Ctrl+Z is the undo command's keyboard shortcut.

• Ctrl+Y is a standard keyboard shortcut that is used to reverse your last Undo.

**Q40. Answer: (b) 6**

Given:

Numbers are 4, 4, 5, 7, 6, 7, 7, 12, 3

Concept used:

To find the median, the data should be arranged, first, in order of least to greatest

If the total number of observations given is odd, then the formula to calculate the median is:

Median = {(n + 1)/2}th term

Calculation:

Arranging the terms in ascending order: 3, 4, 4, 5, 6, 7, 7, 7, 12.

Since the number of terms is 9

Then the median will be the middle term i.e. 5th term which is 6.

Therefore The median is 6

**Q41. Answer: (c) 1 1/5**

Concept used:

Terminating decimal means a decimal that can be expressed in a finite number of figures or for which all figures to the right of some place are zero.

Calculation:

Given options are:

2 1/3 = 7 over 3 ≈ 2.333 (continues)

3 1/7 = 22 over 7 ≈ 3.1428 (continues)

1 1/5 = 6 over 5 = 1.2

4 1/9 = 37 over 9 = 4.11 (continues)

Hence, 1 1/5 has a terminating decimal representation.

Therefore 1 1/5 among the following has terminating decimal representation.

**Q42. Answer: (d) Narendra Modi**

The correct answer is Narendra Modi.

Key Points

• On October 3, 2018, United Nations Secretary-General Antonio Guterres presented Prime Minister Narendra Modi with the 'Champions of the Earth Award,' the world's highest environmental honour.

• PM Modi received this honour alongside French President Emmanuel Macron. The prize was presented on the fringes of the 73rd United Nations General Assembly in New York on September 26.

• The UN's highest environmental honour is the Champions of the Earth award. Inspiration and Action, Policy Leadership, Entrepreneurial Vision, and Science and Innovation are the four categories recognised this year.

• UNEP received a record number of nominations for the 2021 prizes from all over the world.

Important Points

• Piyush Goyal is an Indian politician and cabinet minister who holds the posts of Textiles Minister, Commerce and Industry Minister, and Consumer Affairs, Food and Public Distribution Minister.

• From 30 May 2019 to 7 July 2021, Harsh Vardhan was the Minister of Health and Family Welfare, Minister of Science and Technology, and Minister of Earth Sciences in Prime Minister Narendra Modi's BJP-led NDA cabinet.

• C.K Mishra is a former Union Secretary for Environment, Forests and Climate Change.

**Q43. Answer: (b) 2003**

The correct answer is 2003.

Key Points

• In November 2003, the Indian government approved ISRO's proposal for Chandrayaan-1, India's first lunar mission.

• The idea of an Indian research trip to the Moon was first discussed in 1999 at a meeting of the Indian Academy of Sciences, and then again in 2000 at the Astronautical Society of India.

• The Indian Space Research Organisation established a National Lunar Mission Task Force based on the advice of the learned

members of these forums (ISRO).

• The Chandrayaan-1 mission took high-resolution images of the moon is visible, near-infrared (NIR), low-energy X-rays, and high-energy X-rays.

Important Points

• On October 22, 2008, India's first mission to the Moon, Chandrayaan-1, was successfully launched from Sriharikota's SDSC SHAR.

• The spacecraft was orbiting the Moon at a distance of 100 kilometres from the surface to conduct chemical, mineralogical, and photo-geologic mapping.

• The spacecraft was equipped with 11 scientific instruments developed in India, the United States, the United Kingdom, Germany, Sweden, and Bulgaria.

**Q44. Answer: (d) Black soil**

The correct answer is Black soil.

Key Points

• Regur Soil, also known as Black Soil, is made up of lava flows and is found in the Deccan trap region, which is stretched across the northwest Deccan plateau.

• Black cotton soil, also known as regur dirt or black soil, is perfect for growing cotton. Magnesium, calcium carbonate, potash, and lime are all found in abundance in the soil.

• The phosphoric concentration in black soils is often low. Clayey soils, recognised for their ability to hold moisture, make up the black or regur soils.

• When wet, they inflate and become sticky, and when dry, they shrink. As a result, this soil develops large fractures throughout the dry season.

• As a result, a form of self-ploughing' occurs. The soil varies in colour from deep black to grey.

Important Points

• In the eastern and southern parts of the Deccan Plateau, little rainfall causes red soil to form on crystalline igneous rocks.

• Laterite is both a soil and a rock type rich in iron and aluminium and is commonly considered to have formed in hot and wet tropical areas. Nearly all laterites are of rusty-red coloration, because of their high iron oxide content. In India, laterite soil is widespread, covering over 10% of the total geographical area, namely on the summits of the Western Ghats, Eastern Ghats (Rajamahal Hills, Vindhyas, Satpuras, and Malwa Plateau), southern parts of Maharashtra, parts of Karnataka, Andhra Pradesh, West Bengal Orissa, Jharkhand, Kerala, Assam

• Alluvial soil has the highest productivity with respect to other soils. It is present mostly along rivers and is carried by its streams during weathering of rocks. Most alluvial soils are derived from the sediment being deposited by the river Ganga in the Indo–Gangetic plain, ranging from Punjab in the west to West Bengal and Assam in the east, as well as in the coastal areas of northern parts of Gujarat, Narmada, and Tapi valleys, which are formed by sea waves.

• Yellow and red soils are also found in parts of Odisha, Chhattisgarh, West Bengal, Maharashtra, southern Karnataka, Tamil Nadu, Madhya Pradesh. Red and yellow soils develop a reddish colour due to the diffusion of iron in crystalline and metamorphic rocks.

**Q45. Answer: (d) 12**

The Venn diagram is given below:-

The rectangle represents Sun,

The circle represents Pen.

The triangle represents Planet.

The planets that are not sun = 4 + 8 = 12.

Hence, "option 4" is the correct answer.

**Q46. Answer: (c) Alphabet Inc.**

The correct answer is Alphabet Inc..

Key Points

• Alphabet Inc. is an American multinational technical conglomerate holding company located in Mountain View, California.

• It was founded as a result of a Google reorganisation on October 2, 2015, and it became the parent company of Google and other former Google subsidiaries.

• The two Google co-founders remained as Alphabet's controlling shareholders, board members, and workers.

• Alphabet is the world's third-largest technical corporation by revenue and one of the most valuable.

• It is one of the Big Five American information technology businesses, alongside Amazon, Apple, Meta, and Microsoft.

Important Points

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• Calico is a networking and security solution for containers, virtual machines, and native host-based workloads that is open source.

• Nest Labs is a home automation startup that makes self-learning thermostats and smoke detectors that are sensor-driven and Wi-Fi enabled.

• GV, originally Google Ventures, is Alphabet Inc.'s venture capital arm, created by Bill Maris, that invests in seed, venture, and growth-stage technology businesses.

**Q47. Answer: (d) Part III - Fundamental Rights**

The correct answer is Part III - Fundamental Rights.

Key Points

• Articles 12 to 35 contained in Part III of the Constitution deal with Fundamental Rights.

• These include the right to equality before the law, the prohibition of discrimination on the basis of religion, race, caste, sex, or place of birth, and equal job opportunities.

• Freedom of expression, assembly, organisation, or union, mobility, and residency, as well as the right to perform any profession or occupation (some of these rights are subject to security of the State, friendly relations with foreign countries, public order, decency or morality).

• The right to be free from exploitation includes the prohibition of all forms of forced labour, child labour, and human trafficking. Right to conscience freedom, as well as the freedom to profess, practise, and propagate religion.

• Freedom of expression, assembly, organisation, or union, mobility, and residency, as well as the right to perform any profession or occupation (some of these rights are subject to security of the State, friendly relations with foreign countries, public order, decency or morality).

• The right to be free from exploitation includes the prohibition of all forms of forced labour, child labour, and human trafficking.

• Right to conscience freedom, as well as the freedom to profess, practise, and propagate religion.

• Right of any segment of the population to preserve their culture, language, or script, as well as minorities' right to create and govern educational institutions of their choosing; and Fundamental Rights have the right to constitutional remedies for enforcement.

Important Points

• The Citizenship of India is covered in Part II of the Indian Constitution (Articles 5-11).

• The Directive Principles of State Policy are contained in Part IV of the Indian Constitution (Articles 36–51). (DPSP).

• Article 51A of Part IV A of the Indian Constitution deals with Fundamental Duties.

**Q48. Answer: (a) Gita Gopinath**

The correct answer is Gita Gopinath.

Key Points

• Gita Gopinath is an Indian-American economist who has served as the International Monetary Fund's (IMF) First Deputy Managing Director since January 21, 2022.

• From 2019 until 2022, she was the Chief Economist of the International Monetary Fund. In that capacity, she was the Director of the IMF's Research Department and the Fund's Economic Counsellor.

• In October 2018, Christine Lagarde, the IMF's Managing Director, appointed Gopinath as the organization's Chief Economist. In an interview with Trevor Noah on the Daily Show, she called the global recession of 2020 "The Great Lockdown."

• The IMF's Managing Director, Kristalina Georgieva, appointed her as the First Managing Director, the organization's number two position, in December 2021.

Important Points

• Maurice Moses "Maury" Obstfeld is an economics professor at the University of California, Berkeley, and was previously the International Monetary Fund's Chief Economist.

• Raghuram Rajan served as the Reserve Bank of India's 23rd Governor from September 2013 to September 2016 and was appointed Vice-Chairman of the Bank for International Settlements in 2015.

• Christine Lagarde is the current president of the European Central Bank, a position she has held since November 1, 2019. She is a French politician and lawyer.

**Q49. Answer: (c) 10**

Formula Used:

mean = sum of the observation/Total number

Calculation:

The numbers are 1, 3, 5, 7, 9, 11, 13, 15, 17 and 19

mean = (1 + 3 + 5 + 7 + 9 + 11 + 13 + 15 + 17 + 19)/10

mean = 100/10 = 10

Therefore The mean is 10.

Shortcut TrickSum of n natural odd numbers = $n^2$

Average = $n^2/n = n$

Average = n = 10

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

The logic followed here is:-

• Field, mountain, and valley are landforms.

• So, air is different from others.

Hence, "option 1" is the correct answer.

**Q51. Answer: (d) 6 km**

Given:

A map of a city is drawn on a scale of 1 : 50000.

The distance between two cities A and B on this map is 12 cm.

Calculation:

Let actual distance be x

Now,

According to the question,

x × 1/50000 = 12 cm

=> x = 600000 cm or 6 km [1 km = 100000 cm]

Therefore Actual distance is 6 km

**Q52. Answer: (d) Henry Moseley**

The correct answer is Henry Moseley.

Key Points

• Henry Moseley demonstrated that an element's atomic number (abbreviated as Z) is a more fundamental feature than its atomic mass.

• As a result, Mendeleev's Periodic Law was changed, and the atomic number was used as the basis of the Modern Periodic Table, with the Modern Periodic Law being: 'Properties of elements are a periodic function of their atomic number.'

• Henry Gwyn Jeffreys Moseley was an English physicist who contributed to the field of physics by proving the earlier empirical and chemical concept of the atomic number using physical rules.

Important Points

• John Newlands, an English chemist who discovered a pattern in the atomic structure of elements with similar chemical properties and contributed significantly to the establishment of the periodic law with his "law of octaves."

• Johann Wolfgang Döbereiner was a German chemist who is most known for developing the periodic rule for chemical elements and constructing the Döbereiner's lamp, the first lighter. Dobereiner's triads were first observed by Johann Wolfgang Dobereiner, a German chemist in the 19th century. He made observations about certain alkali earth metals and their salts. They formed a group of three, hence the name 'triad'. He noticed that they had similar properties and their atomic masses followed a pattern. Later, by 1829, he could extend this theory to certain other 'triads' of elements.

• Dmitri Mendeleev is often referred to as the Father of the Periodic Table. He was a Russian chemist and inventor. He is best known for formulating the Periodic Law and creating a farsighted version of the periodic table of elements.

**Q53. Answer: (d) 20 : 27**

Given:

The radii of two cylinders are in ratio 2 : 3

The heights are in ratio 5 : 3

Concept used:

Volume of a cylinder = $\pi r^2 h$

r = radius

h = height

Calculation:

Let the radii of the two cylinders be 2x and 3x

And height be 5y and 3y

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Now,

Ratio = $\pi(2x)^2 5y : \pi(3x)^2 3y$

=> $20x^2y : 27x^2y$

=> 20 : 27

Therefore The ratio of their volumes is 20 : 27

**Q54. Answer: (d) Chanhudaro**

The correct answer is Chanhudaro.

Key Points

• Compared to Mohenjodaro, Chanhudaro was a small settlement. This section was dedicated solely to the manufacturing of handicrafts. Bead-making, shell-cutting, metal-working, seal-making, and weight-making are some of the principal craft productions.

• The Indus Valley Civilization's Chanhudaro site is an archaeological site. Between 4000 and 1700 BCE, the settlement was occupied, and it is thought to have been a center for carnelian bead production.

• The American School of Indic and Iranian Studies and the Museum of Fine Arts, Boston team commanded by Ernest John Henry Mackay excavated Chanhudaro for the first time in March 1931, and again during the winter field session of 1935-36.

Important Points

• Harappa is an archaeological site located about 24 kilometers (15 miles) west of Sahiwal in Punjab, Pakistan.

• One of the twelve Jyotirlingas, Nageshvara is one of the fabled temples mentioned in the Shiva Purana.

• Mohenjo Daro is an archaeological site in the province of Sindh, Pakistan. Built around 2500 BCE, it was one of the largest settlements of the ancient Indus Valley Civilisation, with features such as standardized bricks, street grids, and covered sewerage systems.

**Q55. Answer: (c) YBFFJA**

The logic followed here is:-

Similarly,

Hence, "option 3" is the correct answer.

**Q56. Answer: (a) 157**

The logic followed here is:-

Hence, "Option 1" is the correct answer.

**Q57. Answer: (c) $x^2 + 3x + 1 = (x - 2)^2$**

Concept used:

A quadratic equation is an equation containing one term in which the unknown is squared and no term in which it is raised to a higher power.

Calculation:

Option 1)

$(x + 1)^2 = 2(x - 3)$

=> $x^2 = -7$ .. (Here, the highest of x remains to be 2)

Option 2)

$(x + 2)^2 = 2x(x + 1)$

=> $3x^2 - 2x - 4 = 0$ .. (Here, the highest of x remains to be 2)

Option 3)

$x^2 + 3x + 1 = (x - 2)^2$

=> $7x = 3$ .. (Here, the highest of x doesn't remain to be 2)

Hence, there is no need to check any further. Option 3 must be the answer.

Therefore $x^2 + 3x + 1 = (x - 2)^2$ is NOT a quadratic equation.

**Q58. Answer: (a) IGNOAPS**

The correct answer is IGNOAPS.

Key Points

• On November 19, 2007, the National Old Age Pension Scheme (NOAPS) was renamed Indira Gandhi National Old Age Pension Scheme (IGNOPS) and formally inaugurated.

• The applicant is a 'destitute' in the sense that he or she has little or no regular means of subsistence from his or her own sources

of income or from family members or other sources of financial support.

• Pensions under IGNOAPS are now available to anyone over the age of 60 who lives in a household that is below the poverty threshold, rather than just the poor.

• A family's pension is not limited to just one member. Old-age pensions are available to all members of a BPL family who are above the age of 60 years.

Important Points

• On the death of the major bread-earner between the ages of 18 and 59, the National Family Benefit Scheme (NFBS) gives a one-time lump sum cash support of Rs. 20,000 to low-income households.

• The Government of India's Ministry of Rural Development manages the Indira Gandhi National Widow Pension Scheme (IGNWPS). Widows between the ages of 45 and 64 are eligible to receive the pension.

• In February 2009, the Indira Gandhi National Disability Pension Scheme (IGNDPS) was launched with the goal of assisting persons who suffer from severe or multiple impairments.

**Q59. Answer: (c) Roland Garros**

The correct answer is Roland Garros.

Key Points

• On a clay court, the French Open takes place. The Rolland-Garros is also its name.

• The Australian and United States Opens are held on hard courts, whereas Wimbledon is held on grass. The oldest grand slam tournament is Wimbledon.

• The French Open, often known as Roland-Garros, is a significant tennis tournament held each year in late May at the Stade Roland-Garros in Paris.

• Roland Garros, a French aviator, is honoured by the event and the venue.

Important Points

• The US Open Tennis Championships is a hard-court tennis tournament held annually in the United States.

• Wimbledon, also known simply as Wimbledon or The Championships, is the oldest and most renowned tennis tournament in the world.

• The Australian Open is an annual tennis tournament held in Melbourne, Australia, at Melbourne Park.

**Q60. Answer: (a) Study of inscriptions**

The correct answer is Study of inscriptions.

Key Points

• The study of written materials recorded on hard or enduring material is known as epigraphy. Epigraphein ("to write upon, incise") and epigraph ("inscription") are Classical Greek words.

• An epigrapher or epigraphist is someone who uses epigraphic methods.

• An epigraph (not to be confused with an epigram) is any type of text, ranging from a single grapheme (such as marks on a pot that abbreviate the name of the merchant who shipped the pot's contents) to a long document.

Important Points

• The study of the structure of bones, skeletal elements, teeth, micro bone shape, function, disease, pathology, the ossification process (from cartilaginous moulds), and the resistance and hardness of bones is known as osteology (biophysics).

• The art and science of making maps and charts is known as cartography.

• Numismatics is the study or collection of money, such as coins, tokens, paper money, medals, and other related items.

**Q61. Answer: (b) -1**

Given:

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

Concept used:

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

Calculation:

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

$\Rightarrow (\sqrt{2})^2 - (\sqrt{3})^2$

$\Rightarrow 2 - 3$

$\Rightarrow -1$

Therefore Required answer is - 1

**Q62. Answer: (b) NRHM**

The correct answer is NRHM.

Key Points

• The Hon'ble Prime Minister inaugurated the National Rural Health Mission (NRHM) on April 12, 2005, with the goal of providing accessible, inexpensive, and high-quality health care to the rural population, particularly disadvantaged groups.

• The Union Cabinet approved the establishment of the National Urban Health Mission (NUHM) as a Sub-mission of the overarching National Health Mission (NHM), with the National Rural Health Mission (NRHM) being the other Sub-mission of the National Health Mission, in a decision dated May 1, 2013.

Important Points

• The National Social Help Programme is a Government of India-sponsored scheme that provides financial assistance to the elderly, widowed, and disabled people in the form of social pensions.

• In India, the government's Integrated Child Development Services programme provides healthy meals, preschool education, primary healthcare, immunisation, health check-ups, and referral services to children under the age of six and their mothers.

• Ayurveda, Yoga and Naturopathy, Unani, Siddha, and Homeopathy (AYUSH) are the six Indian systems of medicine that are widely used and practised in India and certain adjacent Asian nations, with a few exceptions in developed countries.

**Q63. Answer: (b) Neutron**

Thee correct answer is Neutron.

Key Points

• James Chadwick achieved a breakthrough in nuclear research in 1932 when he confirmed the existence of neutrons, which are elementary particles that have no electrical charge.

• The neutron is a subatomic particle with the symbol n or n^0and a mass slightly more than that of a proton. It has a neutral charge (no positive or negative charge).

Important Points

• A proton is a stable subatomic particle with a positive electric charge of +1e elementary charge and the sign p, H^+, or ¹H^+.

• A neuron, also known as a nerve cell, is an electrically excitable cell that communicates with other cells through synapses, which are specialised connections between cells.

• Electron, lightest stable subatomic particle known. It carries a negative charge of 1.6 × 10^(−19) coulomb, which is considered the basic unit of electric charge. The rest mass of the electron is 9.1 × 10^(−31) kg, which is only 1/1836 of the mass of a proton. An electron is therefore considered nearly massless in comparison with a proton or a neutron, and the electron mass is not included in calculating the mass number of an atom.

**Q64. Answer: (d) China**

The correct answer is China.

Key Points

• The Dawodang depression, a natural basin in Pingtang County, Guizhou, southwest China, is home to the Five-hundred-meter Aperture Spherical Radio Telescope.

• FAST is built in a natural dip in the environment with a 500 m (1,600 ft) diameter dish.

• After Russia's sparsely-filled RATAN-600, it is the world's largest filled-aperture radio telescope and the second-largest single-dish aperture.

• It helps scientists in detecting more distant and fainter objects.

Important Points

• It features a unique design, with an active surface made up of 4,500 panels that move in real-time to form a moving parabola of metal panels.

• The feed antenna cabin, suspended on cables above the dish, may move automatically by steering the instrument with winches to receive signals from various directions.

Additional Information

• China:

• Capital: Beijing

• Largest city: Shanghai

• President: Xi Jinping

**Q65. Answer: (c) Endemic species**

The correct answer is Endemic species.

Key Points

• The Andaman teal (Anas albogularis) is a duck species native to the Andaman Islands in the Bay of Bengal.

• Previously, it was thought to be a subspecies of the Sunda teal.

• The Andaman Islands (India) and Great Coco Island are home to Andaman teals (Burma).

• Inland pools, mangroves, and lagoons are all good places to look for them. In a survey done in 1995–98, a population estimate of 500 to 600 people was made, and 674 people were tallied in 2005.

• Endemic species are those that are found in just one region and nowhere else in the world.

• For example, kangaroos are originally endemic to Australia and are found nowhere else in the world. The cases where they have been spotted outside their natural habitat is due to humans introducing them when the animal was in captivity.

• Since the Andaman Teal is only found in the Andaman Islands, thus, it comes under the category of endemic species.

Important Points

• Endemism is a term used in biology to describe a taxon's distribution being limited to a small geographic area and thus being found naturally there.

• The extinction of a type of organism or a collection of organisms, usually a species, is referred to as extinction.

• A rare species is a group of creatures that are extremely rare, scarce, or uncommon.

**Q66. Answer: (d) a rational number**

Given:

Two numbers are $4\sqrt{6}$, $3\sqrt{24}$

Concept used:

If a number can be expressed as a fraction where both the numerator and the denominator are integers, the number is a rational number. Some examples of rational numbers are:

1/2

-3/4

0.3 or 3/10

-0.7 or -7/10

0.141414... or 14/99

Calculation:

$4\sqrt{6} \times 3\sqrt{24}$

$\Rightarrow 12\sqrt{(6 \times 24)}$

$\Rightarrow 12\sqrt{144}$

$\Rightarrow 12 \times 12$

$\Rightarrow 144$

According to the concept it is a rational number

Therefore Required answer is Option 4

**Q67. Answer: (b) Elephanta Caves**

The correct answer is Elephanta Caves.

Key Points

• Elephanta Caves was declared a UNESCO World Heritage Site in 1987 after being repaired.

• The Archaeological Survey of India(ASI) currently looks after the Elephanta Caves. They are a series of cave temples mostly dedicated to the Hindu god Shiva. They have been designated as a UNESCO World Heritage Site.

• The Elephanta Caves feature rock-cut stone sculptures, most of which are in high relief, that demonstrate a synthesis of Hindu and Buddhist concepts and imagery.

Important Points

• The Ajanta Caves are approximately 30 rock-cut Buddhist cave monuments dating from the 2nd century BCE to about 480 CE in the Aurangabad district of Maharashtra state in India.

• Ellora is a UNESCO World Heritage Site located in the Aurangabad district of Maharashtra, India. It is one of the largest rock-cut Hindu temple cave complexes in the world, with artwork dating from the period 600–1000 CE.

• Elephanta Island is one of several islands in Mumbai Harbour, located east of the city.

• The Nandi temple is a Hindu temple located in Khajuraho city of Madhya Pradesh, India. It is dedicated to Nandi, the bull which serves as the mount of Shiva, in Hindu epic. As a common architecture trend, temples of Shiva display stone images of a seated Nandi facing Shiva.

**Q68. Answer: (a) 1936**

Given:

$4x^4 + 9y^2 - 12x^2y$

$x = 5$

$y = 2$

Concept used:

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

Calculation:

$4x^4 + 9y^2 - 12x^2y$

$=> (2x^2)^2 + (3y)^2 - 2.2.3x^2y$

$=> (2x^2-3y)^2$

Now,

$(2 \times 5^2 - 3 \times 2)^2$

$=> (2 \times 25 - 3 \times 2)2$

$=> (50 - 6)2$

$=> (44)2$

$=> 1936$

Therefore Required answer is 1936

**Q69. Answer: (a) Norman Borlaug**

The correct answer is Norman Borlaug.

Key Points

• Norman Borlaug is NOT associated with the White Revolution in India.

• Norman Ernest Borlaug was an American agronomist who led global projects that contributed to the Green Revolution's massive increases in agricultural production.

• Borlaug was honoured with the Nobel Peace Prize, the Presidential Medal of Freedom, and the Congressional Gold Medal for his efforts.

Important Points

• Verghese Kurien, called the "Father of the White Revolution" in India, was a social entrepreneur whose "billion-litre idea," Operation Flood, transformed dairy farming into India's greatest self-sustaining business and the largest rural employment sector, accounting for a third of all rural income.

• Since 1989, Ananda Dairy has been a significant dairy and food manufacturing enterprise in India.

• The founding of Amul is linked to India's White Revolution.

**Q70. Answer: (c) 11 days**

Given:

No. of days taken by A= 25 days

No. of days taken by B = 20 days

(A + B) together did work for 5 days

Concept used:

Total work = LCM of the time taken by the workers individually

Calculation:

LCM of 25 and 20 = 100 i.e total work

So, efficiency of A and B is 100/25 = 4, 100/20 = 5

Combined efficiency = 9

Now,

In 5 days,

They will complete $5 \times 9 = 45$

So,

Remaining work = 100 - 45 = 55

B will take 55/5 = 11 days to complete the remaining work

Therefore B completes the remaining work in 11 days.

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**Q71. Answer: (b) Rourkela**

The correct answer is Rourkela.

Key Points

• Hindustan Steel Limited (HSL) was created with the intention of managing only one new plant in Rourkela.

• The Iron and Steel Ministry did the groundwork for the Bhilai and Durgapur steel plants.

• Hindustan Steel was given administration and oversight of these two steel factories in April 1957. New Delhi was the company's first registered office.

• In July 1956, it relocated to Calcutta, and in December 1959, it moved to Ranchi.

Important Points

• SAIL owns and runs five integrated steel mills, including those at Bhilai, Rourkela, Durgapur, Bokaro, and Burnpur (Asansol), as well as three special steel plants in Salem, Durgapur, and Bhadravathi.

• In Chandrapur, it also owns a Ferro Alloy facility.

Additional Information

• Steel Authority of India Limited:

• Founded: 24 January 1973

• Headquarters: New Delhi, India

• Chairman: Soma Mondal

**Q72. Answer: (c) Sodium carbonate**

The correct answer is Sodium carbonate.

Key Points

• Hard water is softened with the sodium component.

• The lasting hardness of the water is removed with washing soda or sodium carbonate.

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

• In water, it binds calcium and magnesium molecules. Adding sodium carbonate (washing soda) or routing the water via an ion-exchange column can soften the water.

• A procedure known as the lime-soda process is used to remove Ca^(2+) and Mg^(2+) from the water supply in large-scale municipal operations.

Important Points

• The caustic white crystalline solid sodium hydroxide (NaOH) easily absorbs moisture until it dissolves.

• NaHCO3 is the chemical formula for sodium bicarbonate, also known as baking soda or bicarbonate of soda.

• Salt, often known as sodium chloride, is an ionic compound with the chemical formula NaCl with a 1:1 ratio of sodium and chloride ions.

**Q73. Answer: (d) Cochin International Airport**

The correct answer is Cochin International Airport.

Key Points

• On March 6, the Cochin International Airport Limited (CIAL) plans to open a 12-megawatt solar power facility at Payyannur in Kerala's Kannur district.

• CIAL will be upgraded from a power-neutral airport to a power-positive airport following the completion of the new solar power plant.

• CIAL was the first airport in the world to be powered entirely by solar energy in 2015.

Important Points

• The power plant, which is located on a 35-acre plot of ground, has a 12-megawatt capacity and was built using CIAL's terrain-based installation concept, which preserves the area's geographical characteristics without altering the land's gradient.

Additional Information

• In India, Cochin International Airport is the first of its kind to be built using a public-private partnership (PPP) concept.

• Nearly 10,000 non-resident Indians from 32 countries contributed to this effort.

**Q74. Answer: (a) 15 : 8**

Given:

A : B = 2 : 3

B : C = 4 : 5

Calculation:

A : B = 2 : 3

A/B = 2/3

B : C = 4 : 5

B/C = 4/5

B should be equal in each case,

So,

A : B : C = 8 : 12 : 15 [By equaling B in each case]

So,

C : A = 15 : 8

Therefore C : A is 15 : 8

**Q75. Answer: (b) Assam**

The logic followed here is:-

• Ranthambore national park is situated in Rajasthan.

• Similarly, Kaziranga national park is situated in Assam.

Hence, "option 2" is the correct answer.

**Q76. Answer: (c) 50% gain**

Given:

In selling 33 m cloth, Rani's profit is equal to the selling price of 11 m cloth

Concept used:

SP = CP + Profit

Profit % = Profit/CP × 100

Calculation:

Let SP of 33 m cloth is Rs. 33x

So, SP of 1 m cloth is Rs. x

According to the question,

33x = CP of 33 m cloth + (x × 11)

=> 33x - 11x = CP of 33 m cloth

=> 22x = CP of 33 m cloth

So, profit = 33x - 22x = 11x

Profit % = (11x/22x) × 100

=> 50%

Therefore Her gain percent is 50

**Q77. Answer: (d) WMA**

The correct answer is WMA.

Key Points

• Microsoft collaborated with composer Stan LePard to create the Windows Media Audio (WMA) line of audio codecs and their accompanying audio coding formats.

• It's a proprietary technology that's integrated into the Windows Media Framework.

• There are four codecs that make-up WMA.

Important Points

• A video that can be played on a Chinese MP5 portable media player is called an MP5 file.

• A MOV file is one of the most prevalent video file formats, and it's used to store movies, TV shows, short video clips, and home movies.

• WMV (Windows Media Video) is a compressed video container developed by Microsoft for the Windows Media framework.

**Q78. Answer: (c) C**

Given that:-

• E is going to Odisha.

• D is going to Mumbai.

| Person | Location |
|---|---|

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| | |
|---|---|
| A | |
| B | |
| C | |
| D | Mumbai |
| E | Odisha |
| F | |

• Then, B is not going to Delhi, F is not going to Delhi and Goa, A and C are not going to UP, and A is not going to Delhi.
• Thus, C is the only possible choice for Delhi.

| Person | Location |
|---|---|
| A | Delhi |
| B | Delhi |
| C | Delhi |
| D | Mumbai |
| E | Odisha |
| F | Delhi |

Hence, "option 3" is the correct answer.

**Q79. Answer: (a) 10**

Shortcut Trick
If $x = \sqrt{a} + \sqrt{b}$ and the difference $(a - b) = 1$, then $x + 1/x = 2\sqrt{a}$.
Here, a = 3 and b = 2, so difference = 1. Therefore, $x + 1/x = 2\sqrt{3}$.
The shortcut for $x^2 + 1/x^2$ is $(x + 1/x)^2 - 2$.
Applying the values: $(2\sqrt{3})^2 - 2 = (4 \times 3) - 2 = 12 - 2 = 10$.
Therefore The correct answer is 10.
Alternate Method
Given: $x = \sqrt{3} + \sqrt{2}$
Formula Used: $(a + b)^2 = a^2 + b^2 + 2ab$ and 1/x = Conjugate of x (when difference of squares is 1).
=> First, calculate the reciprocal 1/x:
=> $1/x = 1/(\sqrt{3} + \sqrt{2})$
=> Rationalizing the denominator: $1/x = [1 \times (\sqrt{3} - \sqrt{2})] / [(\sqrt{3} + \sqrt{2}) \times (\sqrt{3} - \sqrt{2})]$
=> $1/x = (\sqrt{3} - \sqrt{2}) / (3 - 2) = \sqrt{3} - \sqrt{2}$
=> Now, find the sum (x + 1/x):
=> $x + 1/x = (\sqrt{3} + \sqrt{2}) + (\sqrt{3} - \sqrt{2}) = 2\sqrt{3}$
=> Use the Algebraic Identity: $x^2 + 1/x^2 = (x + 1/x)^2 - 2(x)(1/x)$
=> $x^2 + 1/x^2 = (2\sqrt{3})^2 - 2$
=> $x^2 + 1/x^2 = (4 \times 3) - 2 = 12 - 2 = 10$
Therefore The correct answer is 10.
Additional Information
Rationalization of Surds
To rationalize a denominator of the form $(\sqrt{a} + \sqrt{b})$, multiply both the numerator and denominator by its conjugate $(\sqrt{a} - \sqrt{b})$.
Sum of Higher Powers
If $x + 1/x = k$, then $x^2 + 1/x^2 = k^2 - 2$ and $x^3 + 1/x^3 = k^3 - 3k$.
Difference of Squares Identity
The identity $(a + b)(a - b) = a^2 - b^2$ is fundamental in solving reciprocal surd problems.

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**Q80. Answer: (c) Bauxite**

The correct answer is Bauxite.

Key Points

• The state of Odisha produces the most bauxite.

• The Panchpatmali deposits in the Koraput district are the state's most important bauxite reserves.

• Decomposition of rocks rich in aluminium silicates produces bauxite deposits.

• The Amarkantak plateau, Maikal hills, and the Bilaspur-Katni plateau region have the majority of India's bauxite reserves.

• Odisha alone contributes 51 percent of the country's bauxite deposits, followed by Andhra Pradesh (16 percent), Gujarat (9 percent), Jharkhand (6 percent), Maharashtra (5 percent), and Madhya Pradesh and Chhattisgarh (5 percent) (4 percent each).

• The East Coast bauxite deposits in Odisha and Andhra Pradesh contain the majority of the world's bauxite reserves.

Important Points

• Bauxite is a sedimentary rock that is the primary source of aluminium.

• Bauxite is composed of $Al_2O_3.2H_2O$ as its chemical formula. It's generally found in the topsoil of tropical and subtropical areas. Mining operations supply the ore.

**Q81. Answer: (d) 43**

The Venn diagram is given below:-

The circle positioned above represents people who like cricket,

The circle to your left represents people who like volleyball,

The circle to your right represents people who like basketball.

The people who like volleyball = 6 + 21 + 12 + 4 = 43.

Hence, "option 4" is the correct answer.

**Q82. Answer: (c) MR Jayakar**

The correct answer is MR Jayakar.

Key Points

• The Civil Disobedience Movement received a lukewarm reaction from several Muslim political organisations in India.

• Following the demise of the Non-Cooperation and Khilafat Movements, many Muslims felt alienated from Congress.

• The main point of contention was over-representation in the upcoming elected assemblies.

• One of the Muslim League's leaders, Muhammad Ali Jinnah, was willing to give up his demand for separate electorates in exchange for reserved seats in the Central Assembly and representation proportional to the population in Muslim-dominated provinces.

• At the All Parties Conference in 1928, negotiations on addressing the matter fell down when M.R. Jayakar of the Hindu Mahasabha vehemently resisted any compromise efforts.

Important Points

• Mukund Ramrao Jayakar (M.R. Jayakar) was the University of Poona's first Vice-Chancellor. He was also the Chairman of the Kaivalyadhama Yoga Institute's Advisory Board.

• In 1928, he attended the All Parties Conference and played a key role in rejecting the Muslim League's demands, which were put forward by Muhammad Ali Jinnah.

**Q83. Answer: (a) Short**

The logic followed here is:-

• Kind is the antonym of Cruel.

• Similarly, tall is the antonym for short.

• Weak is the antonym of strong, and small is the antonym of large.

Hence, "option 1" is the correct answer.

**Q84. Answer: (c) Ultrasound**

The correct answer is Ultrasound.

Key Points

• Metal blocks can be inspected with ultrasound to discover cracks and faults. Large structures such as houses, bridges, machinery, and scientific apparatus all use metallic components.

• The strength of the construction is weakened by cracks or holes inside the metal blocks that are not visible from the outside.

• Ultrasonic waves are allowed to pass through the metallic block, and the transmitted waves are detected using detectors.

• The ultrasound is reflected back if there is even a minor flaw or defect, revealing the presence of the flaw or defect.

Important Points

• SONAR (sound navigation and ranging) is a navigation and ranging system that employs sound propagation (typically underwater, as in submarine navigation) to navigate, measure distances (ranging), communicate with, and detect objects on or beneath the water's surface, such as other vessels.

• An echo is a sound reflection that arrives at the listener with a delay after the original sound. It is used in audio signal processing and acoustics.

• The persistence of sound, or echo, after a sound is made is known as reverberation in acoustics.

**Q85. Answer: (b) 25^(th) January, 1950**

The correct answer is 25th January 1950.

Key Points

• Election Commission of India:

• The Election Commission of India (ECI) is an autonomous constitutional authority responsible for administering Union and State election processes in India.

• It was established under the Constitution on 25th January 1950 (celebrated as national voters day).

• The secretariat of the commission is located in New Delhi.

• The body administers elections to the Lok Sabha, Rajya Sabha, and State Legislative Assemblies in India, and the offices of the President and Vice President in the country.

• It is not concerned with the elections to panchayats and municipalities in the states.

• For this, the Constitution of India provides for a separate State Election Commission.

**Q86. Answer: (b) 20**

Calculation:

Number of employees who were fired in 2003 = 45

Number of employees who were promoted in 2001 = 25

Difference = 45 - 25 = 20

Therefore Required answer is 20

**Q87. Answer: (b) 1 : 1**

Calculation:

Total of the number of employees hired during 2003 - 2005 = 35 + 50 + 40

=> 125

Total of the number of employees promoted during 2003 - 2005 = 35 + 40 + 50

=> 125

Ratio = 125 : 125

=> 1 : 1

Therefore Required ratio is 1 : 1

**Q88. Answer: (c) 3%**

Calculation:

Number of employees promoted in 2001 = 25

Number of employees promoted in 2004 = 40

Difference = 40 - 25 = 15

Now,

Employee strength in the company was 500 employees in 2001

And here we asked to calculate the percentage on the basis of employee strength

So,

Required % = (15/500) × 100

=> 3%

Therefore Required percentage is 3

**Q89. Answer: (b) 2003**

Calculations:

2001:

Hired: 30, Fired: 35

Difference (Fired - Hired): 35 - 30 = 5

2002:

Hired: 45, Fired: 40

Difference (Fired - Hired): 40 - 45 = -5

2003:

Hired: 35, Fired: 45

Difference (Fired - Hired): 45 - 35 = 10

2004:

Hired: 50, Fired: 35

Difference (Fired - Hired): 35 - 50 = -15

2005:

Hired: 40, Fired: 35

Difference (Fired - Hired): 35 - 40 = -5

Analysis:

The highest positive difference (meaning the year where the number of employees fired was highest compared to the number of employees hired) occurs in 2003, where the difference is 10.

Therefore The number of employees fired was highest compared to the number of employees hired in 2003.

Therefore The correct answer is Option 2.

**Q90. Answer: (c) Both arguments 1 and 2 are strong.**

1. Argument 1 states that by inducing fear of severe punishments, criminals can be stopped from committing more crimes and it implies that this example of punishment for criminals will deter others from involving in criminal activities, thereby reducing the crime rates. Thus, argument 1 is strong.

2. Argument 2 states that human life being precious should be treated with caution. It suggests moderate measures to deal with criminals by giving them a chance to repent and start their life afresh. It implies that harsh punishments could be too extreme for criminals. Thus, argument 2 is also strong.

Hence, both arguments 1 and 2 are strong.

**Q91. Answer: (d) DOLLOR**

The logic followed here is:-

Similarly,

Hence, "option 4" is the correct answer.

**Q92. Answer: (a) 169**

The logic followed here is:-

1. $169 = 13^2$.

2. $8 = 2^3$.

3. $125 = 5^3$.

4. $216 = 6^3$.

Hence, "option 1" is the correct answer.

**Q93. Answer: (a) Punch**

The logic followed here is:-

• Wrist, Fist, and Palm are parts of a body but Punch is not a part of body.

• Punch means to hit somebody/something hard with your closed hand.

Hence, "option 1" is the correct answer.

**Q94. Answer: (b) 13**

The figure is for the triangle is:-

The number of triangles is 13.

Hence, "option 2" is the correct answer.

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**Q95. Answer: (c) Quantity A is greater.**

Given:

x + y = 10 ; y = x - 2

Quantity A is x.

Quantity B is y.

Concept used:

Linear algebraic equation solution.

Calculation:

x + y = 10 ....(1)

y = x - 2

=> x - y = 2 ....(2)

Solving these two equations, we get,

x = 6 and y = 4

Hence, Quantity A and B are 6 and 4 respectively.

Thus, Quantity A is greater.

Therefore Quantity A is greater.

**Q96. Answer: (a) Kanpur**

• Gandhinagar is the capital of Gujarat and Ahmedabad is the state's financial capital.

• Similarly, Lucknow is the capital of Uttar Pradesh and Kanpur is the state's financial capital.

Hence, Kanpur is the correct answer.

**Q97. Answer: (c) Only assumption 2 is implicit**

• Assumption 1 is not implicit because it says that "sales increased". This cannot be determined from an advertisement.

• The purpose of an advertisement for an offer is to attract more people and an advertisement generally believes that people are more willing to buy when offers are provided. Therefore, assumption 2 is implicit.

Hence, only assumption 2 is implicit.

**Q98. Answer: (b) 17**

Given:

Sakshi attended to the following number of clients at the front desk during her internship for 15 days:

18, 20, 16, 17, 32, 17, 6, 16, 12, 13, 17, 28, 24, 45, 17.

Concept used:

The mode is the value that is repeatedly occurring in a given set

To find the median, the data should be arranged, first, in order of least to greatest

If the total number of observations given is odd, then the formula to calculate the median is:

Median = {(n + 1)/2}^(th)term

Calculation:

Mode = 17

As 17 is given 4 times which is the highest among other

Now,

Arrangement of numbers in ascending order = 6, 12, 13, 16, 16, 17, 17, 17, 17, 18, 20, 24, 28, 32, 45

As here the total number of observations is 15

So, median = [(15 + 1)/2]th observation

So, 8th observation is 17

Average of median and mode = (17 + 17)/2 = 17

Therefore The average of the mode and median is 17

**Q99. Answer: (a) 7 : 8**

Given:

8/15 members of the scout team are girls,

Calculation:

Let total members be 15x

So, no. of girls = 15x × 8/15 = 8x

So, no. of boys are 15x - 8x = 7x

Ratio = 7x : 8x

=> 7 : 8

Therefore The ratio of boys to girls in the team is 7 : 8

**Q100. Answer: (a) 16**

Shortcut Trick

Let current age be 1 unit.

Age after 8 years = 3 units → Change = 2 units = 8 years.

Therefore 1 unit = 4 years.

To be 5 times (5 units), change from current (1 unit) = 4 units.

Time required = 4 units × 4 years = 16 years.

Therefore The correct answer is 16 years.

Alternate Method

Given:

Let the present age of Subhash be x.

After 8 years, age = 3x.

Calculations:

=> x + 8 = 3x

=> 2x = 8

=> x = 4 years (Present Age)

Target age = 5 × Present age = 5x = 5 × 4 = 20 years.

=> Years required = Target age − Present age

=> 20 − 4 = 16 years.

Therefore The correct answer is 16 years.

Additional Information

Linear Equations in Ages

Age problems are solved by translating verbal statements into algebraic equations where 'n years ago' implies (x − n) and 'n years hence' implies (x + n).

Ratio Method for Ages

If the ratio of ages changes over time, the difference between the ages of two people remains constant regardless of the number of years passed.

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