RRB JE

JUNIOR ENGINEER

CBT-1 EXAM

25 PREVIOUS YEAR SOLVED PAPERS (2026, 2024 & 2019) & **10** PRACTICE SETS ON THE LATEST PATTERN



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MONTHLY CURRENT AFFAIRS MAGAZINE

SCAN ME

SOLVED PAPER

1

RRB JE CBT-I, 2026

(Held on 25 Feb, 2026 Shift-3)

1. Simar starts from Point A and drives 10 km towards south. He then takes a right turn, drives 7 km, turns right and drives 12 km. He then takes a right turn and drives 9 km. He takes a final right turn, drives 2 km and stops at Point P. How far (shortest distance) and towards which direction should he drive in order to reach Point A again?
(All turns are 90 degree turns only unless specified.)
(*a*) 2 km to the west
(*b*) 3 km to the west
(*c*) 2 km to the east
(*d*) 3 km to the east

2. A tap can fill a cistern in 32 hours, while another tap can empty the full cistern in 64 hours. If the cistern is initially empty and both taps are opened together, find the time (in hours) required to fill one-fourth of the cistern.
(*a*) 64 (*b*) 48
(*c*) 32 (*d*) 16

3. The list price of a refrigerator is ₹15,000. It is sold to a retailer after two successive discounts of 32% and 40%. The retailer wants to earn a profit of 45% on his cost after allowing a 49% discount (on its new list price) to the customer. At what price should he list the refrigerator?
(*a*) ₹17,400 (*b*) ₹17,412
(*c*) ₹17,325 (*d*) ₹17,504

4. D, R, A, W and S have different marks. Only one person has scored between A and R. Only one person has scored between R and W. S has scored more than R and W. How many people have scored less than D?
(*a*) One (*b*) Two
(*c*) Four (*d*) Three

5. Express $5.97\overline{3}$ as a vulgar fraction.
(*a*) $5\frac{219}{225}$ (*b*) $5\frac{319}{225}$
(*c*) $5\frac{229}{255}$ (*d*) $5\frac{319}{215}$

6. Select the pair which follows the same pattern as that followed by the two set of pairs given below. Both pairs follow the same pattern.
JKK : KFH
HVO : IQL
(*a*) CPR : DKN (*b*) OOP : PJM
(*c*) FJL : GDI (*d*) CUK : DPG

7. Why are sulphide ores usually converted into oxides before the extraction of metals?
(*a*) Metal sulphides react faster with carbon
(*b*) Sulphide ores are unstable at room temperature
(*c*) Sulphide ores contain more gangue materials
(*d*) Metal oxides are easier to reduce than sulphides

8. Under the Stand-Up India Scheme, bank loans from Scheduled Commercial Banks (SCBs) are provided in what range for eligible beneficiaries?
(*a*) ₹5 lakh to ₹50 lakh
(*b*) ₹25 lakh to ₹2 crore
(*c*) ₹1 crore to ₹5 crore
(*d*) ₹10 lakh to ₹1 crore

9. If $\frac{4(x^2+1)-8x}{3x} = 6$, $x > 0$, then find the positive value of $\sqrt{x}+\frac{1}{\sqrt{x}}$.
(*a*) $\sqrt{\frac{2}{5}}$ (*b*) $\sqrt{\frac{2}{3}}$
(*c*) $\sqrt{\frac{5}{3}}$ (*d*) $\sqrt{\frac{17}{2}}$

10. What is the primary composition of the stable composite developed by IIT Mandi that prevents 2D semiconductors from degrading?
(*a*) Carbon nanotubes embedded in polymer matrix
(*b*) Boron nitride mixed with epoxy resin
(*c*) Tungsten disulfide (WS) encapsulated in polydimethylsiloxane (PDMS)
(*d*) Graphene combined with silicone

11. If $14.8 : x :: x : 3.7$ and $x > 0$, then find the value of x.
(*a*) 7.4 (*b*) 4.1
(*c*) 12.9 (*d*) 11.4

12. 'Utkal Diwas', which was celebrated on 1st April 2025, marks the anniversary of the statehood of _____.
(*a*) Chhattisgarh (*b*) Uttarakhand
(*c*) Telangana (*d*) Odisha

13. Seven boxes, D, E, F, G, H, W and X, are kept one over the other, but not necessarily in the same order. Only H is kept above E. Only D is kept between E and G. Only F is kept below X. How many boxes are kept between W and E?
(*a*) One (*b*) Three
(*c*) Two (*d*) Four

14. 19 is related to 287 following a certain logic. Following the same logic, 23 is related to 347. To which of the following is 28 related, following the same logic?
(**Note:** Operations should be performed on the whole numbers, without breaking down the numbers into their constituent digits. E.g. 13 – Operations on 13 such as adding / subtracting /multiplying etc. to 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)
(*a*) 422 (*b*) 426
(*c*) 424 (*d*) 420

15. Why are brackets used in the formula $Ca(OH)_2$?
(*a*) To show ionic nature
(*b*) To balance oxygen atoms
(*c*) To indicate two hydroxide groups
(*d*) To represent molecular bonding

16. In a certain code language,
A + B means 'A is the daughter of B'
A – B means 'A is the brother of B'
A × B means 'A is the wife of B'
A ÷ B means 'A is the father of B'
Based on the above, how is E related to K if 'E – F + G × H ÷ K'?
(*a*) Husband (*b*) Brother
(*c*) Son (*d*) Father

17. If + means –, – means ×, × means ÷, ÷ means +, then what will come in place of the question mark (?) in the following equation?
$4 - 18 \times 3 \div 50 + 33 = ?$
(*a*) 31 (*b*) 40
(*c*) 41 (*d*) 30

18. The average of the first 18 positive multiples of 11 is:
(*a*) 104.5 (*b*) 18
(*c*) 11 (*d*) 99

19. How many metres of cloth 2 metres wide will be required to make a conical tent with the diameter of the base being 14 metres and its slant height being 9.5 metres?
(Use $\pi = \frac{22}{7}$)
(*a*) 114.5 (*b*) 104.5
(*c*) 124.5 (*d*) 109.5

20. A dentist uses a mirror to obtain a large image of a patient's tooth. Which mirror should the dentist use and why?

(*a*) Plane mirror, because it gives a real image

(*b*) Concave mirror, because it gives a magnified image

(*c*) Spherical mirror, because it gives a virtual image

(*d*) Convex mirror, because it gives a magnified image

21. What is the primary material used to develop vermicompost?

(*a*) Bacteria and viruses

(*b*) Earthworms

(*c*) Yeast

(*d*) Chemical fertilisers

22. Girish scored 695 marks in an examination and was 17 marks short of 89% of the maximum marks. In the same examination, his friend scored 688 marks. What is the percentage of marks scored by his friend?

(*a*) 84% (*b*) 83%

(*c*) 86% (*d*) 87%

23. How do check-dams help in improving agricultural water availability and soil quality?

(*a*) They increase groundwater levels and reduce soil erosion.

(*b*) They directly irrigate fields with river water and increase soil erosion.

(*c*) They store water only for city use, and reduce soil erosion.

(*d*) They divert water away from farms and increase soil erosion.

24. Which observation supports the law of constant proportions for water?

(*a*) Water boils at fixed temperature

(*b*) Water exists in three states

(*c*) Hydrogen and oxygen ratio is fixed

(*d*) Water conducts electricity weakly

25. P is the brother of W. W is the father of R. T is the father of J. J is the son of R. How is T related to P?

(*a*) Daughter's son

(*b*) Brother's daughter's son

(*c*) Daughter's husband

(*d*) Brother's daughter's husband

26. A shopkeeper sells his goods at cost price. If by using false weights he gains $3\frac{19}{27}$ %, then what weight does he use for 1 kg (in g, rounded off to 2 decimal places)?

(*a*) 987.35 (*b*) 964.29

(*c*) 938.99 (*d*) 954.79

27. What should come in place of '?' in the given series?

7 10 16 25 ?

(*a*) 34 (*b*) 43

(*c*) 40 (*d*) 37

28. In a micelle, which part faces outward toward water?

(*a*) Hydrocarbon tail (*b*) Ionic head

(*c*) Non-polar end (*d*) Grease molecule

29. A student claims that two cars of equal mass, one moving at 40 km/h and another at 80 km/h, have the same kinetic energy if their engines provide the same power. What is the error in this reasoning?

(*a*) The cars have equal energy if the engines are identical.

(*b*) Kinetic energy depends on the square of speed, not just on power supplied.

(*c*) Power supplied determines energy, regardless of speed.

(*d*) Both cars have equal kinetic energy since both cover the same distance.

30. A farmer wants to grow wheat with better baking quality and resistance to drought. Which two characteristics should be targeted in variety improvement?

(*a*) Higher yield and wider adaptability

(*b*) Improved quality and abiotic resistance

(*c*) Improved quality and biotic resistance

(*d*) Wider adaptability and biotic resistance

31. As per the India Meteorological Department (IMD), what is the approximate total annual normal rainfall received in the Thar Desert, which has a coefficient of variation (CV) of about 38%?

(*a*) 250 mm per year (*b*) 200 mm per year

(*c*) 150 mm per year (*d*) 50 mm per year

32. Which rivers have contributed to the formation of the Northwestern Plains of India?

(*a*) Krishna, Godavari, and Kaveri

(*b*) Satluj, Beas, and Ravi

(*c*) Ganga, Yamuna, and Brahmaputra

(*d*) Narmada, Tapti, and Mahanadi

33. A question is followed by two statements numbered (I) and (II). You have to decide whether the data provided in the statements are sufficient to answer the question. Read both the statements carefully and decide the appropriate answer.

Question: 5 people, P, Q, X, Y and Z, have an exam on different days of the same week between Monday and Friday. Who has an exam on Thursday?

Statements:

I. P has an exam on Wednesday. Only one person has an exam between P and Q. Z has an exam immediately before X.

II. No one has an exam between P and Y. Only two people have an exam between Y and X. Z does not have an exam on Monday.

(*a*) Data in statement II alone is sufficient to answer the question while data in statement I is not

(*b*) Data in statement I alone is sufficient to answer the question while data in statement II is not

(*c*) Data in statements I and II together is not sufficient to answer the question

(*d*) Data in statements I and II together (and not statement I alone or statement II alone) is sufficient to answer the question

34. Why does our palm feel cold when acetone or petrol is poured on it?

(*a*) The liquid blocks heat flow from surroundings

(*b*) The liquid increases moisture on skin surface

(*c*) The liquid absorbs heat from the skin to evaporate

(*d*) The liquid reacts chemically with our skin surface

35. When x is added to each of 13, 19, 16 and 23, then the numbers so obtained, in this order, are in proportion. Then, if $5x : y :: y : (8x - 4)$, and $y > 0$, what is the value of y?

(*a*) 42 (*b*) 37

(*c*) 41 (*d*) 30

36. Refer to the following letter, number and symbol series and answer the question that follows.

(Left) H @ $ V 1 B 2 C N E T U 8 6 % # L C N Q A (Right)

If all the letters are dropped from the series, which of the following will be fifth from the left?

(*a*) 6 (*b*) 8

(*c*) % (*d*) 2

37. Which region is the Sarhul festival, orgainsed on 1st April 2025, particularly significant in?

(*a*) The southern states of India

(*b*) The Himalayan region

(*c*) The Chhotanagpur region and Jharkhand

(*d*) The coastal regions of India

38. How do rays parallel to the principal axis behave after reflection from a convex mirror?

(*a*) They actually converge at the focus.

(*b*) They appear to diverge from a point on the principal axis.

(*c*) They get reflected back along the same path.

(*d*) They pass through the centre of curvature.

39. Which of the following articles is *incorrectly* matched with the Constitutional Provisions related to Parliament ?

(*a*) Article 93 — Speaker and Deputy Speaker of the House of People

(*b*) Article 99 — Composition of the Council of States/Rajya Sabha

(*c*) Article 89 — Chairman and Deputy Chairman of Council of States

(*d*) Article 105 — Powers and Privileges of the Houses of Parliament

40. The monthly income of Chetan is ₹ 60,000 and his expenditure is ₹ 35,000. If his income increases by 25%, and his expenditure increases by 15%, then what will be the percentage increase in his savings?

(*a*) 35% (*b*) 36%

(*c*) 39% (*d*) 38%

41. Which of the following situations is NOT an example of action and reaction forces?

(*a*) A swimmer pushing water backwards

(*b*) A bat hitting a cricket ball

(*c*) A ball thrown upward comes back down due to the pull of gravity.

(*d*) A rocket launching upwards

42. In a certain code, 'parents teach good values' is coded as 'sc fs ye un', 'strong values shape character' is coded as 'lx zv fs lb' and 'good habits discipline strong' is coded as 'ye hk gb zv'.

(All the codes are two-letter codes only.)

What is the possible code for 'character'?

(*a*) Either 'ye' or 'lb' (*b*) Either 'fs' or 'zv'

(*c*) Either 'lb' or 'fs' (*d*) Either 'lb' or 'lx'

43. Which of the following statements best explains why humans are severely affected by biological magnification?

(*a*) Humans can break down toxins

(*b*) Humans are best decomposers in food chain

(*c*) Humans consume less food than other consumers in food chain

(*d*) Humans occupy the top trophic level in many food chains

44. Which of the following folk dances is performed to celebrate a good harvest and is popular in the states of Odisha and Chhattisgarh?

(*a*) Bhangra (*b*) Karma

(*c*) Garba (*d*) Rouf

45. The fluid content inside the plasma membrane is named:

(*a*) Chromatin (*b*) Genes

(*c*) Cytoplasm (*d*) Chromosomes

46. Select the set in which the numbers are related in the same way as are the numbers of the following sets.

(**Note:** Operations should be performed on the whole numbers, without breaking down the numbers into its constituent digits. E.g. 13 – Operations on 13 such as adding/subtracting/multiplying etc. to 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed)

(13, 91, 27)

(19, 133, 39)

(*a*) (25, 175, 50) (*b*) (26, 130, 53)

(*c*) (20, 140, 41) (*d*) (29, 210, 57)

47. The roots of the equation $ax^3 - 24x^2 + 188x - 480 = 0$ are three consecutive even natural numbers. The value of a is ____,

(*a*) 2 (*b*) 1

(*c*) 3 (*d*) 4

48. Which waste based difference between the renal artery and renal vein is directly related to excretory function?

(*a*) The renal vein has higher pressure

(*b*) The renal artery has more valves

(*c*) The renal artery contains more urea

(*d*) The renal vein contains more oxygen

49. A car suddenly changes direction while moving at constant speed. Which aspect of inertia is being demonstrated, and how does the car's mass influence this effect?

(*a*) The inertia of rest is demonstrated, and the car's mass does not affect direction changes.

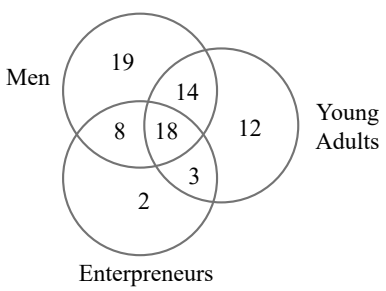
(*b*) The inertia of speed is demonstrated, and a lighter car resists direction change more.

(*c*) Mass only affects speed, not direction, when a car turns.

(*d*) The inertia of direction is demonstrated, and a car with greater mass will resist the change in direction more.

50. Study the given diagram carefully and answer the question that follows. The numbers in different sections indicate the number of persons.

(**Note:** You have to take the given data to be true even if they seem to be at variance from commonly known facts.)



How many young adults are entrepreneurs?

(*a*) 21 (*b*) 3

(*c*) 22 (*d*) 18

51. In the Assumed Mean Method, if the assumed mean (A) = 55 and an observed value $x = 40$, what is the deviation d?

(*a*) 1.5 (*b*) –1.5

(*c*) 15 (*d*) –15

52. If a body at rest is dropped from a certain height and takes 4 seconds to reach the ground, what is the approximate height from which it was dropped? (Take g = 10 m/s²)

(*a*) 80 meters (*b*) 160 meters

(*c*) 40 meters (*d*) 100 meters

53. Which of the following is usually 'stored under high pressure'?

(*a*) N_2 (*b*) H_2

(*c*) Solid CO_2 (*d*) NaCl

54. The value of $4^3 - 7^2 + \left(\frac{16}{4}\right)^2 - 4 + 9 \times 1 =$ _____

(*a*) 33 (*b*) 44

(*c*) 42 (*d*) 36

55. Which of the following objectives is stated in Article 38 of the Indian Constitution?

(*a*) To establish military rule for national security

(*b*) To establish a social order based on justice—social, economic, and political

(*c*) To guarantee employment to all citizens

(*d*) To provide equal education opportunities for all

56. The Five Ps of Sustainable Development are:

(*a*) Poverty, Peace, Protection, Plant, Product

(*b*) Population, Peace, Production, Power, Partnership

(*c*) People, Peace, Power, Planet, Partnership

(*d*) People, Peace, Prosperity, Planet, Partnership

57. A farmer wants to plant 95 mango trees, 171 banyan trees, and 152 banana trees in equal rows (in terms of the number of trees). Also, he wants to create distinct rows of trees, with only one type of tree in each row. Find the minimum number of rows required.

(*a*) 23 (*b*) 18

(*c*) 19 (*d*) 22

58. Find the roots of the quadratic equation $15x^2 - x - 2 = 0$

(*a*) $x = \frac{-1}{3}$ or $x = \frac{-2}{5}$

(*b*) $x = \frac{1}{3}$ or $x = \frac{2}{5}$

(*c*) $x = \frac{-1}{3}$ or $x = \frac{2}{5}$

(*d*) $x = \frac{1}{3}$ or $x = \frac{-2}{5}$

59. If $14\sin y + \cos y = \sqrt{14}\ \sin y$, then find the value of $\tan y$.

(*a*) $\frac{-14-\sqrt{14}}{182}$ (*b*) $\frac{-14-\sqrt{14}}{187}$

(*c*) $\frac{-14-\sqrt{14}}{192}$ (*d*) $\frac{-15-\sqrt{14}}{182}$

60. This question is based on the following words/letter clusters.

(Left) ADS DUG AGS BEG (Right)

How many letters are there between the second letter of the second word/letter cluster from the right and the second letter of the second word/letter cluster from the left, counted in the English alphabetical order?

(*a*) 11 (*b*) 12

(*c*) 13 (*d*) 14

61. By the late 1960s, what major achievement did India attain in agriculture?
(*a*) Shifted entirely to organic farming
(*b*) Started exporting food grains
(*c*) Became self-sufficient in food grains
(*d*) Stopped using fertilizers

62. Simplify: $110 - 42 \times (5 + 6) - 6$
(*a*) −348 (*b*) −363
(*c*) −350 (*d*) −358

63. Who among the following has overtaken Yuzvendra Chahal to become India's highest wicket-taker in T20 Internationals at Eden Gardens in Kolkata on 22 January 2025?
(*a*) Jasprit Bumrah
(*b*) Kuldeep Yadav
(*c*) Mohammed Siraj
(*d*) Arshdeep Singh

64. A regular hexagon is inscribed in a circle. If the length of the shortest diagonal of the hexagon is 12 cm, find one-sixth of the area (in cm^2) of the region lying between the circle and the hexagon.
(*a*) $6(3\pi - 2\sqrt{3})$ (*b*) $4(2\pi - 3\sqrt{3})$
(*c*) $4(3\pi - 2\sqrt{3})$ (*d*) $6(2\pi - 3\sqrt{3})$

65. What should come in place of the question mark (?) in the given series?

2 16 44 100 212 ?

(*a*) 436 (*b*) 433
(*c*) 430 (*d*) 435

66. Select the set in which the numbers are related in the same way as are the numbers of the following sets.

(**Note:** Operations should be performed on the whole numbers, without breaking down the numbers into their constituent digits. E.g. 13 – Operations on 13 such as adding / subtracting /multiplying, etc. to 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)

(133, 5,23)

(107, 1, 18)

(*a*) (76, 20, 16) (*b*) (10, 22, 2)
(*c*) (75, 9, 4) (*d*) (18, 24, 1)

67. Which of the following is/are correct about Tej Bahadur Sapru?
I. He helped Annie Besant to build up the Central Hindu College at Banaras.
II. He entered politics during the Home Rule movement.
III. He participated in the Round Table Conferences held between 1930 and 1932 in London.
(*a*) Only I (*b*) Only II
(*c*) All I, II and III (*d*) Only II and III

68. Which of the following tissues ensures that food made in the leaves is delivered to all plant parts?
(*a*) Phloem (*b*) Mesophyll
(*c*) Xylem (*d*) Epidermis

69. Amit had invested same amount of sums at simple as well as compound interest, compounded annually. The time period of both the sums was 2 years and rate of interest too was same 10% per annum. At the end, he found a difference of ₹97 in both the interests received. What were the sums (in ₹) invested?
(*a*) 8,950 (*b*) 8,800
(*c*) 9,700 (*d*) 10,050

70. Plant diseases are caused by pathogens transmitted through:
(*a*) Sunlight exposure
(*b*) Soil, water and air
(*c*) Crop residues alone
(*d*) Fertilisers and manure only

71. What conclusion can be drawn from the experiment in which potassium permanganate solution remains coloured even after repeated dilution?
(*a*) Particles of matter are extremely small in size
(*b*) Particles of matter are fixed and stationary
(*c*) Particles of matter are visible to naked eye
(*d*) Particles of matter occupy no space at all

72. Ozone shields the surface of the Earth from which type of radiation coming from the Sun?
(*a*) X rays (*b*) White light
(*c*) Infra-red (*d*) Ultra violet

73. Mr. W travelled 425 km, 946 km and 340 km at a speed of 5 km/hr, 43 km/hr and 34 km/hr, respectively. Find his average speed in km/hr.
(*a*) $14\frac{71}{117}$ (*b*) $14\frac{75}{117}$
(*c*) $14\frac{73}{117}$ (*d*) $14\frac{70}{117}$

74. Which of the following everyday mixtures is best classified as a suspension?
(*a*) Salt solution prepared in water
(*b*) Sugar completely dissolved in water
(*c*) Copper sulphate dissolved in water
(*d*) Chalk powder mixed with water

75. In what ratio should sugar costing ₹34/kg be mixed with sugar costing ₹58/kg so that by selling the mixture at ₹52.80/kg, there is a profit of 32%?
(*a*) 5 : 3 (*b*) 7 : 3
(*c*) 3 : 1 (*d*) 5 : 2

76. When dilute hydrochloric acid reacts with calcium carbonate, the gas evolved is passed through limewater. On passing the gas in excess, the milkiness disappears due to the formation of:
(*a*) Calcium oxide
(*b*) Calcium hydrogen carbonate
(*c*) Calcium carbonate
(*d*) Calcium hydroxide

77. Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statements.

Statements:
All apples are mangos.
All mangos are balls.
No ball is a cat.

Conclusions:
I. No apple is a cat.
II. Some balls are apples.
(*a*) Both conclusions (I) and (II) follow
(*b*) Neither conclusion (I) nor (II) follows
(*c*) Only conclusion (II) follows
(*d*) Only conclusion (I) follows

78. If the current in a wire is 2 amperes, how much charge flows through a cross-section in 5 seconds?
(*a*) 7 coulombs (*b*) 10 coulombs
(*c*) 0.4 coulombs (*d*) 2.5 coulombs

79. Find the ratio between the fourth proportional of 8, 12 and 4, and the third proportional of 6 and 9.
(*a*) 4 : 9 (*b*) 5 : 11
(*c*) 7 : 11 (*d*) 9 : 13

80. The ratio of the cost prices of articles X and Y is 1 : 2. A man earns a profit of 12% by selling X and incurs a loss of 36% by selling Y. What is his overall gain or loss percentage in the entire transaction?
(*a*) Loss, 20% (*b*) Gain, 20%
(*c*) Gain, 26.5% (*d*) Loss, 24.5%

81. Each of C, D, E, F, X, Y and Z has an exam on a different day of a week starting from Monday and ending on Sunday of the same week. X has exam on Friday. Only two people have exams between Y and X. Only four people have exams between C and Y. D has exam immediately after F. Z doesn't have exam on Monday. How many people have exam(s) between Z and E?
(*a*) Four (*b*) Two
(*c*) Three (*d*) One

82. A can do a work in 9 days and B in 12 days. They work on alternate days, beginning with B. In how many days will the work be completed?
(*a*) $8\frac{1}{3}$ (*b*) $9\frac{1}{3}$
(*c*) $10\frac{1}{3}$ (*d*) $12\frac{1}{3}$

83. Select the triad which follows the same pattern as that followed by the two triads given below. Both triads follow the same pattern.

JM-HK-FI

MP-KN-IL

(*a*) QS-NP-KO (*b*) PS-NQ-LO
(*c*) PS-NQ-KO (*d*) QS-MP-KO

SOLVED PAPER

5

RRB JE CBT-I, 2024

(Held on 17 Dec 2024 Shift-2)

1. Find the simple interest (in closest integral ₹) on ₹4000 at 5.25% per annum rate of interest for the period from 5 February 2024 to 6 April 2024
(*a*) 33 (*b*) 34
(*c*) 36 (*d*) 35

2. Which of the following statements is INCORRECT about the Annual Financial Statement 2024-25?
(1) The Budget 2024-25 will focus on four castes.
(2) 1 crore farmers across the country will be initiated into natural farming, supported by certification and branding in the next 2 years.
(3) 20,000 need-based bio-input resource centres to be established.
(4) 1,000 Industrial Training Institutes will be upgraded in hub and spoke arrangements with outcome orientation.
(*a*) 3 only (*b*) 4 only
(*c*) 2 only (*d*) 1 only

3. Which of the following is true about asexual reproduction?
(*a*) It results in offspring genetically identical to the parent.
(*b*) It requires complex reproductive organs.
(*c*) It requires fertilisation.
(*d*) It involves two parent organisms.

4. What are the number of chromosomes in a human male germ cell?
(*a*) 46 pairs of Chromosomes
(*b*) 23 pairs of Chromosomes
(*c*) 23 Chromosomes
(*d*) 46 Chromosomes

5. In which language was the classic Indian novel 'Chandrakanta' originally written?
(*a*) Hindi (*b*) Bengali
(*c*) Urdu (*d*) Tamil

6. In Delhi Sultanate, the holder of an 'iqta', who also worked as the administrative head of his 'iqta', was designated as _____.
(*a*) ariz (*b*) wazir
(*c*) qazi (*d*) muqti

7. A six-digit number is divisible by 91. If 143 is added to this number, the resulting number is divisible by which of the following number?
(*a*) 13 (*b*) 7
(*c*) 11 (*d*) 91

8. GJBF is related to ILDH in a certain way based on the English alphabetical order. In the same way, JMEI is related to LOGK. To which of the following is MPHL related, following the same logic?
(*a*) ROJN (*b*) ORJN
(*c*) ORNJ (*d*) RONJ

9. Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusion(s) logically follow(s) from the statements.
Statements:
All waters are liquids.
All liquids are juices.
All juices are fruits.
Conclusions:
(I) All waters are fruits.
(II) Some fruits are liquids.
(*a*) Both conclusions (I) and (II) follow.
(*b*) Only conclusion (I) follows.
(*c*) Only conclusion (II) follows.
(*d*) Neiher conclusion (I) nor (II) follows.

10. Which of the following statements about AIDS is FALSE?
(*a*) AIDS is caused by the HIV virus.
(*b*) AIDS can be transmitted through mosquito bites.
(*c*) AIDS can be prevented by practising safe sex.
(*d*) AIDS affects the immune system of the body.

11. Hindustan Socialist Republican Association (HSRA) was founded in 1928 in which of the following cities?
(*a*) Delhi (*b*) Lahore
(*c*) Pune (*d*) Calcutta

12. Based on the english alphabetical order, three of the following four letter-clusters are alike in a certain way and thus form a group. Which letter-cluster DOES NOT belong to that group? (Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster.)
(*a*) ENPU (*b*) HPSX
(*c*) CKNS (*d*) KSVA

13. If '×' means 'addition', '+' means 'subtraction', '−' means 'division' and '÷' means 'multiplication', then what will come in place of the question mark (?) in the following equation?
$14 + 1 \div 7 \times 32 - 8 = ?$
(*a*) 12 (*b*) 11
(*c*) 14 (*d*) 13

14. The average of four consecutive odd numbers is 36. What is the greatest of these numbers?
(*a*) 37 (*b*) 39
(*c*) 43 (*d*) 41

15. Which of the following statements best describes what happens in a double displacement reaction?
(*a*) Electrons are transferred between atoms.
(*b*) Ions in two compounds switch places to form two new compounds.
(*c*) Two elements combine to form a compound.
(*d*) A compound breaks down into simpler substances.

16. In a certain code language,
'hat tie watch' is coded as 'zm ph mt',
'belt bow tie' is coded as 'la oe zm',
'bow watch clip' is coded as 'oe mt dy'.
What is the code for 'hat' in that language? (Note: All the codes are two-letter coded only.)
(*a*) oe (*b*) mt
(*c*) ph (*d*) zm

17. What is the sum of the numbers between 250 and 450, such that when it is divided by 8, 12 and 18, it leaves no remainder?
(*a*) 1080 (*b*) 1152
(*c*) 936 (*d*) 1008

18. If the mean of the following data is 40, then the value of X is:

xi	10	25	70	85
fi	21	X	22	35

(*a*) 112 (*b*) 107
(*c*) 120 (*d*) 134

19. If the interest earned during the 2nd year on a certain sum is ₹3726, and the rate of interest is 15% per annum compounded annually, then the sum is:
(*a*) ₹21600 (*b*) ₹20885
(*c*) ₹21185 (*d*) ₹20835

20. The number of 176-Ω resistors (in parallel) required to carry 5 A on a 220-V line is:
(*a*) 4 (*b*) 16
(*c*) 2 (*d*) 8

21. Based on the english alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair DOES NOT belong to that group?

(Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster.)

(*a*) MO - RT (*b*) VW - XZ
(*c*) DF - IK (*d*) JL - OQ

22. Each of D, E, F, K, L, M and N has an exam on a different day of a week, starting from Monday and ending on Sunday of the same week. N has exam on Thursday. L has an exam two days before N. Only four people have exams between F and L. M has an exam on one of the days after L. D has an exam on the day immediately before E.

How many people have exams between E and M?

(*a*) Three (*b*) One
(*c*) Two (*d*) Four

23. Which of the following rights is NOT part of the Right to Life under Article 21 of the Indian Constitution?

(*a*) Right to Property
(*b*) Right to Privacy
(*c*) Right to Free Legal Aid
(*d*) Right to Livelihood

24. The special reproductive structures in fungi like Rhizopus, which germinate to form new individuals, are called:

(*a*) Spores (*b*) Anthers
(*c*) Gemmules (*d*) Pollens

25. When the pH of rainwater falls below 5.6, it is commonly referred to as:

(*a*) acid rain (*b*) alkaline rain
(*c*) hard water (*d*) mineral rain

26. What should come in place of the question mark (?) in the given series?

78 79 83 92 108 ?

(*a*) 134 (*b*) 135
(*c*) 133 (*d*) 132

27. Which of the following ratio is smallest?

(*a*) 18 : 42 (*b*) 19 : 60
(*c*) 15 : 47 (*d*) 29 : 55

28. A number when increased by 50 %', gives 2790. The number is:

(*a*) 5580 (*b*) 930
(*c*) 3720 (*d*) 1860

29. The average price of three items of furniture is Rs 16440. If their prices are in the ratio 3 : 5 : 7, the price of the cheapest item (in Rs) is:

(*a*) 9864 (*b*) 3288
(*c*) 5480 (*d*) 7672

30. The magnetic field lines of a bar magnet may NOT be drawn using:

(*a*) another bar magnet
(*b*) a magnetic compass
(*c*) iron filings
(*d*) wood particles

31. Which of the following is true for a balanced chemical equation?

(*a*) The mass of reactants is always greater than the mass of products.
(*b*) The number of molecules on each side is always equal.
(*c*) The products have more atoms than the reactants.
(*d*) The total number of atoms for each element is the same on both sides of the equation.

32. Manur starts from Point A and drives 12 km towards the East. He then takes a right turn, drives 11 km, turns right and drives 13 km. He then takes a right turn and drives 17 km. He takes a final right turn, drives 1 km and stops at Point P. How far (shortest distance) and towards which direction should he drive in order to reach Point A again? (All turns are 90 degrees turns only unless specified)

(*a*) 2 km to the South (*b*) 5 km to the South
(*c*) 6 km to the South (*d*) 3 km to the South

33. This question is based on the five, four-digit numbers given below.

(Left) 5479 3126 6785 9254 1630 (Right)

(Example: 697 – First digit = 6, second digit = 9 and third digit = 7)

NOTE: All the operations to be performed from left to right.

What will be the resultant if the fourth digit of the second-greatest number is added to the third digit of the smallest number?

(*a*) 12 (*b*) 10
(*c*) 8 (*d*) 14

34. The difference in the age of two people is 24 years. If 6 years ago, the older of the two was four times as old as the younger one, then find their present ages.

(*a*) 15 and 39 years (*b*) 12 and 36 years
(*c*) 14 and 38 years (*d*) 16 and 40 years

35. What is the primary reason for a central bank to increase the reserve requirement ratio of commercial banks?

(*a*) To decrease the money supply in the economy
(*b*) To increase the money supply in the economy
(*c*) To decrease the profitability of commercial banks
(*d*) To encourage banks to lend more

36. Which of the following statements is correct regarding magnets?

(*a*) A magnet can have either north or south pole.
(*b*) A magnet is a dipole with north and south poles.
(*c*) A magnet produces magnetic as well as electric fields.
(*d*) A magnet can attract an electron.

37. What is the result when sodium chloride and silver nitrate are mixed in a double displacement reaction?

(*a*) Formation of a salt
(*b*) Formation of water
(*c*) Formation of a precipitate
(*d*) Formation of a gas

38. Find the value of $8.25 \times 6 - 3.14 \times 7 + 2.758$ of $2.5 - 4.365 \times 5$

(*a*) 12.97 (*b*) 11.05
(*c*) 11.82 (*d*) 12.59

39. What is the average of all the natural numbers from 1 to 95?

(*a*) 49 (*b*) 48
(*c*) 48.5 (*d*) 47.5

40. Which electrical appliance helps preserve food by maintaining low temperatures?

(*a*) Microwave (*b*) Electric kettle
(*c*) Refrigerator (*d*) Toaster

41. The ratio of the lengths of two corresponding sides of two similar triangles is 17 : 13. The ratio of the areas of these two triangles, in the order mentioned, is:

(*a*) 289 : 169 (*b*) 17 : 13
(*c*) $17\sqrt{17}$:13 (*d*) 290 : 170

42. The numbers of children in 10 families of a locality are 2, 1, 3, 4, 2, 3, 5, 1, 1, 3. The number of children per family is:

(*a*) 2.8 (*b*) 2.5
(*c*) 2.4 (*d*) 3

43. If A : B = 1 : 3, B : C = 4 : 3 and C : D = 6 : 7, then A : B : C : D is

(*a*) 8 : 24 : 18 : 21 (*b*) 6 : 24 : 18 : 21
(*c*) 8 : 22 : 18 : 21 (*d*) 8 : 24 : 16 : 21

44. With respect to Quad Leaders' Summit, which of the following statements is/are correct?

(1) The Quad Leaders' Summit was held in Wilmington (US) in 2024.

(2) The year 2024 marks 22 years since the formation of the grouping.

(3) India will host the 2025 Quad Leaders Summit.

(*a*) 1 and 3 only (*b*) 1 only
(*c*) 2 and 3 only (*d*) 1 and 2 only

45. Kapil Parmar created history by securing India's first-ever medal in which game at the Paralympic Games 2024?

(*a*) Judo (*b*) Shooting
(*c*) Fencing (*d*) Table Tennis

46. In a row of 25 students facing north, Manoj is 15th from the right end. If Harish is 10th to the left of Manoj, what is Harish's position from the left end of the row?

(*a*) 1^{st} (*b*) 2^{nd}
(*c*) 3^{rd} (*d*) 4^{th}

47. If x is inversely proportional to y, and $y = 6$ when $x = 7$, find the value of x, when $y = 64$.

(*a*) $\frac{21}{32}$ (*b*) $\frac{23}{35}$

(*c*) $\frac{22}{33}$ (*d*) $\frac{21}{33}$

48. In surgical procedures for contraception in males, sperm transfer gets prevented if which of the following is blocked?

(*a*) Fallopian tubes (*b*) Testes
(*c*) Vas deferens (*d*) Ovary

49. The solution of the system of linear equations is:

$x + y + z = 6, 2x - y + 3z = 14, -x + 2y - z = -2$

(*a*) $x = \frac{-4}{3}, y = \frac{4}{3}, z = 6$

(*b*) $x = \frac{4}{3}, y = \frac{-4}{3}, z = 5$

(*c*) $x = \frac{5}{3}, y = \frac{-5}{3}, z = 6$

(*d*) $x = \frac{-5}{3}, y = \frac{5}{3}, z = 6$

50. Students and professors of which IIT have developed an innovative fire rescue drone in June 2024?
(*a*) IIT Delhi (*b*) IIT Mandi
(*c*) IIT Madras (*d*) IIT Dharwad

51. How many members of the Rajya Sabha are nominated by the President of India?
(*a*) 12 (*b*) 10
(*c*) 8 (*d*) 15

52. For a concave mirror, where is the centre of curvature located relative to the mirror?
(*a*) In front of the mirror
(*b*) Behind the mirror
(*c*) At the mirror's focal point
(*d*) At the mirror's surface

53. What should come in place of the question mark (?) in the given series based on the English alphabetical order?
TUR FGD RSP DEB ?
(*a*) NQP (*b*) NPQ
(*c*) PNQ (*d*) PQN

54. The population of a town in 1927 was 232300. If its population increased in two successive decades by 30% in each decade, the population of the town in 1947 was:
(*a*) 392583 (*b*) 392585
(*c*) 392592 (*d*) 392587

55. B, C, E, F and H have different heights. B is taller than C. Only E is shorter than F. H is taller than B. How many people are taller than C?
(*a*) Two (*b*) One
(*c*) Four (*d*) Three

56. P is the daughter of Q's sister R. S is the wife of Q and T is the son of S. How is P related to T?
(*a*) Sister's daughter
(*b*) Father's daughter
(*c*) Father's mother
(*d*) Father's sister's daughter

57. If the distance between A and B is 1253 km. From A, Chaman goes to B with speed 93 km/h and return to A with the speed 95 km/h. Find the average speed of Chaman. (rounded off to two decimal place)
(*a*) 93.99 km/h (*b*) 90.46 km/h
(*c*) 103.98 km/h (*d*) 94.47 km/h

58. What is the molecular formula of washing soda?
(*a*) $NaHCO_3$ (*b*) $Na_2CO_3 \cdot 10H_2O$
(*c*) NaCl (*d*) Na_2CO_3

59. Which of the following is a primary reason why all multi-cellular organisms do not reproduce by fragmentation?
(*a*) Their cells are loosely organised.
(*b*) They have specialised cells organised into tissues and organs.
(*c*) They are unicellular.
(*d*) They have a random arrangement of cells.

60. If the object is placed beyond the center of curvature (C) in front of a concave mirror, the image formed will be _____.
(*a*) virtual, upright and diminished
(*b*) real, inverted and diminished
(*c*) real, inverted and enlarged
(*d*) virtual, upright and enlarged

61. The radius of the base of a right circular cone is 21 m and its curved surface area is 1914 m^2. Find the volume (in m^3) of the cone.
(*a*) 9549 (*b*) 10250
(*c*) 9240 (*d*) 8549

62. What should come in place of the question mark (?) in the given series based on the English alphabetical order?
FMK HOM JQO LSQ ?
(*a*) NVR (*b*) NUR
(*c*) NUS (*d*) NVS

63. Correctly match the following Biosphere Reserves to their respective states.

Biosphere Reserves	States
1. Nokrek	a. Meghalaya
2. Panna	b. Madhya Pradesh
3. Manas	c. Assam

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

64. P, Q, R, S, T and U are sitting around a circular table facing the centre. U sits third to the left of T. R sits second to the right of Q. Q is not the immediate neighbour of T. P is not the immediate neighbour of R. Who sits third to the left of Q?
(*a*) P (*b*) T
(*c*) S (*d*) U

65. KL91 is related to CD66 in a certain way. In the same way, MN81 is related to EF56. To which of the following is OP71 related, following the same logic?
(*a*) HG46 (*b*) GH56
(*c*) HG56 (*d*) GH46

66. When a metal and sulphuric acid react with each other, metal displaces hydrogen, which is higher in the reactivity series. Identify the metal for which the bubbling of hydrogen gas will be the fastest.
(*a*) Iron (*b*) Zinc
(*c*) Aluminium (*d*) Magnesium

67. What should come in place of the question mark (?) in the given series? 160 151 141 130 118 ?
(*a*) 105 (*b*) 101
(*c*) 95 (*d*) 91

68. A shopkeeper lists the price of a fan at 25% above its cost price and offers a 10% discount on its list price. If he earns a profit of ₹117, then what is the list price (in ₹) of the fan?
(*a*) 1308 (*b*) 1170
(*c*) 1346 (*d*) 896

69. Let O be the incentre of a triangle PQR and S be a point on the side QR such that OS ⊥ QR. If ∠QOS = 15°, then ∠PQR = ?
(*a*) 65° (*b*) 130°
(*c*) 75° (*d*) 150°

70. Which of the following Articles of the Indian Constitution states that there shall be a Legislative Assembly for the National Capital Territory and the seats in such Assembly shall be filled by members chosen by direct election from territorial constituencies in the National Capital Territory?
(*a*) Article 239 AA (*b*) Article 239A
(*c*) Article 239 B (*d*) Article 239 AB

71. What develops into fruit after fertilisation?
(*a*) Stigma (*b*) Style
(*c*) Anther (*d*) Ovary

72. Refer to the following number, symbol series and answer the question. Counting to be done from left to right only.
(Left) 3 8 9 5 £ 6 3 @ 3 % @ 7 * 1 # 2 6 9 2 7 & £ (Right)
How many such symbols are there each of which is immediately preceded by a number and also immediately followed by a number?
(*a*) 5 (*b*) 6
(*c*) 3 (*d*) 4

73. Which of the following diseases can be prevented by using a mechanical barrier contraceptive method?
(*a*) Malaria (*b*) AIDS
(*c*) TB (*d*) Typhoid

74. Two sets of numbers are given below. In each set of numbers, certain mathematical operation(s) on the first number result(s) in the second number. Similarly, certain mathematical operation(s) on the second number result(s) in the third number and so on. Which of the given options follows the same set of operations as in the given sets?
(NOTE: Operations should be performed on the whole numbers, without breaking down the numbers into their constituent digits. E.g. 13 – Operations on 13 such as adding / subtracting /multiplying to 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)
12-60-120-130; 14-70-140-150
(*a*) 13-65-130-120 (*b*) 15-75-150-140
(*c*) 16-80-160-170 (*d*) 11-55-110-130

75. What is the pH of a solution containing significant concentrations of H^+ ions?
(*a*) 7
(*b*) Greater than 7
(*c*) Less than 7
(*d*) Cannot be determined

76. Shalini travels a distance of 270 km with speed of 54 km/h and 300 km with 30 km/h by her car. Find the average speed (in km/h) of Shalini.
(*a*) 47 (*b*) 38
(*c*) 43 (*d*) 44

77. What is one of the main attractions of 'Mamallapuram' apart from the dance festival?
(*a*) Modern art galleries
(*b*) Architectural beauty of temples
(*c*) Wildlife sanctuaries
(*d*) Local handicrafts

78. Find the HCF of 84, 126 and 210.
(*a*) 42 (*b*) 14
(*c*) 70 (*d*) 21

79. Which of the following is NOT a homologous series?
(*a*) C_2H_4, C_2H_6, C_3H_6, C_4H_8
(*b*) C_2H_2, C_2H_4, C_3H_6, C_4H_8
(*c*) CH_4, C_2H_6, C_3H_8, C_4H_{10}
(*d*) $C_3H_7OH, C_4H_9OH, C_5H_{11}OH, C_6H_{11}OH$

80. Which status was conferred upon Shipping Corporation of India (SCI) by the Government of India in August 2008?
(*a*) Navratna (*b*) Miniratna
(*c*) Maharatna (*d*) Dashratna

81. Which of the following statements is true regarding the refractive index?
(*a*) Refractive index of glass is less than 1.
(*b*) Refractive index of water is always greater than 1.
(*c*) Refractive index depends only on the speed of light in vacuum.
(*d*) Refractive index of a given medium is independent of the wavelength of the light.

82. Simplify the given expression.
$(\sin A + \text{cosec } A)^2 + (\cos A - \sec A)^2 + 3$
(*a*) $1+ \tan^2 A + \cot^2 A$
(*b*) $\tan^2 A + \cot^2 A$
(*c*) $3 + \tan^2 A + \cot^2 A$
(*d*) $6 + \tan^2 A + \cot^2 A$

83. In a certain code,
'red blue green' is coded as 'dy ph mt',
'blue violet black' is coded as 'lp ph st' and
'black red white' is coded as 'st bq dy'.
All the codes are two-letter codes only.
What is white coded as?
(*a*) dy (*b*) bq
(*c*) ph (*d*) st

84. A question is given, followed by two statements labelled I and II. Identify which of the statements is/are sufficient to answer the question. A, B, C, D and E are sitting in a straight line facing north. Who sits on the extreme left end?
(I) A sits fourth to the right of E.
(II) Exactly 1 person sits between B and C.
(*a*) Data in statement I alone is sufficient to answer the question, while data in tatement II is not.
(*b*) Both statements I and II put together are not sufficient to answer the question.
(*c*) Both statements I and II put together (and not independently) are sufficient to answer the question.
(*d*) Data in statement II alone is sufficient to answer the question, while data in statement I is not.

85. If the refractive index of water is 1.33, then the speed of light in water is approximately _____.
(*a*) 2.26×10^8 m/s (*b*) 1.5×10^8 m/s
(*c*) 4×10^8 m/s (*d*) 3×10^8 m/s

86. A double displacement reaction typically involves the exchange of:
(*a*) neutrons (*b*) protons
(*c*) electrons (*d*) ions

87. A man sold an article for ₹533 by first giving a *d*% discount on its marked price, and then another discount having the same nominal value (in ₹). If the marked price of the article is ₹1025, then what is the value of *d*?
(*a*) 22 (*b*) 24
(*c*) 29 (*d*) 21

88. 35 men can do a piece of work in 48 days. The number of men required to complete the same work in 21 days is:
(*a*) 72 (*b*) 80
(*c*) 77 (*d*) 79

89. Which of the following Ministries launched the electric mobility promotion scheme in March 2024 to provide short term support to Electric Vehicles?
(*a*) Ministry of Heavy Industries
(*b*) Ministry of Corporate Affairs
(*c*) Ministry of Environment, Forest and Climate Change
(*d*) Ministry of Road Transport and Highways

90. Which of the following letter-clusters should replace # and % so that the pattern and relationship followed between the letter-cluster pair on the left side of : : is the same as that on the right side of : :?
: DGJ :: EHK : %
(*a*) # = MZC, % = LOR
(*b*) # = WZC, % = LOP
(*c*) # = WZC, % = LOR
(*d*) # = WXC, % = LOR

91. Amit purchased 10 kg of rice at the rate of ₹35 per kg and 39 kg of rice at ₹44 per kg. He sold the mixture at the rate of ₹42 per kg. Find his loss (in ₹).
(*a*) 8 (*b*) 3
(*c*) 13 (*d*) 16

92. If the resistance in a circuit is increased while the voltage remains constant, the current will _____.
(*a*) decrease (*b*) increase
(*c*) double (*d*) remain constant

93. Besides being a barrier method of contraception, condoms also serve which of the following purposes?
(*a*) Prevent transmission of STDs such as gonorrhoea
(*b*) Help in transmission of STDs such as gonorrhoea
(*c*) Prevent diseases that spread through skin-to-skin contact
(*d*) Decrease sexual desire

94. 15 is related to 35 following a certain logic. Following the same logic, 21 is related to 49. To which of the given options is 27 related, following the same logic?
(NOTE: Operations should be performed on the whole numbers, without breaking down the numbers into their constituent digits. E.g. 13 – Operations on 13 such as adding/subtracting/multiplying to 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)
(*a*) 63 (*b*) 69
(*c*) 65 (*d*) 51

95. If 'A' stands for '÷', 'B' stands for '×', 'C' stands for '+' and 'D' stands for '–', then what will be come in place of the question mark (?) in the following equation?
30 C 48 D 36 B 50 A 20 = ?
(*a*) −10 (*b*) −12
(*c*) −11 (*d*) −14

96. The sum of the ages of Ram and Ramesh is 48 years. Four years ago the age of Ram was three times the age of Ramesh. What will be the age of Ramesh five years from now?
(*a*) 14 years (*b*) 21 years
(*c*) 19 years (*d*) 18 years

97. What is the difference between baking powder and baking soda?
(*a*) Baking soda is a mixture of baking powder and tartaric acid.
(*b*) Baking powder is a mixture of baking soda and tartaric acid.
(*c*) Baking powder is a mixture of baking soda and hydrochloric acid.
(*d*) Baking soda is a mixture of baking powder and hydrochloric acid.

98. Mendel studied traits such as flower colour and seed shape in pea plants. These traits are called as:
(*a*) visible characters
(*b*) progeny units
(*c*) dominant characteristics
(*d*) genetic codes

99. A wire of given material having length L and area of cross-section A has a resistance of 4 Ω. The resistance of another wire of the same material having length L/2 will be:
(*a*) 8 Ω (*b*) 4 Ω
(*c*) 1 Ω (*d*) 2 Ω

100. Two taps can fill a cistern in 2 hours and 53 hours respectively. A third tap can empty it in 53 hours. How long (in hours) will it take to fill the empty cistern, if all of them are opened together?
(*a*) 2 (*b*) 3
(*c*) 4 (*d*) 5

Answers with Explanations

1. (*d*) February (remaining days) = 24 days (2024 is a leap year, so February has 29 days)

March = 31 days

April = 6 days

Total days = 24 + 31 + 6 = 61 days

Convert days into years: $T = \frac{61}{366}$

$SI = \frac{4000 \times 5.25 \times 61}{100 \times 366} = \frac{12810}{366} = 35$

2. (*a*) The Union Budget (Annual Financial Statement) 2024-25 actually proposes setting up 10,000—not 20,000—need-based Bio-Input Resource Centres to support its natural-farming push, so statement (3) is incorrect.Four "castes" focus – the Finance Minister said the Budget's welfare agenda centres on the "four castes" of the poor, farmers, youth and women.Natural-farming scale-up – the National Mission on Natural Farming aims to reach about one crore farmers within two years, backed by certification and branding.ITI up-gradation – a new ₹60,000-crore centrally sponsored scheme will upgrade 1,000 Industrial Training Institutes into hub-and-spoke skill centres over five years, aligning courses with industry needs.

3. (*a*) Asexual reproduction results in off spring genetically identical to the parent.

There is no fertilization involved.

It does not require complex reproductive organs.

The off spring are typically clones, meaning they are genetically identical to the parent organism.

4. (*c*) There are 23 chromosomes in a human male germ cell.

A human male germ cell is a haploid cell, meaning it contains half the number of chromosomes found in a normal body cell.

These comprise 22 autosomes plus one sex chromosome, either X or Y, making the cell haploid (n) so that normal fertilisation with a haploid ovum (23 X) restores the diploid complement of 46 chromosomes in the zygote.

Germ cells have 23 chromosomes so that when fertilization occurs, the resulting zygote has the full 46 chromosomes.

5. (*a*) The classic Indian novel 'Chandrakanta' was originally written in Hindi.

It is one of the first modern Hindi novels and played a key role in popularizing Hindi prose fiction in India.

Devaki Nandan Khatri wrote Chandrakanta in Hindi, first serialising it in 1888 and then publishing it in book form in 1892. It became one of the earliest best-selling works in modern Hindi prose and is credited with popularising the language among a wide reading public.

It introduced the concept of tilism and ayyars, attracting a wide audience.

6. (*d*) In Delhi Sultanate, the holder of an 'iqta' was designated as muqti.

The muqti was responsible for collecting revenue, maintaining law and order, and administering the iqta.

They were also expected to maintain troops for the Sultan and ensure smooth governance in their assigned region.

7. (*a*) Let the six-digit number be n, which is divisible by 91.

So, n = 91k where k is an integer.

$\Rightarrow$ 91k + 143

Common factors of 91 and 143.

$91 = 7 \times 13$

$143 = 11 \times 13$

HCF of 91 and 143 = 13

The resulting number is divisible by 13.

8. (*b*) As

G	J	B	F
7	10	2	6
↓+2	↓+2	↓+2	↓+2
I	L	D	H
9	12	4	8

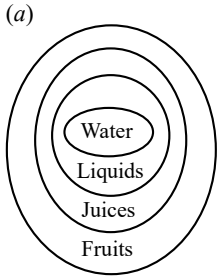
And

J	M	E	I
10	13	5	9
↓+2	↓+2	↓+2	↓+2
L	O	G	K
12	15	7	11

Similarly,

M	P	H	L
13	16	8	12
↓+2	↓+2	↓+2	↓+2
O	R	J	N
15	18	10	14

9. (*a*)



Here, both conclusions (I) and (II) follow.

10. (*b*) AIDS can not be transmitted through mosquito bites.

AIDS stands for Acquired Immunodeficiency Syndrome and is the final stage of infection caused by the HIV (Human Immunodeficiency Virus).

AIDS can be transmitted through unprotected sexual contact with an infected person, sharing needles/syringes and blood transfusions with contaminated blood.

It attacks the immune system, especially CD4 (T-helper) cells.

11. (*a*) The Hindustan Socialist Republican Association (HSRA) was founded in New Delhi at Feroz Shah Kotla in 1928.

It was established from the earlier Hindustan Republican Association, with a key shift in ideology towards socialism.

Key founders and leaders included Chandrashekhar Azad, Bhagat Singh, and Sukhdev.

Chandrashekhar Azad, Bhagat Singh, Sukhdev, and several other young revolutionaries drafted the new constitution and added "Socialist" to reflect their Marxist leanings.

12. (*a*) Option (*b*) HPSX

H	P	S	X
8	16	19	24
	+8	+3	+5

Option (*c*) CKNS

C	K	N	S
3	11	14	19
	+8	+3	+5

Option (*d*) KSVA

K	S	V	A
11	19	22	1
	+8	+3	+5

But, option (*a*) ENPU

E	N	P	U
5	14	16	21
	+9	+2	+5

13. (*b*) After replacing the signs

$14 - 1 \times 7 + 32 \div 8 = ?$

$\Rightarrow 14 - 1 \times 7 + 4 = ?$

$\Rightarrow 18 - 7 = ? \Rightarrow 11 = ?$

14. (*b*) Let the four consecutive odd numbers be $x - 3$, $x - 1$, $x + 1$, and $x + 3$.

Average of these numbers

$$= \frac{(x-3)+(x-1)+(x+3)+(x+1)}{4}$$

$$\Rightarrow 36 = \frac{4x}{4} \Rightarrow x = 36$$

The greatest of these numbers

$= x + 3 = 36 + 3 = 39$

15. (*d*) In a double displacement reaction, the constituent ions of two distinct compounds transpose their places, thereby giving rise to a pair of newly formed compounds.

In such reactions, the cations and anions of two different compounds exchange places, often resulting in the formation of a precipitate, gas, or water.

A double displacement reaction features formation of a precipitate, gas and water.

A classic example is mixing aqueous silver nitrate ($AgNO_3$) with sodium chloride (NaCl), where Ag+ pairs with Cl^- to form solid AgCl, while Na^+ pairs with NO_3– to remain in solution as $NaNO_3$.

16. (*c*)

hat tie watch → zm ph mt

belt bow tie → la oe zm

bow watch clip → oe mt dy

∴ 'Ph' is the code for 'hat'

17. (*a*) $8 = 2^3$, $12 = 2^2 \times 3$, $18 = 2 \times 3^2$

LCM of 8, 12, and 18 $= 2^3 \times 3^2 = 72$

Multiples of 72 in this range of 250 to 450 are 288, 360, 432.

Sum = 288 + 360 + 432 = 1080

18. (*b*) $\Sigma(fixi) = (10 \times 21) + (25 \times X) + (70 \times 22) + (85 \times 35)$

$\Sigma(fixi) = 210 + 25X + 1540 + 2975 = 4725 + 25X$

$\Sigma fi = 21 + X + 22 + 35 = 78 + X$

Now, $40 = \dfrac{4725 + 25X}{78 + X}$

$\Rightarrow 3120 + 40X = 4725 + 25X$

$\Rightarrow 15X = 1605 \Rightarrow X = 107$

19. (*a*) Let the principal amount be P.

Amount after 1 year $= P\left(1 + \dfrac{15}{100}\right)$

$= P \times 1.15$

Amount after 2 years $= P\left(1 + \dfrac{15}{100}\right)^2$

$= P \times 1.15^2 = P \times 1.3225$

Interest for the 2nd year = amount after 2 years – amount after 1 year

Interest for the 2nd year

$= P \times 1.3225 - P \times 1.15$

$= P(1.3225 - 1.15) = P \times 0.1725$

Interest for the 2nd year = ₹ 3726

$\Rightarrow P \times 0.1725 = 3726 \Rightarrow P = ₹21600$

20. (*a*) The number of 176–Ω resistors in parallel required to carry 5 A on a 220–V line is 4.

According to Ohm's Law: $R = \dfrac{V}{I} = \dfrac{220}{5}$ = 44Ω.

$\text{Req} = \dfrac{176}{n} = 44 \Rightarrow n = \dfrac{176}{44} = 4$

21. (*b*) Option (*a*) MO - RT:

M O

13 15

↓+5 ↓+5

R T

18 20

Option (*c*) DF - IK:

D F

4 6

↓+5 ↓+5

I K

9 11

Option (*d*) JL - OQ:

J L

10 12

↓+5 ↓+5

O Q

15 17

But, Option (*b*) VW - XZ:

V W

22 23

↓+2 ↓+3

X Z

24 26

22. (*c*) The final arrangement:

Week Day	Person
Monday	K
Tuesday	L
Wednesday	M
Thursday	N
Friday	D
Saturday	E
Sunday	F

Thus, two people have exams between E and M.

23. (*a*) Right to Property is not part of the Right to Life under Article 21 of the Indian Constitution.

Article 21 of the Indian Constitution guarantees the Right to Life and Personal Liberty.

Right to Property was originally a fundamental right under Article 31, but was removed by the 44th Amendment Act, 1978.

Right to Property is now a legal right under Article 300A, not a fundamental right.

24. (*a*) The special reproductive structures in fungi like Rhizopus, which germinate to form new individuals, are called spores.

Spores are asexual reproductive units and capable of germinating into new individuals when conditions are favorable.

Rhizopus reproduces asexually by forming sporangia.

25. (*d*) When the pH of rainwater falls below 5.6, it is commonly referred to as acid rain.

Normal rainwater has a pH of around 5.6 due to the natural presence of carbon dioxide forming weak carbonic acid.

When the pH drops below 5.6, due to pollutants like sulfur dioxide and nitrogen oxides mixing with rainwater, it becomes more acidic.

26. (*c*) 78 79 83 92 108 133

$+1^2$ $+2^2$ $+3^2$ $+4^2$ $+5^2$

27. (*b*) Option (*a*): $18 : 42 \Rightarrow \dfrac{18}{42} = 0.4286$

Option (*b*): $19 : 60 \Rightarrow \dfrac{19}{60} = 0.3167$

Option (*c*): $15 : 47 \Rightarrow \dfrac{15}{47} = 0.3191$

Option (*d*): $29 : 55 \Rightarrow \dfrac{29}{55} = 0.5273$

The smallest ratio is 19 : 60

28. (*d*) Let the number be *x*.

According to question,

$x \times 1.5 = 2790 \Rightarrow x = 1860$

29. (*a*) Sum of ratios = 3 + 5 + 7 = 15

Let the prices be 3*x*, 5*x*, and 7*x*

Average price $= \dfrac{3x + 5x + 7x}{3}$

$\Rightarrow 16440 = \dfrac{15x}{3}$

$\Rightarrow 16440 = 5x \Rightarrow x = 3288$

Price of the cheapest item = 3*x*

$= 3 \times 3288 = 9864$

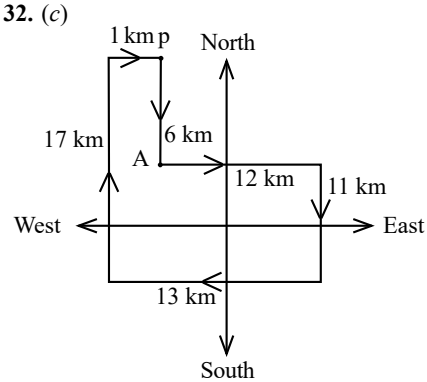
30. (*d*) The magnetic field lines of a bar magnet may not be drawn using wood particles.

Wood is non-magnetic, so its particles neither align with nor respond to the magnetic field surrounding a bar magnet; consequently, they cannot trace the field-line pattern.

Magnetic field lines represent the direction and strength of the magnetic field around a magnet.

31. (*d*) In a balanced chemical equation, every element obeys the law of conservation of mass, meaning its atoms are neither created nor destroyed during the reaction. While the overall mass of reactants and products is identical, the count of individual molecules can differ, and products never possess more atoms than the reactants—they contain exactly the same atoms rearranged into new substances. Thus, only option (*d*) correctly identifies the defining feature of a balanced equation.

32. (*c*)



Thus, Manur should drive (17 km – 11 km) 6 km in the south direction in order to reach point A again.

33. (*c*)

Given numbers	Arrangement in ascending order
5479	1630
3126	3126
6785	5479
9254	6785
1630	9254

Fourth digit of the second-greatest number = 6785 $\Rightarrow$ 5

Third digit of the smallest number =1630 $\Rightarrow$ 3

So, sum of the fourth digit of the second-greatest number and the third digit of the smallest number = (5 + 3) = 8

34. (*c*) Let the present age of the younger person be x years.

Then, the present age of the older person = x + 24 years.

Age of the younger person = (x – 6) years

Age of the older person = (x + 24) – 6

= (x + 18) years

According to question

$x + 18 = 4(x - 6)$ years

$\Rightarrow x + 18 = 4x - 24 \Rightarrow 42 = 3x \Rightarrow x = 14$

Present age of the younger person = 14 years

Present age of the older person = x + 24 = 14 + 24 = 38 years

35. (*a*) A central bank increases the reserve requirement ratio of commercial banks to decrease the money supply in the economy.

The reserve requirement ratio is the fraction of customer deposits that commercial banks are required to hold as reserves, rather than lending out.

When the central bank increases the reserve requirement ratio, commercial banks must hold more money in reserve and can lend out less.

This reduces the money supply in the economy, as less money is available for lending and circulation.

36. (*b*) The statement that a magnet is a dipole with north and south poles is correct regarding magnets.

A magnet always has both a north and a south pole, not just one.

Magnets only produce magnetic fields, not electric fields.

While magnets can attract charged particles like electrons, they do not attract electrons directly in the same way they attract other magnetic materials.

37. (*c*) When aqueous sodium chloride (NaCl) is mixed with aqueous silver nitrate ($AgNO_3$), the Ag^+ and Cl^- ions exchange partners, producing insoluble silver chloride (AgCl) as a white precipitate while sodium nitrate ($NaNO_3$) remains dissolved. This visible AgCl solid is the hallmark of the double-displacement reaction.

38. (*d*) 8.25 × 6 – 3.14 × 7 + 2.758 × 2.5 – 4.365 × 5

= 49.5 + 6.895 – 21.98 – 21.825

= 56.395 – 43.805 = 12.59

39. (*b*) Average of first n natural numbers

$= \frac{n+1}{2}$; If n = 95

$\text{Average} = \frac{95+1}{2} = \frac{96}{2} = 48$

40. (*c*) Refrigerator helps preserve food by maintaining low temperatures.

This slows down the activity of microorganisms and enzymes that cause food to spoil, thereby extending the shelf life of perishable items.

Refrigerator slows bacterial growth, reduces food waste, and prevents spoilage of dairy, meat, vegetables, etc.

41. (*a*) Ratio of areas of the triangles = (ratio of the lengths of the sides)^2

$\Rightarrow$ Ratio of areas = $\left(\frac{17}{13}\right)^2 = \frac{289}{169}$

42. (*b*) Sum of the number of children in all families

= 2 + 1 + 3 + 4 + 2 + 3 + 5 + 1 + 1 + 3 = 25

Average number of children per family

$= \frac{25}{10} = 2.5$

43. (*a*) Multiply A : B by 4 and B : C by 3:

A : B = 1 × 4 : 3 × 4 = 4 : 12

B : C = 4 × 3 : 3 × 3 = 12 : 9

Now A : B : C = 4 : 12 : 9

Multiply A : B : C by 2 and C : D by 3:

A : B : C = 4 × 2 : 12 × 2 : 9 × 2 = 8 : 24 : 18

C : D = 6 × 3 : 7 × 3 = 18 : 21

Therefore, A : B : C : D = 8 : 24 : 18 : 21

44. (*a*) Statements 1 and 3 are correct regarding Quad Leaders' Summit.

The 2024 Quad Leaders' Summit took place in Wilmington, Delaware, on 21 September 2024, where President Biden hosted the other three leaders and they issued the "Wilmington Declaration".

The statement that 2024 marked 22 years since the grouping's creation is off-mark: the Quad traces its origins to the 2004 Indian-Ocean-tsunami "Core Group," so 2024 actually marked 20 years.

A recent Quad Foreign Ministers' communiqué (July 2025) confirms that India will host the next Leaders' Summit later in 2025, validating statement (3).

45. (*a*) Kapil Parmar created history by securing India's first-ever medal in judo at the Paralympic Games 2024.

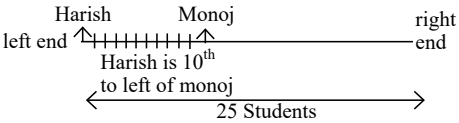
In the bronze medal match, Parmar defeated Brazil's Elielton de Oliveira by Ippon in just 33 seconds.

Born on June 23, 2000, in Sehore, Madhya Pradesh, Kapil Parmar is an Indian para-judo athlete.

He won gold medal at the Commonwealth Judo Championships in Birmingham.

46. (*a*)

(1st from left end) (11st from left end)
or
(25st from right end) (15st from right end)



Thus, Harish is at the 1st position from the left end of the row.

47. (*a*) Since x is inversely proportional to y

Then, $x \propto \frac{1}{y}$ or $x \times y = k$

(where k is *a* constant)

$\Rightarrow 7 \times 6 = k \Rightarrow k = 42$

Now, when y = 64,

$\Rightarrow x \times 64 = 42 \Rightarrow x = \frac{42}{64} = \frac{21}{32}$

48. (*c*) In surgical procedures for contraception in males, sperm transfer gets prevented if vas deferens is blocked.

This prevents sperm from mixing with semen, effectively stopping fertilization during intercourse.

This does not affect testosterone levels, sexual function, or ejaculation.

It is considered a permanent method of contraception, though reversals are sometimes possible.

49. (*a*) $x + y + z = 6$

Also, $z = 6 - x - y$ ...(i)

$2x - y + 3(6 - x - y) = 14$ (Using (i))

$\Rightarrow x + 4y = 4$

For the third equation:

$-x + 2y - (6 - x - y) = -2$

$\Rightarrow 3y = 4 \Rightarrow y =$

Now in $x + 4y = 4$

$x + 4 \times \frac{4}{3} = 4$

$\Rightarrow x + \frac{16}{3} = 4 \Rightarrow x = \frac{-4}{3}$

Now substitute $x = -\frac{4}{3}$ and $y = \frac{4}{3}$ into $z = 6 - x - y$:

$z = 6 - \left(\frac{-4}{3}\right) - \frac{4}{3}$

$= 6 + \frac{4}{3} - \frac{4}{3} = 6$

The solution is $x = -\frac{4}{3}, y = \frac{4}{3}, z = 6$.

50. (*d*) Students and professors of IIT Dharwad have developed an innovative fire rescue drone in June 2024.

The project was led by Prof. Sudheer Siddapureddy and Prof. Ameer Mulla, with funding support from the TiHAN Foundation at IIT Hyderabad.

The project is led under the National Mission on Interdisciplinary Cyber-

Physical Systems (NMICPS) initiative of the Government of India.

The drone was unveiled during a two-day workshop titled "Drone Design and Autonomous Navigation in Fire Rescue (DDANFR 2024)", held on May 31 and June 1, 2024.

51. (*a*) 12 members of the Rajya Sabha are nominated by the President of India.

These individuals are nominated for their special knowledge or practical experience in fields such as literature, science, art, and social service.

These nominated members are not elected but are selected based on their contributions to society, helping bring in a diverse range of perspectives to the legislative process.

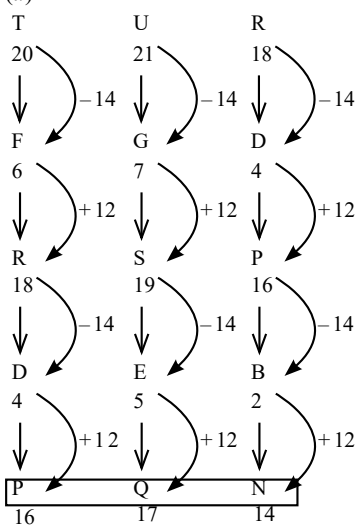
52. (*a*) For a concave mirror, the centre of curvature is located in front of the mirrorr.

This is because the concave mirror is a part of a spherical surface, and the center of curvature lies at the center of the sphere from which the mirror is a segment.

The focal point of a concave mirror is half the distance between the mirror's surface and the center of curvature.

The focus and center of curvature are both located in front of the mirror, on the same side as the object.

53. (*d*)



54. (*d*) Population in $1937 = 232300 \times \left(1+\frac{30}{100}\right)$

$= 232300 \times 1.3 = 301990$

Population in $1947 = 301990 \times \left(1+\frac{30}{100}\right)$

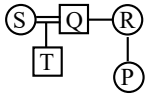
$= 301990 \times 1.3 = 392587$

55. (*a*) The final arrangement:

H > B > C > F > E

Thus, two people are taller than C.

56. (*d*) The final arrangement:



Thus, P is T's father's sister's daughter or cousin

57. (*a*) Time taken to go from A to B $= \frac{1253}{93}$

Time taken to return from B to A $= \frac{1253}{95}$

Total distance = 1253 + 1253 = 2506 km

Total time $= \frac{1253}{93}+\frac{1253}{95} = 13.47 + 13.19$

= 26.66 hours

Average speed $= \frac{2506}{26.66} = 93.99$ km/h

58. (*b*) The molecular formula of washing soda is $Na_2CO_3\ 10H_2O$.

Na_2CO_3 is sodium carbonate, and the $10H_2O$ indicates that it contains 10 molecules of water of crystallization.

Washing soda is commonly used in cleaning, laundry, and other industrial processes.

It is also used in water softening, as it can precipitate calcium and magnesium ions, making water less "hard."

59. (*b*) In most complex multicellular organisms, individual cells are grouped into tissues, and tissues into organs, each with distinct functions.

Fragmenting such an organism would break these integrated systems, so the separated pieces could not survive or regenerate a whole new organism.

Fragmentation works for simpler organisms (e.g., sponges, some algae) where cells are totipotent or only loosely organised, but not for higher plants and animals with rigid tissue–organ structure.

60. (*b*) If the object is placed beyond the center of curvature in front of a concave mirror, the image formed will be real, inverted and diminished.

The image will be formed between the focus (F) and the center of curvature (C), and it will be reduced in size compared to the object.

The center of curvature (C) of a concave mirror is the center of the spherical surface from which the mirror is a part.

61. (*c*) Curved surface area of a cone (CSA) $= \pi rl$

$1914 = \pi \times 21 \times l$

$\Rightarrow l = \frac{1914}{\left(\frac{22}{7}\times 21\right)} = \frac{1914}{66} = 29\,\text{m}$

Using the Pythagoras theorem.

$l^2 = r^2 + h^2$

$29^2 = 21^2 + h^2$

$841 = 441 + h^2$

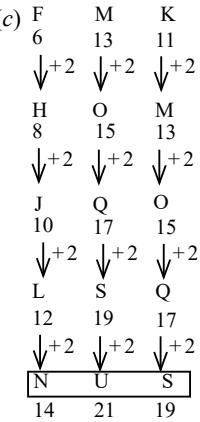
$\Rightarrow h^2 = 400 \Rightarrow h = 20$ m

Volume of a cone (V) $= \frac{1}{3}\pi r^2 h$

$= \frac{1}{3} \times \frac{22}{7} \times 21^2 \times 20$

$= 22 \times 21 \times 20 = 9240\ \text{m}^3$

62. (*c*)

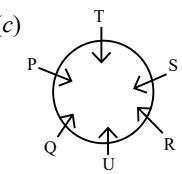


63. (*d*) Nokrek Biosphere Reserve lay in the Garo Hills of Meghalaya.

Panna Biosphere Reserve lay in the Vindhyan ranges of Madhya Pradesh.

Manas Biosphere Reserve straddled the foothills of the Eastern Himalaya in Assam.

64. (*c*)



Thus, S sits third to the left of Q.

65. (*d*) As,

K L 91
11 12
−8 −8 −25
C D 66
3 4

And,

M N 81
13 14
−8 −8 −25
E F 56
5 6

Similarly, OP71 is related to

O P 71
15 16
−8 −8 −25
G H 46
7 8

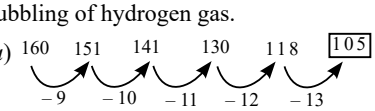
66. (*d*) The bubbling of hydrogen gas will be the fastest for magnesium.

In the reactivity series, the higher a metal is, the more readily it reacts with acids to displace hydrogen gas.

Magnesium is the most reactive metal, followed by aluminium, zinc, and iron.

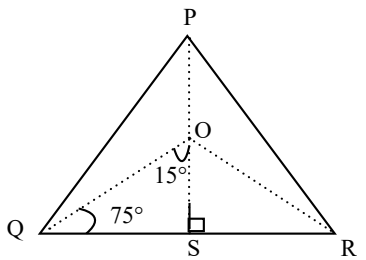
The faster the reaction, the greater the bubbling of hydrogen gas.

67. (*a*)



68. (*b*) Let the cost price (CP) be x.
List price (LP) = $x + 0.25x = 1.25x$
Selling price (SP) = LP – 0.10LP
= $1.25x - 0.10 \times 1.25x = 1.125x$
Profit = SP – CP
= $1.125x - x = 0.125x$
According to question,
$0.125x = 117 \Rightarrow x = 936$
List Price (LP) = $1.25\ x$
= $1.25 \times 936 = 1170$

69. (*d*) In triangle OQS
Therefore, ∠OQS = 180° – (90° + 15°)
= 180° – 105° = 75°



Since O is the incenter, OQ bisects ∠ PQR.
Therefore, ∠ PQR = 2 × ∠ OQS = 2 × 75°
= 150°

70. (*a*) Article 239AA lays down that the National Capital Territory of Delhi shall have a Legislative Assembly whose seats are filled by members chosen through direct elections from territorial constituencies.
Article 239 AA also outlines the composition of the Assembly, the election of members through direct elections from territorial constituencies in Delhi, and the powers and functions of the Assembly.
Article 239AA provides Delhi with a form of limited autonomy, allowing it to have its own Legislative Assembly while keeping the control of certain key matters under the Union Government.

71. (*d*) Ovary develops into fruit after fertilisation.
The fertilized ovule inside the ovary becomes the seed, while the ovary itself grows and matures into the fruit.
When pollen from the anther lands on the stigma, it travels through the style to reach the ovary, where the ovule is fertilized by the sperm cell.
After fertilization, the fertilized ovule develops into a seed, and the ovary itself starts to grow and mature into the fruit.

72. (*d*) Condition: Number – Symbol – Number
(Left) 3 8 9 **5 £ 6** **3 @ 3** % @ **7 * 1 # 2** 6 9 2 7 & £ (Right)
Thus, there are four such symbols which are immediately followed by and also immediately preceded by a number.

73. (*b*) AIDS can be prevented by using a mechanical barrier contraceptive method.
Mechanical barrier contraceptive methods, such as condoms, can help prevent the transmission of sexually transmitted infections, including AIDS.
Condoms act as a physical barrier that reduces the risk of transmitting or acquiring HIV and other STIs during sexual activity.
Malaria, TB, and Typhoid are not sexually transmitted diseases, so mechanical barrier methods like condoms do not prevent these infections.

74. (*c*) 12 - 60 - 120 - 130
$12 \times 5 = 60$
$60 \times 2 = 120$
$120 + 10 = 130$
And, 14 - 70 - 140 - 150
$14 \times 5 = 70$
$70 \times 2 = 140$
$140 + 10 = 150$
From option (*c*) 16 - 80 - 160 - 170
$16 \times 5 = 80$
$80 \times 2 = 160$
$160 + 10 = 170$

75. (*c*) The pH of a solution containing significant concentrations of H^+ ions is less than 7.
The pH of a solution is a measure of its acidity or alkalinity. The pH scale ranges from 0 to 14.
pH less than 7 indicates an acidic solution, while pH greater than 7 indicates a basic or alkaline solution.
Since the question refers to a solution with significant concentrations of H^+ ions, it suggests an acidic solution, which would have a pH less than 7.

76. (*b*) Time taken for first part = $\frac{270}{54}$ = 5 hrs

Time taken for second part = $\frac{300}{30}$ = 10 hrs

Total distance = 270 + 300 = 570 km
Total time = 5 + 10 = 15 hours

Average speed = $\frac{570}{15}$ = 38 km/h

77. (*b*) Architectural beauty of temples is one of the main attractions of 'Mamallapuram' apart from the dance festival.
Mamallapuram is renowned for its UNESCO-listed rock-cut shrines and shore temples, which draw visitors year-round in addition to the annual dance festival.
These monuments were constructed during the Pallava dynasty, and their architectural style is a significant part of India's cultural heritage.

78. (*a*) Prime factorization of 84: $2^2 \times 3 \times 7$.
Prime factorization of 126: $2 \times 3^2 \times 7$
Prime factorization of 210: $2 \times 3 \times 5 \times 7$
Common prime factors: 2, 3, 7
HCF = $2 \times 3 \times 7 = 42$

79. (*a*) C_2H_4, C_2H_6, C_3H_6, C_4H_8 is not a homologous series, because the set mixes an alkane (C_2H_6) with alkenes (C_2H_4, C_3H_6, C_4H_8); members of a true homologous series must all share the same functional group and differ successively by a $–CH_2–$ unit.
A homologous series is a group of organic compounds that have a similar structure and chemical properties, and each successive compound in the series differs by a CH_2 unit.

80. (*a*) The status of Navratna was conferred upon Shipping Corporation of India (SCI) by the Government of India in August 2008.
This status allows the company greater autonomy in decision-making, especially in terms of financial and operational management.
The Shipping Corporation of India is a government-owned corporation under the Ministry of Ports, Shipping, and Waterways in India.
It was established in 1961.

81. (*b*) The statement that refractive index of water is always greater than 1 is true.
This indicates that light travels slower in water compared to vacuum.
The refractive index of a medium is a measure of how much light slows down as it passes through that medium compared to its speed in a vacuum.
The refractive index of air is very close to 1 because light travels at almost the same speed in air as it does in a vacuum.

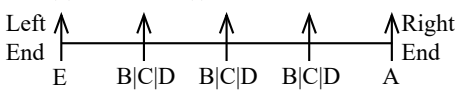
82. (*d*) $(\sin A + \text{cosec}\, A)^2 + (\cos A - \sec A)^2 + 3$
$= (\sin^2 A + \text{cosec}^2 A + 2\sin A\ \text{cosec}\ A) + (\cos^2 A + \sec^2 A - 2\cos A \sec A) + 3$
$= \sin^2 A + \text{cosec}^2 A + 2\sin A \left(\frac{1}{\sin A}\right) + \cos^2 A + \sec^2 A - 2\cos A \left(\frac{1}{\cos A}\right) + 3$
$= (\sin^2 A + \cos^2 A) + \text{cosec}^2 A + \sec^2 A + 3$
$= 1 + \text{cosec}^2 A + \sec^2 A + 3$
$= 4 + (1 + \cot^2 A) + (1 + \tan^2 A)$
$= 6 + \cot^2 A + \tan^2 A$

83. (*b*)

red	blue	green	→	dy	ph	mt
blue	violed	black	→	lp	ph	st
black	red	white	→	st	bq	dy

Thus, according to the given codes the code 'bq' is for the word 'white'

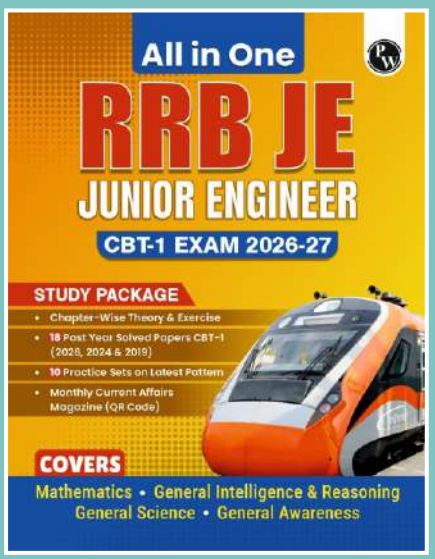
84. (*a*) Statement (I)



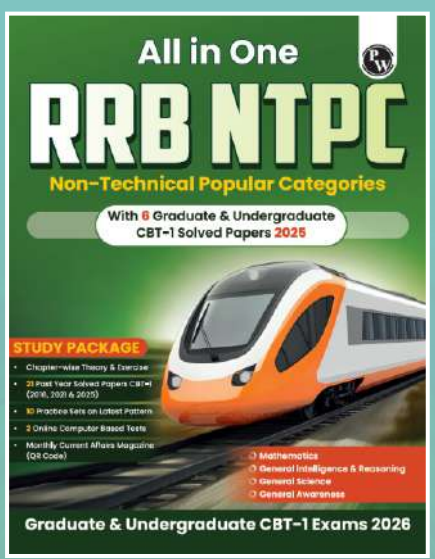
Therefore data in statement I alone is sufficient to answer the question.
Statement (II)

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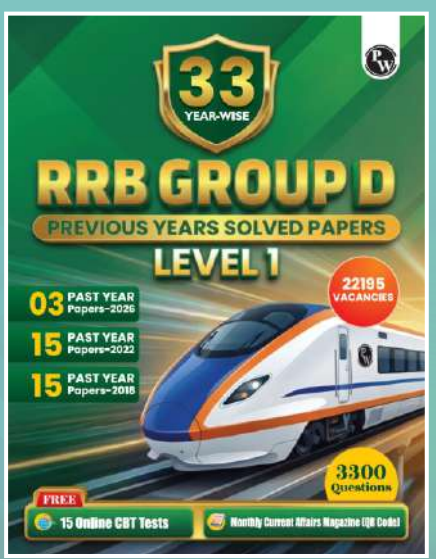












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