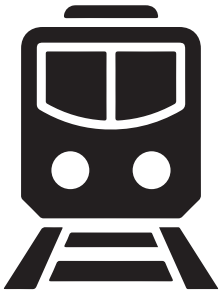
RRB ALP

ASSISTANT LOCO PILOT

CBT 1



2018 AND 2024

35 PREVIOUS YEAR SOLVED PAPERS

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P R E F A C E

Dear Aspirants,

We are thrilled to bring you this all-encompassing guide, meticulously designed to be your perfect partner in preparing for the **RRB ALP CBT-1 Exam**. Packed with **35 previous year solved papers** and **5 mock tests** tailored to the latest exam pattern, this book is your complete roadmap to success.

Key Features of the Book:

1. •**35 Previous Years RRB ALP CBT-1 Solved Papers**, spanning exams from **2018 and 2024**, offering comprehensive explanations to ensure you grasp every concept.
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This book is designed to equip you with the practical knowledge and confidence needed to ace the exam. With regular practice and this book in your hands, you will be well on your way to securing a successful career in the railway sector.

We are confident that with this resource, your preparation will be thorough, efficient, and highly effective.

Best of luck in your journey towards success!

Exam Details

Exam Name	Railway Recruitment Board Assistant Loco Pilot (RRB ALP)
Exam Level	National
Conducting body	Railway Recruitment Board (RRB)
Exam mode	Online (Computer Based Test – CBT)
Duration	60 minutes
Number of questions	75
Type of questions	MCQ
Marking scheme	+1 for each correct answer $-\frac{1}{3}$ for each wrong answer
Languages	English, Hindi & other regional languages

Recruitment Process

The Railway Recruitment Board (RRBs) released the RRB ALP notification on 29-03-2025 to recruit 9,970 vacancies for the post of Assistant Loco Pilot (ALP).

Post	Pay Level in 7th CPC	Initial pay (Rs.)	Medical Standard	Age as on 01-07-2025	Total Vacancies (All RRBs)
Assistant Loco Pilot (ALP)	Level-2	19900	A-1	18 – 30 years	9970

The recruitment process shall comprise of the following stages:

1. First Stage CBT (CBT-1)
2. Second Stage CBT (CBT-2)
3. Computer Based Aptitude Test (CBAT)
4. Document Verification (DV) and
5. Medical Examination (ME)

Syllabus for CBT - 1

(A) Mathematics: Number system, BODMAS, Decimals, Fractions, LCM, HCF, Ratio and Proportion, Percentages, Mensuration, Time and Work, Time and Distance, Simple and Compound Interest, Profit and Loss, Algebra, Geometry and Trigonometry, Elementary Statistics, Square Root, Age Calculations, Calendar & Clock, Pipes & Cistern etc.

(B) Mental Ability: Analogies, Alphabetical and Number Series, Coding and Decoding, Mathematical operations, Relationships, Syllogism, Jumbling, Venn Diagram, Data Interpretation and Sufficiency, Conclusions and Decision Making, Similarities and Differences, Analytical reasoning, Classification, Directions, Statement – Arguments and Assumptions etc.

(C) General Science: The syllabus under this shall cover Physics, Chemistry and Life Sciences of 10th standard level.

(D) General Awareness: Current affairs, science & technology, sports, culture, personalities, economics, politics and other subject of importance.

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2018

Exam Paper – 9 August 2018 (Shift-I)

Railway Recruitment Board

(Assistant Loco Pilot)

QUESTIONS WITH EXPLANATIONS

1. A convex mirror of focal length f (in air) is immersed in a liquid ($\mu = 4/3$). The focal length of the mirror in liquid will be:

(1) $(4/3)$f (2) $(3/4)$f
(3) $(7/3)f$ (4) f

2. Select the most appropriate term for the given set of items.



(1) Fine arts (2) Pictures
(3) Culture (4) Technology

3. Who is the MD and CEO of Allahabad Bank as of March 2018?

(1) Arundhathi Bhattacharya
(2) Chitra Ramakrishna
(3) Shikha Sharma
(4) Usha Ananthasubramanian

4. If $9 \times 6 = 45, 7 \times 4 = 33$ and $6 \times 4 = 20$, then what is the value of 5×3 ?

(1) 13 (2) 16
(3) 24 (4) 10

5. Tapas, Avi and Rishi shared a cake. Tapas had $\frac{1}{2}$ of it, Rishi had $\frac{1}{3}$ of it and Avi had the rest. What was Avi's share of the cake?

(1) $\frac{3}{5}$ (2) $\frac{2}{6}$
(3) $\frac{3}{6}$ (4) $\frac{1}{6}$

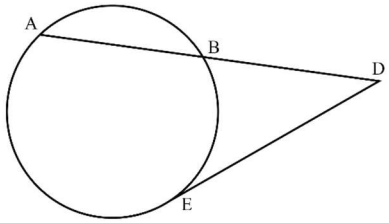
6. Negative acceleration is in the opposite direction of:

(1) Velocity (2) force
(3) distance (4) Momentum

7. Which of the following numbers will have an irrational square root?

(1) 2048 (2) 2401
(3) 1024 (4) 4096

8.



In the circle above, chord $\overline{AB}$ is extended to meet the tangent $\overline{DE}$ at D. If $\overline{AB} = 12$ cm and $\overline{DE} = 8$ cm, find the length of $\overline{BD}$.

(1) $4\sqrt{6}$ cm (2) 6 cm
(3) 4 cm (4) 5 cm

9. By which of the following processes are metals of high reactivity extracted from purified molten ore?

(1) Calcination
(2) Electrolysis
(3) Roasting
(4) Reduction by an appropriate reducing agent

10. A ladder 13 m long reaches a window which is 12 m above the ground on side of a street. Keeping its foot at the same point, the ladder is turned to the other side of the street to reach a window 5 m high, then the width of the street is:

(1) 17 m (2) 16 m
(3) 14 m (4) 15 m

11. Which of the following is a Saprotroph?

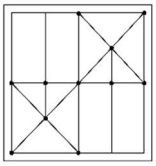
(1) Pigeon (2) Mushroom
(3) Algae (4) Man

12. An increase in price of which of these products will have a ripple effect in increasing the prices of many products, thereby resulting in inflation?

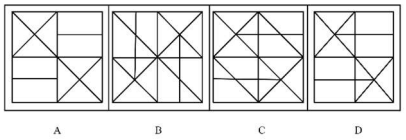
(1) Automobiles (2) Petroleum
(3) Smartphones (4) Medicines

13. From the options given, select the rotated version of the following image.

Image



Options



(1) C (2) B
(3) D (4) A

14. Consider the given statement true and decide which of the conclusions logically follow(s) from the information given in the statement.

Statement: The population in metro cities is increasing tremendously which leads to the shortage of living space and a drop in living conditions of the people.

Conclusions:

1. Government should re-plan city development.
2. Government should demolish illegal buildings and build cottages for people.

(1) Neither conclusion 1 nor 2 follows.
(2) Only conclusion 2 follows.
(3) Both conclusions 1 and 2 follow.
(4) Only conclusion 1 follows.

15. Which of the following is the last element in Newlands Law of Octaves classification?
(1) Radium (2) Thorium
(3) Iron (4) Rhodium

16. If the difference between the mode and median is 2, then the difference between the median and mean is: (in the given order)
(1) 2 (2) 1
(3) 3 (4) 4

17. When a number of resistors are connected in series in a circuit, the value of current:
(1) becomes half
(2) remains the same
(3) increases
(4) Decreases

18. In the morning X and Y are walking towards each other in a park. When they meet each other, Y 's shadow falls straight in front of X. In which direction was X facing?
(1) West (2) North
(3) East (4) South

19. Name the metal that can be easily cut with a knife:
(1) Copper (2) Sodium
(3) Gold (4) Aluminium

20. Which gas is released when water is added to bleaching powder?
(1) Carbon dioxide (2) Oxygen
(3) Chlorine (4) Hydrogen

21. Which of the following is not a Triangular number?
(1) 15 (2) 3
(3) 10 (4) 5

22. Consider the given statements true and decide which of the given conclusions can definitely be drawn from the given statements.
Statements:
1. Some fruits are vegetables.
2. Some vegetables are not edible.
Conclusions:
1. Some fruits are not edible.
2. Some vegetables are fruits.
(1) Conclusion 2 is correct.
(2) Conclusion 1 is correct.
(3) Both conclusions 1 and 2 are correct.
(4) Neither conclusion 1 nor 2 is correct.

23. Consider the given question and decide which of the following statements is/are sufficient to answer the question.
Is $X - 5$ even? X is a real number.
Statements:
1. $X - 15$ belongs to integer
2. $X - 10$ is an odd integer
(1) Both statements 1 and 2 are sufficient
(2) Statement 2 alone is sufficient while statement 1 alone is insufficient
(3) Neither statement 1 nor 2 is sufficient
(4) Statement 1 alone is sufficient while statement 2 alone is insufficient

24. A 4.0 kg object is moving horizontally with a speed of $5.0\ m/s$. To increase its speed to $10\ m/s$, the amount of net work required to be done on this object is:
(1) 150 J (2) 50 J
(3) 75 J (4) 100 J

25. Who is the author of the speculative fiction book 'Half of What I Say'?
(1) Namita Gokhale
(2) Shashi Tharoor
(3) Anil Menon
(4) K.R. Meera

26. Consider the given question and decide which of the following statements is sufficient to answer the question.
How was the sale of the company ABC?
Statements:
1. The company ABC sold 75000 units of soaps each at ₹ 70/-.
2. ABC has no other products in the production line.
(1) 1 alone is sufficient while 2 alone is not sufficient to answer the question.
(2) Both 1 and 2 are sufficient to answer the question.
(3) Neither 1 nor 2 is sufficient to answer the question.
(4) 2 alone is sufficient while 1 alone is not sufficient to answer the question.

27. Who is the Chairman of the Economic Advisory Council to the Prime Minister (PMEAC) as of February 2018?
(1) Amit Mitra
(2) Amartya Sen
(3) Bibek Debroy
(4) Najma Heptulla

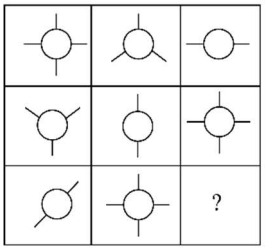
28. A train takes 10 seconds to cross a bridge of length 100 m travelling at 90 kmph. Find the length of the train in metres.
(1) 140 (2) 150
(3) 130 (4) 120

29. The SI unit of resistance is:
(1) Joule (2) Coulomb
(3) Ohm (4) Newton

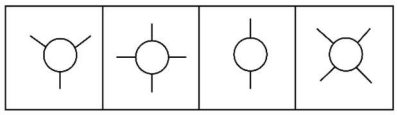
30. Consider the given statement and decide which of the given assumptions is/are implicit in the statement.
Statement: Honesty is the best policy.
Assumptions:
(I) Honest people are policy makers.
(II) Each policy must contain honesty.
(1) Neither assumption (I) nor (II) is implicit.
(2) Only assumption (I) is implicit.
(3) Only assumption (II) is implicit.
(4) Both assumptions (I) and (II) are implicit.

31. Who is the newly appointed Governor of Tamil Nadu as of February 2018?
(1) Satyapal Malik
(2) Subramanian Swamy
(3) Banwarilal Purohit
(4) K Rosaiah

32. Select the Answer Figure that fits in the blank space in the given Problem Figure.
Problem Figure



Answer Figures

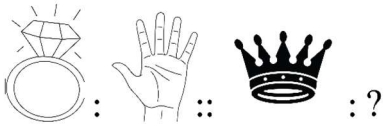


A B C D

(1) B (2) D
(3) A (4) C

33. The reflector of a search light is a:
(1) plane mirror
(2) concave mirror
(3) cylindrical mirror
(4) convex mirror

34. Select the option that is related to the third figure in the same way as the second figure is related to the first figure.



(1)  (2) 

(3)  (4) 

35. Fill in the blank with the most appropriate option.
Plants that do not have a differentiated plant body belong to the group ___ .
(1) Pteridophyta
(2) Phanerogams
(3) Thallophyt
(4) Bryophyta

36. The interest earned on ₹ 1,600 at the rate of 5% simple interest per annum for 6 years would be:
(1) ₹ 496 (2) ₹ 2,080
(3) ₹ 480 (4) ₹ 450

37. Select the related word pair from the following options.
Goose : Geese :: ___
(1) Socks: Sock (2) Shirts: Shirt
(3) Jacket : Jacket (4) Pant: Pants

38. Which of the following is true?
(1) $\frac{29}{6} > \frac{43}{12}$ (2) $\frac{29}{6} = \frac{43}{12}$
(3) $\frac{29}{6} < \frac{43}{12}$ (4) $\frac{29}{6} = \frac{53}{12}$

39. In the following series, one term is missing as shown by the question mark (?). Select the missing term from given options.
ST, TU, UV, VW, ?
(1) WY (2) WX
(3) WZ (4) WV

40. Nodes of Ranvier are microscopic gaps found within:
(1) myelinated axons
(2) gland cells
(3) osteoblasts
(4) Chondroblasts

41. Consider the given statement and decide which of the given assumptions is/are implicit in the statement.
Statement:
Teachers must attend workshop.
Assumptions:
(I) Workshop updates teachers.
(II) Workshops kill time.
(1) Only assumption (I) is implicit.
(2) Both assumptions (I) and (II) are implicit
(3) Only assumption (II) is implicit.
(4) Neither assumption (I) nor (II) is implicit.

42. Select the option that depicts the correct mirror image of the given word when the mirror is placed horizontally below the word.
H E A L T H Y
(1) Y H T L A ∃ H
(2) Y H T L A E H
(3) H E ∀ Γ ⊥ H ʎ
(4) Y H T ⅃ A ∃ H

43. Pir Panjal Railway Tunnel is located in ___ .
(1) Jammu and Kashmir
(2) Himachal Pradesh
(3) Uttarakhand
(4) Sikkim

44. Consider the given question and decide which of the following statements is sufficient to answer the question
Is Raju fond of travelling ?
Statements:
1. Raju has seen East, West, North and Southern parts of India.
2. Raju likes to be in the company of his friends

(1) Both statements taken together are sufficient to answer the question, but neither statement alone is sufficient.
(2) Statement 2 alone is sufficient but statement 1 alone is not sufficient to answer the question.
(3) Statements 1 and 2 together are not sufficient, and additional data is needed, to answer the question.
(4) Statement 1 alone is sufficient but statement 2 alone is not sufficient to answer the question.

45. The number of neutrons in an atom is equal to the:
(1) Mass number - atomic number
(2) Atomic number
(3) Number of electrons
(4) Mass number

46. Seven years from now Virat will be twice as old as Mohinder. Five years ago Mohinder's age was one year less than $\frac{2}{5}$ of Virat's age. What is Virat's present age?
(1) 53 years (2) 57 years
(3) 51 years (4) 55 years

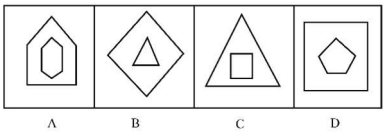
47. A swimming pool is filled in 10 hours by three tankers A, B and C. The tanker C is Twice as fast as B and B is twice as fast as A. How much time will tanker A alone take to fill the swimming pool?
(1) 90 hours (2) 80 hours
(3) 40 hours (4) 70 hours

48. The number of symbols that are preceded by a number in the given expression is ___ .
R+JM2$#QR?*O@7F3
(1) 3 (2) 1
(3) 2 (4) 4

49. Consider the given argument and decide which of the given assumptions is/are implicit in the argument.
Argument: The campaign of 'Swachh Bharat', keep your cities clean, started by the apartment association didn't bring much response from its residents.
Assumptions:
1. Residents do not wish to keep their apartment clean.
2. The association had failed in the campaign.

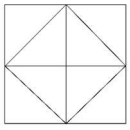
(1) Only assumption 2 is implicit.
(2) Neither 1 nor 2 is implicit.
(3) Only assumption 1 is implicit.
(4) Both 1 and 2 are implicit.

50. Select the figure that does NOT belong in the following group.



(1) A (2) C
(3) D (4) B

51. How many triangles are present in the following figure?



(1) 11 (2) 13
(3) 10 (4) 12

52. Which of the numbers given below is the square root of 15376?
(1) 128 (2) 134
(3) 122 (4) 124

53. Umar and Avinash started a partnership with investments of ₹ 10,000 and ₹ 15,000, respectively but due to a financial emergency the latter had to withdraw his investment after 8 months. In what ratio should the profit of the first twelve months be shared among the duo?
(1) 3: 2 (2) 1: 1
(3) 2: 3 (4) 1: 2

54. The volume of a right circular cone, whose radius of the base is same as one-third of its altitude, and the volume of a sphere are equal. The ratio of the radius of the cone to the radius of the sphere is:
(1) $\sqrt[3]{3}: \sqrt[3]{2}$ (2) 1: 1
(3) $\sqrt[3]{4}: 1$ (4) $\sqrt[3]{4}: \sqrt[3]{3}$

55. Type 1 workers can do three times the work of Type 2 workers. Twelve Type 1 workers can complete a task in 10 days. How many days would it have taken 4 Type 1 and 8 Type 2 workers to complete the same task?
(1) 20 (2) 18
(3) 16 (4) 17

56. Asexual reproduction differs from sexual reproduction in that in asexual reproduction, ___ -
(1) the nuclei of gametes fuse
(2) the gametes are produced in reproduction
(3) the offspring shows variations
(4) the new organisms are genetically identical to the parent

57. How many atoms are present in a $(NH_4)_2SO_4$ molecule?
(1) 15 (2) 14
(3) 12 (4) 13

58. The ratio of the numbers of blue to red balls in a bag is constant. When there were 44 red balls, the number of blue balls was 36. If the number of blue balls is 54, how many red balls will be in the bag?
(1) 64 (2) 66
(3) 62 (4) 68

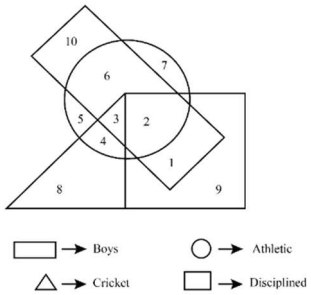
59. By which legislation were India and Pakistan divided into two independent nations?
(1) Indian Independence Act 1947
(2) Pakistan Independence Act 1947
(3) Indian Partition Act 1947
(4) Pakistan Partition Act 1947

60. Looking at the portrait of a girl, Sheesha, a girl, said, "Her mother is my grandfather's only daughter who has only one daughter and no sons". How is Sheesha related to the girl in the portrait?
(1) Niece
(2) Sister
(3) (Aunt)/Aunt
(4) Sheesha is the girl in the portrait

61. Who is the current (as of February 2018) President of the Indian Olympic Association?
(1) Sharad Pawar
(2) Narinder Dhruv Batra
(3) Abhinav Bindra
(4) Prannoy Roy

62. Momentum is measured as the product of :
(1) Mass and acceleration
(2) Mass and inertia
(3) Mass and velocity
(4) Mass and force

63.



According to the given Venn diagram, which number represents 'Boys who participate in athletics and also play cricket'?
(1) 2 (2) 3
(3) 1 (4) 11

64. In Mendeleev's periodic table, the properties of the elements are considered a periodic function of their:
(1) Atomic number
(2) Atomic mass
(3) Ionization enthalpy
(4) Atomic size

65. Consider the given question and decide which of the following statements is/are sufficient to answer the question.

Between X and Y who is the better dancer?
Statements:
1. X had given more dance auditions.
2. Y had given more stage performances.

(1) Neither statement 1 nor 2 is sufficient
(2) Statement 2 alone is sufficient while statement 1 alone is insufficient
(3) Statement 1 alone is sufficient while statement 2 alone is insufficient
(4) Both statement 1 and 2 are sufficient

66. Which of the following acids is present in Red Ants?
(1) Malic acid (2) Oxalic acid
(3) Formic acid (4) Tannic acid

67. Select the most appropriate term for the following set of items.



(1) Celebration (2) Meeting
(3) Marriage (4) Books

68. Find a two digit number which is exactly three times the product of its digits?
(1) 36 (2) 12
(3) 48 (4) 24

69. Who is the author of the book 'The Association of Small Bombs", which is currently shortlisted for the International Dublin Literary Award?
(1) Namitha Ghokhale
(2) Arundhathi Roy
(3) Chetan Bhagat
(4) Karan Mahajan

70. As of February 2018, who owns the Kolkata-based IPL team 'Kolkata Knight Riders"?
(1) Sourav Ganguly (2) Aamir Khan
(3) Shah Rukh Khan (4) Subrata Roy

71. Three years from now Dharitri's age will be eight years less than twice Eunice's age. The sum of their present ages is 61 years. What is Dharitri's present age?
(1) 39 years (2) 41 years
(3) 43 years (4) 36 years

72. ABC$+#DEF&=?GHI!2*@
Find the missing term using the above sequence:
ABC : @*2 :: $#E : _____.
(1) !H? (2) ?H!
(3) !HG (4) HH!

73. 1 kWh = ?
(1) $3.6 \times 10^6\ J$ (2) $3.6 \times 10^5\ J$
(3) $3.6 \times 10^{-5}\ J$ (4) $3.6 \times 10^{-6} J$

74. In a class, there were 9 boys and some girls. In a test the mean score obtained by the boys was 12 while that obtained by the girls was 14. If the overall average was 13.1, what was the total number of students in the class?
(1) 22 (2) 19
(3) 20 (4) 21

75. At 9.5% simple interest per annum a sum of money became ₹942 in 6 years. The sun initially invested was:
(1) ₹ 626 (2) ₹ 600
(3) ₹ 675 (4) ₹ 650

Answer Key

1	2	3	4	5	6	7	8	9	10
(4)	(4)	(4)	(2)	(4)	(1)	(1)	(3)	(2)	(1)
11	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
(2)	(2)	(3)	(4)	(2)	(2)	(2)	(3)	(2)	(3)
21	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
(4)	(1)	(2)	(1)	(3)	(2)	(3)	(2)	(3)	(1)
31	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**
(3)	(3)	(2)	(2)	(3)	(3)	(4)	(1)	(2)	(1)
41	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**	**50**
(1)	(3)	(1)	(4)	(1)	(4)	(4)	(2)	(1)	(4)
51	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
(4)	(4)	(2)	(4)	(2)	(4)	(1)	(2)	(1)	(4)
61	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**
(2)	(3)	(2)	(2)	(2)	(3)	(1)	(4)	(4)	(3)
71	**72**	**73**	**74**	**75**					
(1)	(1)	(1)	(3)	(2)					

EXPLANATIONS

1. Explanation: (4) For **mirrors**, the focal length **does NOT change** when placed in any medium.
Only **lenses** are affected by refractive index.
Mirrors depend only on their radius of curvature, not on the surrounding medium.
So, $f_{\text{in liquid}} = f$

2. Explanation: (4) The items shown are: **computer**, **CD/DVD**, **camera**.
All these objects are **electronic devices**.
They belong to the category of **modern gadgets / tech equipment**.
So the best common term is **Technology**.

3. Explanation: (4) The correct answer is: **Usha Ananthasubramanian**
She was the **MD and CEO of Allahabad Bank** as of **March 2018**.

4. Explanation: (2)
Use the rule $a \times b = a^2 - b^2$.
Check the given:
$9 \times 6 = 9^2 - 6^2 = 81 - 36 = 45$
$7 \times 4 = 7^2 - 4^2 = 49 - 16 = 33$
$6 \times 4 = 6^2 - 4^2 = 36 - 16 = 20$
Now for 5×3:
$5^2 - 3^2 = 25 - 9 = 16.$

5. Explanation: (4)
Tapas had **1/2**, Rishi had **1/3**.
Avi's share = $1 - \left(\frac{1}{2} + \frac{1}{3}\right) = 1 - \frac{5}{6} = \frac{1}{6}$
Correct answer: 4. 1/6

6. Explanation: (1)
Negative acceleration (also called **retardation**) always acts **opposite to the direction of velocity**. It slows down the moving object.
So the correct answer is: **Velocity**

7. Explanation: (1) A number will have an **irrational square root** if it is **not a perfect square**.
2048 → not a perfect square → √2048 is **irrational**
2401 = 49² → perfect square → rational
1024 = 32² → perfect square → rational
4096 = 64² → perfect square → rational
Correct answer: 1. 2048.

8. Explanation: (3) Use the **power of a point (secant–tangent)** theorem:
1. For external point (D), $DB \times DA =$ (tangent length)^2. Here tangent $DE = 8$, so $DB \cdot DA = 8^2 = 64$.
2. Since (A) and (B) lie on the same line with (D) beyond (B), $DA = DB + AB = DB + 12$.
3. So $DB(DB + 12) = 64 \rightarrow DB^2 + 12DB - 64 = 0$.

4. Solve: discriminant $= 144 + 256 = 400$, so $DB = \frac{-12+20}{2} = 4$ (positive root).
Therefore $BD = 4$ cm

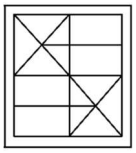
9. **Explanation: (2)** Metals with **high reactivity** (like Na, K, Ca, Mg, Al) cannot be reduced using common reducing agents.
They are extracted **from their molten purified ores by electrolysis**.

10. **Explanation: (1)**
1st position
Ladder = 13 m
Height = 12 m
Horizontal distance from foot = $\sqrt{13^2 - 12^2} = \sqrt{169 - 144} = \sqrt{25} = 5$ m
2nd position
Ladder = 13 m
Height = 5 m
Horizontal distance from foot $=\sqrt{13^2 - 5^2} = \sqrt{169 - 25} = \sqrt{144} = 12$ m
Width of the street
$5 + 12 = 17$ m

11. **Explanation: (2)** A **saprotroph** is an organism that gets its food by decomposing dead and decaying matter.
Among the options, **Mushroom** is a fungus and is a **saprotroph**.

12. **Explanation: (2)** The price of **petroleum** affects **transport, manufacturing, electricity generation, agriculture and logistics**.
So when petroleum becomes costlier, the cost of almost all goods and services rises.

13. **Explanation: (3)**
Rotating given image anticlockwise by 90 degrees, gives



D .

14. **Explanation: (4)**
Given statement
Population in metro cities is rising → shortage of space + drop in living conditions.
Conclusion 1: Government should re-plan city development.
This is a **logical and relevant** step to handle overcrowding and space shortage.
Follows.
Conclusion 2: Government should demolish illegal buildings and build cottages.
This is **too specific**, not directly supported by the statement.
The statement doesn't mention illegal buildings or cottages.
Does NOT follow.
Correct answer: 4. Only conclusion 1 follows.

15. **Explanation: (2)**
The correct answer is **2. Thorium**.

16. **Explanation: (2)**
Use the **empirical relationship** between mean, median, and mode:
$\text{Mode} = 3\text{Median} - 2\text{Mean}$
$\text{Mode} - \text{Median} = 2(\text{Median} - \text{Mean})$
Given: $\text{Mode} - \text{Median} = 2$
So, $2 = 2(\text{Median} - \text{Mean})$
$\text{Median} - \text{Mean} = 1$

17. **Explanation: (2)** When resistors are connected **in series**, the **same current flows through each resistor**.
So the value of current in the circuit: **remains the same**

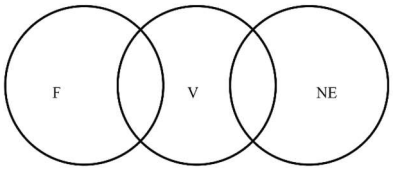
18. **Explanation: (3)** In the morning the sun is in the **east**, so shadows fall **toward the west**.
If **Y's shadow** falls straight **in front of X**, the shadow must be on the **west** side of Y — i.e. **toward X**.
That means **X is standing to the west of Y**, and because they are walking toward each other X must be **facing east**.

19. **Explanation: (2)** The metal that can be easily cut with a knife is **Sodium**.

20. **Explanation: (3)** When water is added to bleaching powder ($CaOCl_2$), it releases **chlorine gas**.

21. **Explanation: (4)** A number is **triangular** if $\frac{n(n+1)}{2} =$ number
for some whole number **n**.
1. **15**
$15 = \frac{5\times6}{2} \rightarrow$ **Triangular**
2. **3**
$3 = \frac{2\times3}{2} \rightarrow$ **Triangular**
3. **10**
$10 = \frac{4\times5}{2} \rightarrow$ **Triangular**
4. **5**
Try solving $n(n+1)/2 = 5$ → no whole number n gives 5.
So **5 is NOT triangular**.

22. **Explanation: (1)**



Only conclusion 2 is correct.

23. **Explanation: (2)**
Statement 1: X − 15 is an integer
This only tells us **X is an integer** (because X = integer + 15).
But X could be **even** or **odd**, so:
If X = 8 → X − 5 = 3 (odd)
If X = 7 → X − 5 = 2 (even)
We **cannot** determine the parity of X − 5.
Statement 1 alone is NOT sufficient.
Statement 2: X − 10 is an odd integer
Let X − 10 = odd
⇒ X = odd + 10
⇒ X = odd + even = **odd**
If X is odd:
X − 5 = odd − odd = **even**
This always holds true.
Statement 2 alone is sufficient.

24. **Explanation: (1)** We can solve this using the **work-energy theorem**:
$W_{\text{net}} = \Delta KE = \frac{1}{2}mv_f^2 - \frac{1}{2}mv_i^2$
Given:
$m = 4.0$ kg
$v_i = 5.0$ m/s
$v_f = 10.0$ m/s
$KE_i = \frac{1}{2}(4.0)(5.0)^2 = 2.0 \times 25 = 50$ J
$KE_f = \frac{1}{2}(4.0)(10.0)^2 = 2.0 \times 100 = 200$ J
$W_{\text{net}} = KE_f - KE_i = 200 - 50 = 150$ J

25. **Explanation: (3)** The speculative fiction book **Half of What I Say** is written by **Anil Menon**.

26. **Explanation: (2)**
Statement 1:
ABC sold **75,000 soaps** at **₹70 each**.
This gives **sales from soaps**, but **does NOT tell whether ABC sells other products**.
So we **cannot know total company sales** from Statement 1 alone.
NOT sufficient alone
Statement 2:
ABC has **no other products** in the production line.
This tells us **soaps are the only product**, but gives **no sales numbers**.
NOT sufficient alone

Combine both statements

From **Statement 2**, we know ABC sells **only soaps**.

From **Statement 1**, we know how many soaps were sold and at what price.

So combined:

Total Sales $= 75{,}000 \times 70$

$= ₹52{,}50{,}000$

Now we can answer the question **completely**.

Both statements together are sufficient.

27. Explanation: (3) As of February 2018, the Chairman of the Economic Advisory Council to the Prime Minister (PMEAC) was Dr. Bibek Debroy.

28. Explanation: (2)

Train length = L meters

Bridge length = 100 m

Total distance to cross bridge = $L + 100$ m

Time taken = 10 seconds

Speed = 90 kmph

$90 \text{ kmph} = 90 \times \frac{1000}{3600} \text{ m/s} = 25 \text{ m/s}$

$\text{Speed} = \frac{\text{Total distance}}{\text{Time}}$

$25 = \frac{L + 100}{10}$

$L + 100 = 250$

$L = 150$ m

The length of the train is **150 meters**.

29. Explanation: (3) The SI unit of resistance is the ohm (symbol: Ω).

30. Explanation: (1) The statement **"Honesty is the best policy"** only suggests that honesty is good or beneficial.

It does **not** imply:

that honest people make policies (I)

that every policy must include honesty (II)

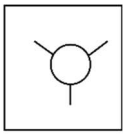
So **neither** assumption is implicit.

31. Explanation: (3) As of February 2018, the Governor of Tamil Nadu was Banwarilal Purohit (appointed in October 2017).

32. Explanation: (3) Each column(or row) has three figures with a circle and connecting dashes. The number of dashes are 2, 3, 4.

In last column, a figure with three dashes is missing.

So, figure (A) is correct fit.



(A)

33. Explanation: (2) The reflector of a search light is a **concave mirror** because it converges light into a strong parallel beam.

34. Explanation: (2)



35. Explanation: (3) Plants that do not have a differentiated plant body (i.e., no true roots, stems, or leaves) belong to the group Thallophyta (Algae and some fungi were historically included in this group in older classifications).

36. Explanation: (3) Given:

Principal $P = ₹\,1600$

Rate $R = 5\%$ per annum

Time $T = 6$ years

$SI = \frac{P \times R \times T}{100}$

$SI = \frac{1600 \times 5 \times 6}{100}$

$SI = \frac{48000}{100}$

$SI = ₹\,480$

37. Explanation: (4) Goose: Geese → singular : plural

Following the same pattern:

Pant: Pants

38. Explanation: (1)

Let's compare $\frac{29}{6}$ and $\frac{43}{12}$.

Convert both to common denominator (LCM of 6 and 12 = 12).

$\frac{29}{6} = \frac{29 \times 2}{6 \times 2} = \frac{58}{12}$

Compare $\frac{58}{12}$ and $\frac{43}{12}$.

Clearly $\frac{58}{12} > \frac{43}{12}$, so $\frac{29}{6} > \frac{43}{12}$

39. Explanation: (2) The series is:

ST → TU → UV → VW → ?

Each term is two consecutive letters of the alphabet:

ST (S, T)

TU (T, U)

UV (U, V)

VW (V, W)

Next will be **WX** (W, X).

40. Explanation: (1) Nodes of Ranvier are found in **myelinated axons**, where they are gaps between Schwann cells (in PNS) or oligodendrocytes (in CNS) that allow saltatory conduction of nerve impulses.

41. Explanation: (1) The statement **"Teachers must attend workshop"** implies that workshops are **useful** or **beneficial** → so **(I) is implicit**.

It does **not** suggest that workshops waste time → **(II) is not implicit**.

42. Explanation: (3)

HEAVEN

43. Explanation: (1) The Pir Panjal Railway Tunnel is located in Jammu and Kashmir.

44. Explanation: (4) Statement 1 alone is sufficient because seeing all parts of India clearly implies that Raju travels a lot and is fond of travelling, whereas statement 2 is unrelated to travelling and cannot answer the question.

45. Explanation: (1) The number of neutrons in an atom is calculated as:

Neutrons = Mass number − Atomic number

46. Explanation: (4) Let Virat's present age = (V), Mohinder's present age = (M).

From the first statement:

$V + 7 = 2(M + 7)) \rightarrow (V = 2M + 7.$

From the second statement:

$M - 5 = \frac{2}{5}(V - 5) - 1.$

Substitute (V=2M+7) into the second equation:

$M - 5 = \frac{2}{5}(2M + 7 - 5) - 1$

$= \frac{2}{5}(2M + 2) - 1 = \frac{4}{5}(M + 1) - 1.$

Multiply both sides by 5:

$5M - 25 = 4(M + 1) - 5 = 4M - 1.$

So $5M - 25 = 4M - 1 \Rightarrow M = 24.$

Then $V = 2M + 7 = 48 + 7 = 55.$

Virat's present age = 55 years.

47. Explanation: (4)

Let the filling rates be:

Tanker **A = a**

Tanker **B = 2a** (twice A)

Tanker **C = 4a** (twice B)

Total filling rate: $a + 2a + 4a = 7a$

They fill the pool in **10 hours**, so:

$7a = \frac{1}{10}$

$a = \frac{1}{70}$

So, tanker **A alone** will take:

$\frac{1}{a} = 70$ hours

48. Explanation: (2) Count symbols that have a digit immediately **before** them.

String: R + J M **2 $** # Q R ? * O @ 7 F 3

'$' is immediately after '2'

other symbols ('@','#','?','*','+') are not immediately after digits.

So answer = **1**.

49. Explanation: (1) The statement says the campaign **"didn't bring much response"** → this clearly implies the **campaign failed** → so **Assumption 2 is implicit**.

It **does NOT** imply that residents "do not wish to keep their apartment clean." They may be busy, unaware, or uninterested in the campaign — not necessarily in cleanliness. → **Assumption 1 is NOT implicit**.

50. Explanation: (4)



B

Except B, other figures have one edge less in outside shape than inside shape.

51. Explanation: (4) There are 8 small and 4 big triangles.
So, total 12 triangles present in the given figure.

52. Explanation: (4)
We have $124^2 = 15376$

53. Explanation: (2) To find the profit-sharing ratio, use the **investment × time** rule.
Umar: Investment = ₹10,000
Time = 12 months
Contribution = $10{,}000 \times 12 = 120{,}000$
Avinash: Investment = ₹15,000
Time = 8 months (since he withdrew afterward)
Contribution = $15{,}000 \times 8 = 120{,}000$
Ratio of contributions:
$120000 : 120000 = 1 : 1$

54. Explanation: (4) Given:
For a **right circular cone**:
Radius $r_c = \frac{h}{3}$
Volume of cone = Volume of sphere

1. Volume of Cone
$V_c = \frac{1}{3}\pi r_c^2 h$
Substitute $r_c = \frac{h}{3}$:
$V_c = \frac{1}{3}\pi \left(\frac{h}{3}\right)^2 h$
$= \frac{1}{3}\pi \cdot \frac{h^2}{9} \cdot h$
$= \frac{1}{27}\pi h^3$

2. Volume of Sphere
Let radius of sphere = r_s
$V_s = \frac{4}{3}\pi r_s^3$
Given volumes are equal:
$\frac{1}{27}\pi h^3 = \frac{4}{3}\pi r_s^3$
$\frac{1}{27}h^3 = \frac{4}{3}r_s^3$
$h^3 = 36 r_s^3$
$\left(\frac{h}{r_s}\right)^3 = 36$

3. Ratio of radii
We want: $\frac{r_c}{r_s} = \frac{h/3}{r_s}$
$\frac{r_c}{r_s} = \frac{h/3}{r_s} = \frac{1}{3}\frac{h}{r_s}$
Cube both sides:
$\left(\frac{r_c}{r_s}\right)^3 = \frac{1}{27}\left(\frac{h}{r_s}\right)^3$
$= \frac{1}{27} \cdot 36 = \frac{4}{3}$
Thus:
$\frac{r_c}{r_s} = \sqrt[3]{\frac{4}{3}} = \frac{\sqrt[3]{4}}{\sqrt[3]{3}}$

55. Explanation: (2) Let **Type-1 worker efficiency = 3 units/day**
Let **Type-2 worker efficiency = 1 unit/day**
12 Type-1 workers complete the work in 10 days.
Efficiency of 12 Type-1 workers: $12 \times 3 = 36$ units/day
Total work: $36 \times 10 = 360$ units
Efficiency of new group
Group: **4 Type-1 + 8 Type-2**
$4 \times 3 = 12$ units
$8 \times 1 = 8$ units
Total efficiency:
$12 + 8 = 20$ units/day
Time required
Time $= \frac{360}{20} = 18$ days

56. Explanation: (4) The key difference is:
In asexual reproduction, there is no fusion of gametes and the offspring are produced from a single parent.
As a result, the new organisms are genetically identical to the parent.
Correct answer: 4. the new organisms are genetically identical to the parent

57. Explanation: (1) The molecule is $(\mathbf{NH_4})_2\mathbf{SO_4}$ (Ammonium sulfate).
Let's count the atoms carefully:
Nitrogen (N): 2 ammonium ions → (2 × 1 = 2)
Hydrogen (H): 2 ammonium ions × 4 H each → (2 × 4 = 8)
Sulfur (S): 1
Oxygen (O): 4
Total atoms = 2 + 8 + 1 + 4 = 15

58. Explanation: (2) We are given:
Blue : Red = constant
When Red = 44, Blue = 36
Blue : Red $= 36 : 44 = 9 : 11$
Blue : Red $= 9 : 11 = 54 : x$
$x = \frac{54 \times 11}{9} = 66$

59. Explanation: (1) India and Pakistan were divided into two independent nations by the **Indian Independence Act, 1947**.

60. Explanation: (4) Given:
Sheesha says: *"Her mother is my grandfather's only daughter who has only one daughter and no sons."*
Identify "my grandfather's only daughter"
Sheesha's grandfather's **only daughter** → Sheesha's **mother** (since only daughter of grandfather).
"who has only one daughter and no sons"
Sheesha's mother has only **one daughter** → that daughter is **Sheesha** herself.
"Her mother is my grandfather's only daughter…"
So, the girl in the portrait's mother = Sheesha's mother → Sheesha is **the girl in the portrait**.
Answer: 4. Sheesha is the girl in the portrait

61. Explanation: (2) As of February 2018, the **President of the Indian Olympic Association** was: **Narinder Dhruv Batra**

62. Explanation: (3)
Momentum is defined as the product of an object's **mass** and its **velocity**.
Momentum(p) = mass(m) × velocity(v)

63. Explanation: (2)
Let's analyze the Venn diagram:
Rectangle → Boys
Circle → Athletic
Triangle → Cricket
We are asked: *Boys who participate in athletics and also play cricket* → Intersection of **Boys** ∩ **Athletic** ∩ **Cricket**.
Looking at the diagram:
The number in the overlap of rectangle, circle, and triangle is **3**.

64. Explanation: (2) In **Mendeleev's periodic table**, elements were arranged according to their **atomic mass**, not atomic number.

65. Explanation: (2)
Statement 2 alone is sufficient: Giving more stage performances implies a level of experience and qualification that has been consistently selected by professionals (e.g., qualifying many auditions). It provides a strong basis to infer that Y is likely considered the better dancer for performing more often.
Statement 1 alone is insufficient: Giving more auditions only indicates

that X has *tried* more often, but does not confirm selection or success in those auditions. X might not have been selected for any performances, so the number of auditions alone is not a measure of skill.

66. Explanation: (3) Red ants contain **formic acid**, which causes the burning sensation when they bite.

67. Explanation: (1) Celebration is the appropriate term for above atoms.

68. Explanation: (4) Let the two-digit number be **10a + b**, where **a** and **b** are its digits.
Given: $10a + b = 3ab$
4. 24
Digits → 2 and 4
Product → $2 \times 4 = 8$
$3 \times 8 = 24$

69. Explanation: (4) *The Association of Small Bombs* is a novel written by Indian-American author **Karan Mahajan**.

70. Explanation: (3) As of **February 2018**, the Kolkata-based IPL team **Kolkata Knight Riders (KKR)** was owned by: **Shah Rukh Khan** (along with Juhi Chawla & Jay Mehta)

71. Explanation: (1)
Let **D = Dharitri's present age**
Let **E = Eunice's present age**
Given:
Three years from now:
Dharitri's age = D + 3
Eunice's age = E + 3
Statement:
"Three years from now Dharitri's age will be eight years less than twice Eunice's age."
So: $D + 3 = 2(E + 3) - 8$
$D + 3 = 2E + 6 - 8$
$D + 3 = 2E - 2$
$D = 2E - 5$
Also given:
$D + E = 61$
Substitute:
$2E - 5 + E = 61$
$3E = 66$
$E = 22$
Now:
$D = 2(22) - 5 = 39$
Dharitri's present age = 39 years

72. Explanation: (1)
Pair the string from ends inward:
A ↔ @, B ↔ *, C ↔ 2 → so ABC : @*2
Similarly, $ (4th) ↔ ! (16th), # (6th) ↔ H (14th), E (8th) ↔ ? (12th).
Thus $#E : !H?

73. Explanation: (1)
1 kWh = 1 kilowatt × 1 hour
$= 1000,\text{W} \times 3600,\text{s}$
$= 1000 \times 3600$ joules
= **3,600,000 J**
= **3.6×10^6 J**

74. Explanation: (3)
Let the **number of girls = g**.
Total boys = **9**.
Boys' total marks = $9 \times 12 = 108$
Girls' total marks = $14g$
Overall average = **13.1**
$$\frac{108 + 14g}{9 + g} = 13.1$$
$108 + 14g = 13.1(9 + g)$
$108 + 14g = 117.9 + 13.1g$
$14g - 13.1g = 117.9 - 108$
$0.9g = 9.9$
$g = 11$
Total students
$9 + 11 = 20$

75. Explanation: (2)
We are given:
Final Amount $A = ₹942$
Rate $R = 9.5$
Time $T = 6$ years
Simple Interest formula: $A = P + \frac{PRT}{100}$
Use the formula
$$942 = P\left(1 + \frac{9.5 \times 6}{100}\right)$$
$942 = P(1 + 0.57)$
$942 = 1.57P$
$$P = \frac{942}{1.57} = 600$$

2018

Exam Paper – 9 August 2018 (Shift-II)

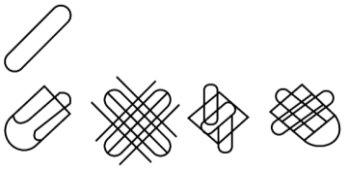
Railway Recruitment Board

(Assistant Loco Pilot)

QUESTIONS WITH EXPLANATION

1. Which of the following metals is stored in kerosene oil?
(1) Gold (2) Sodium
(3) Copper (4) Platinum

2. The below figure is embedded in one of the answer figures. Choose the correct figure containing the below figure.



(1) C (2) A
(3) D (4) B

3. Two pipes, when working one at a time, can fill a cistern in 3 hours and 4 hours, respectively while a third pipe can drain the cistern empty in 8 hours. All the three pipes were opened together when the cistern was $\frac{1}{12}$ full. How long did it take for the cistern to be completely full?
(1) 2 hour 10 minutes
(2) 2 hours
(3) 1 hour 45 minutes
(4) 2 hour 11 minutes

4. The focal length of a concave mirror with a radius of curvature of 20.0 cm is:
(1) 5 cm (2) 15 cm
(3) 10 cm (4) 20 cm

5. An object with a mass of 22 kg moving with a velocity of $5\ m/s$ possesses a kinetic energy of:
(1) 275 J (2) 2750 J
(3) 1100 J (4) 110 J

6. If you look into a mirror and find that the image (your reflexion) is smaller than you, then the type of the mirror is:
(1) concave mirror
(2) convex mirror
(3) plano-concave mirror
(4) plane mirror

7. The 'Kathopanishad' captures the conversation between a young boy named Nachiketas and a god. Which of the following gods is talking to Nachiketas?
(1) Lord Yama (2) Lord Indra
(3) Lord Karthikeya (4) Lord Shiva

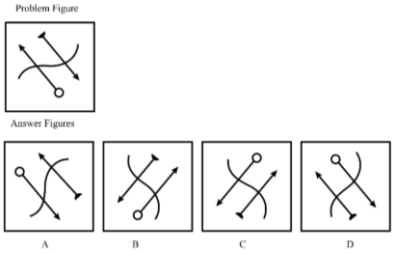
8. To draw a pair of tangents to a circle which are inclined to each other at an angle of 75°, it is required to draw tangents at the end points of those two radii of the circle, the angle between whom is
(1) 105° (2) 65°
(3) 95° (4) 75°

9. The resistance of a conductor is inversely proportional to its:
(1) area of cross section
(2) length
(3) Temperature
(4) resistivity

10. There are saplings of 361 Mango tree and Neem tree in a garden. The ratio of the number of Mango tree to that of Neem tree saplings is $8:11$, then how many Neem tree saplings are in the garden?
(1) 57 (2) 209
(3) 152 (4) 171

11. If $3x^2 + ax + 4$ is perfectly divisible by $x - 5$, then the value of a is:
(1) – 5 (2) - 15.8
(3) – 15.6 (4) -12

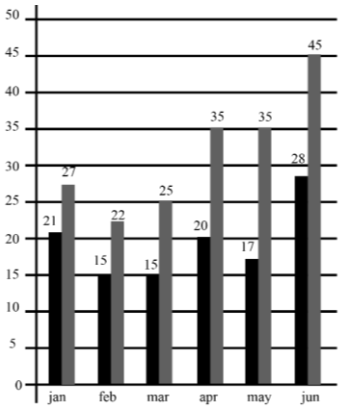
12. Choose the correct water image of the problem figure.



(1) D (2) C
(3) B (4) A

13. Which of the following is essential for the synthesis of thyroxin?
(1) Potassium (2) Calcium
(3) Iodine (4) Sodium

14.



The given data shows the registration of bikes and total vehicles (in thousands) for 6 months in 2017 in City X.
Note: In the chart, the first number represents bikes and the second number represents total vehicles.

Based on the given data, from January to April 2017, the increase in the registration of vehicles other than bikes is ___.
(1) 9000 (2) 8500
(3) 9050 (4) 8000

15. Which was the first country to introduce GST in its system?
(1) Germany (2) Australia
(3) Canada (4) France

16. The mean height of 25 boys in a class is 150 cm, and the mean height of 35 girls in the same class is 145 cm. The combined mean height of 60 students in the class is _____(approximately)
(1) 147 (2) 145
(3) 146 (4) 143

17. Who among the following laid the foundation of chemical sciences by establishing two important laws of chemical combination?
(1) Ernest Rutherford
(2) Democritus
(3) Antoine L. Lavoisier
(4) Joseph L. Proust

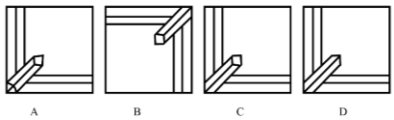
18. $\frac{2}{3}$ of a milk-water mixture was milk. There was 21 litres of the mixture. If 4 litres of water is added to it, the percentage of milk in the new mixture will be:
(1) 44 (2) 11
(3) 56 (4) 14

19. Which of the Answer Figures is the correct water image for the given Problem figure?

Problem Figure



Answer Figures



(1) B (2) D
(3) A (4) C

20. The following table gives the details of the number of students in Class 10 section A and B who had taken mid-term and final exam.

The percentage of students in section A is ___ (round to one decimal).

Result	Sec A	Sec B
Total number of students who failed in both exams	28	23
Total number of students who failed in mid-term but passed in finals	14	12
Total number of students who passed in mid-term but failed in finals	6	17
Total number of students who passed in both the exams	64	55

(1) 51 (2) 51.1
(3) 51.2 (4) 51 .3

21. Consider the argument and decide which of the given assumptions is/are implicit.
Argument: The BEST bus travels company has decided to increase its fare by 10%.
Assumptions:
(1) Passengers may opt for other buses costing less than the BEST bus travels company.
(2) The demand for the buses by passengers may remain unchanged even after the fare hike.
Option:
(1) Neither 1 nor 2 is implicit
(2) Only assumption 1 is implicit
(3) Both 1 and 2 are implicit
(4) Only assumption 2 is implicit

22. To convert temperature from Celsius to Kelvin scale, you must
(1) add 273 to the given temperature
(2) divide the given temperature by 273
(3) subtract 273 from the given temperature
(4) multiply the given temperature by 273

23. Elements A, B and C occur as Dobereiner's triads. If the atomic mass of A is 7 and that of C is 39, what will be the atomic mass of B?
(1) 20 (2) 23
(3) 40 (4) 12

24. A battlefield always has:
(1) Arrows (2) Soldiers
(3) Elephants (4) Chariots

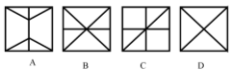
25. If the number 1 on the clock is replaced by the letter 'M', the number 2 is replaced by 'N' and so on, then when the time is 21:00 p.m. the hour hand will be at _____.
(1) T (2) S
(3) V (4) U

26. The 2016 Olympics was held in which city?
(1) Rio de Janeiro (2) Mexico City
(3) Paris (4) London

27. Choose the correct analogous word pair from the given alternatives.
Carpenter : Hammer
(1) Crane : Builder
(2) Plumber : Wrench
(3) Computer : Writer
(4) Axe : Logger

28. The following figure is embedded in one of the four answer figures. Which figure contains the problem figure?





(1) A (2) C
(3) B (4) D

29. Which eminent Hindi writer was chosen for the Vyas Samman 2017 for her work 'Dukham Sukham'?
(1) Meena Kandasamy
(2) Jhumpa Lahiri
(3) Namita Gokhale
(4) Mamta Kalia

30. Which of the numbers given below is NOT rational?
(1) $\sqrt[3]{64}$ (2) $\sqrt{8}$
(3) $\sqrt[3]{8}$ (4) $\sqrt{64}$

31. A sum of money was invested at the rate of 7.5% simple interest per annum for 4 years. If the investment was for 5 years, the interest earned would have been ₹ 375 more. What was the initial sum invested?

(1) ₹ 4,500 (2) ₹ 5,000
(3) ₹ 4,750 (4) ₹ 3,750

32. Consider the given statements as true and decide which of the given conclusions can definitely be drawn from the given statements.
Statements: People think that paying tax to the government is a burden and waste. Hence, they avoid paying tax or don't pay tax promptly.
Conclusions:
1. Government should create awareness among the people that paying tax helps to build nation.
2. Tax should be increased so that more money is collected.

Option:
(1) Both 1 and 2 follow.
(2) Only conclusion 1 follows.
(3) Neither 1 nor 2 follows.
(4) Only conclusion 2 follows.

33. Which Indian Chief Minister's father was a 'Maharaja'?
(1) Chandrababu Naidu
(2) Devandra Fadnavis
(3) K Chandrasekhar Rao
(4) Amarinder Singh

34. The surface areas of three faces of a cuboid sharing a vertex are 20 m^2, 32 m^2 and 40 m^2 what is the volume of the cuboid?
(1) 184 m^3 (2) 92 m^3
(3) $\sqrt{3024}\ m^3$ (4) 160 m^3

35. Metals reacts with acids to give:
(1) A salt and Hydrogen
(2) A salt and base
(3) A salt and water
(4) A salt and Chlorine

36. Find the missing term in the letter series.
BGL, DIN, ___ , HMR
(1) GLQ (2) FPK
(3) FKP (4) EJO

37. Chlorine gas is used in the manufacture of:
(1) Bleaching powder
(2) Washing soda
(3) Baking soda
(4) Baking powder

38. Which of the following is a reducible fraction?
(1) $\frac{105}{112}$ (2) $\frac{91}{15}$
(3) $\frac{41}{17}$ (4) $\frac{79}{26}$

39. If $a + b + c = 0$, then $(a^3 + b^3 + c^3)^2 =$
(1) $3a^2b^2c^2$ (2) $9abc$
(3) $27\ abc$ (4) $9a^2b^2c^2$

40. If $\cot^4\theta + \cot^2\theta = 3$, then $cosec^4\theta - cosec^2\theta =$?
(1) 1 (2) 0
(3) 2 (4) 3

41. Choose the correct alternative which will complete the series.
ACT, EGG, INK, ___
(1) BYE (2) DIP
(3) FUN (4) OLD

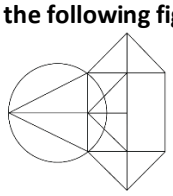
42. Solve the following:
$-\frac{1}{4}\{-45 - (-96) \div (-32)\} =$?
(1) -10.5 (2) 10.5
(3) -12 (4) 12

43. Three-fifths of my current age is the same as five-sixths of that of one of my cousins'. My age ten years ago will be his age four years hence. My current age is____ years
(1) 60 (2) 45
(3) 50 (4) 55

44. 'Food' is related to 'Refrigerator' in the same way as 'Clothes' is related to ___ .
(1) Material (2) Closet
(3) Garage (4) Fold

45. A body of mass 2 kg is thrown upward with initial velocity of 0 m/s. After 2 seconds, its kinetic energy will be: ($g = 10\ m/s^2$)
(1) 200 J (2) 400 J
(3) 0 J (4) 100 J

46. How many triangles are present in the following figure?



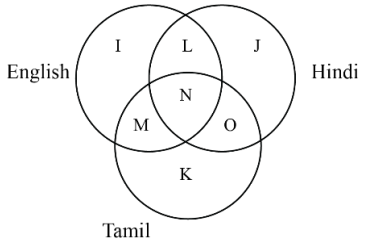
(1) 12 (2) 15
(3) 14 (4) 13

47. ₹ 750 invested for 3 months gave an interest of ₹ 18. What was the simple rate of interest per annum?
(1) 9.6 % (2) 2.4%
(3) 12% (4) 7.2%

48. Consider the argument and decide which of the given assumptions is/are implicit.
Argument:
Public smoking is an offence under the law.
Assumption:
1. Smoking is injurious to the health of the person who smoke.
2. Smoke is injurious even to others health in the public places.

(1) Both 1 and 2 are implicit
(2) Neither 1 nor 2 is implicit
(3) Only assumption 2 is implicit
(4) Only assumption 1 is implicit

49. The given Venn diagram represents the students who can speak different languages. According to it, the total number of students who can speak exactly two languages is ___ .



(1) L + M + O + N (2) N + L
(3) L + O (4) L + M + O

50. Who won the 2017 Hridaynath Mangeshkar Award?
(1) Asha Bhosle (2) Anupam Kher
(3) Shabana Azmi (4) Javed Akhtar

51. A body of 4.0 kg is lying at rest. Under the action of a constant force, it gains a speed of 5 m/s. The work done by the force will be ___
(1) 30 J (2) 50 J
(3) 40 J (4) 20 J

52. The girth of the stem or root in plants increases due to:
(1) Extra meristem
(2) Apical meristem
(3) Lateral meristem
(4) Intercalary meristem

53. Which state government has made yoga guru Ramdev Baba as the brand ambassador of Yoga and Ayurveda?
(1) Himachal Pradesh (2) Rajasthan
(3) Uttar Pradesh (4) Haryana

54. The Dadasaheb Phalke Award is awarded for significant public achievement in which field?
(1) Literature (2) Sports
(3) Films (4) Journalism

55. Odisha often faces natural disasters due to __.
(1) Rainfall (2) earthquakes
(3) Cyclones (4) Drizzle

56. 'Madhya Pradesh' is related to 'Diamond' in the same way as 'Karnataka' is related to
(1) Copper (2) Platinum
(3) Silver (4) Gold

57. Consider the given question and decide which of the following statements is sufficient to answer the question.
Who among P, Q, R, S and T is lightest in weight?
Statements:
1. Q weight < P and S also S weight > T
2. R weight > Q but < T

(1) Neither statement 1 nor 2 is sufficient
(2) Statement 2 alone is sufficient while statement 1 alone is insufficient X3.
(3) Statement 1 alone is sufficient while statement 2 alone is insufficient
(4) Both statement 1 and 2 are sufficient

58. Which of the following serves as a nutritive tissue for the growing embryo?
(1) Zygote (2) Endosperm
(3) Ovary (4) Ovule

59. The two sides holding the right-angle in a right-angled triangle are 3 cm and 4 cm long. The area of its circumcircle will be:
(1) 5π cm^2 (2) 6.75π cm^2
(3) 7π cm^2 (4) 6.25π cm^2

60. Select the odd figure out of the following figure series.

A	F	I	Z	L
1	2	3	4	5

(1) 2 (2) 1
(3) 4 (4) 5

61. The main cause of rancidity in foods is the ___ of fats and oils.
(1) Oxidation (2) Reduction
(3) Hydrolysis (4) Clarification

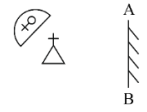
62. The value of $-261 + (-380) - (-521) + 821 - (-121)$ is:
(1) 800 (2) 825
(3) 833 (4) 822

63. Which of the following never occurs singly in nature?
(1) Inertia (2) Force
(3) Velocity (4) Momentum

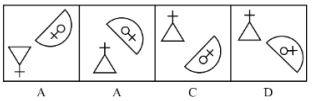
64. Sharan and Mayukh, working together, can complete a task in 18 days. However, Mayukh works alone and leaves after completing one-third of the task. Then, Sharan takes over and completes the remaining work by himself. As a result, the duo could complete the task in 40 days. How many days would Sharan alone have taken to do the job if Mayukh had worked faster than Sharan?
(1) 30 (2) 45
(3) 24 (4) 72

65. Name the Indian paralympic high jumper who won gold at the Rio Paralympics. He was awarded the Padma Shri in 2017.
(1) Mariyappan Thangavelu
(2) Varun Bhati
(3) Narender Ranbir
(4) Devendra Jhajharia

66. Choose the correct mirror image of the problem figure if the mirror is placed to the right of the figure.
Problem Figure



Answer Figures



(1) A (2) D
(3) C (4) B

67. If the atomic number of Krypton is 36, then its electronic configuration is:
(1) 2,18,16 (2) 2.18,8,8
(3) 2,8,18,8 (4) 2,8,20,6

68. Decide which of the conclusions logically follow(s) from the information given in the statement.
Statements: Politicians marry only beautiful girls. X is beautiful.
Conclusions:
(1) X will marry a politician
(2) X won't marry a politician
Option:
(1) Only conclusion 1 follows
(2) Either 1 or 2 follows
(3) Only conclusion 2 follows
(4) Both 1 and 2 follow

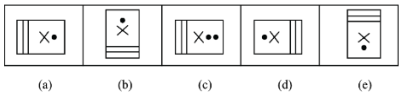
69. In a computer game, a builder can build a wall in ten hours while a destroyer can demolish such a wall completely in fourteen hours. Both, the builder and the destroyer were initially set to work together on level ground. But after 7 hours the destroyer was taken out. What was the total time (in hours) taken to build the wall?
(1) 35 (2) 24
(3) 17 (4) 15

70. Which of the fractions given below, when added to $\frac{5}{8}$, gives 1?
(1) $\frac{5}{2}$ (2) $\frac{6}{16}$
(3) $\frac{6}{3}$ (4) $\frac{6}{24}$

71. Mr. X starts from point 'A' travels 80 km towards west, takes a left turn, travels 50 km and reaches point 'B'. What is the shortest distance between points 'A' and 'B'?
(1) $10\sqrt{39}$ (2) $10\sqrt{98}$
(3) $10\sqrt{93}$ (4) $10\sqrt{89}$

72. Which of the following gases is not generated in a biogas plant?
(1) CO (2) CO_2
(3) CH_4 (4) H_2S

73. Select the odd figure out of the given series.



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

74. If ___ is involved, even greater diversity will be generated.
(1) binary fission
(2) vegetative propagation
(3) sexual reproduction
(4) asexual reproduction

75. Solve the following:
$27 - [38 - \{46 - (15 - 13 - 2)\}]$
(1) 30 (2) 31
(3) 35 (4) 29

ANSWER KEY									
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
(2)	(4)	(2)	(3)	(1)	(2)	(1)	(1)	(1)	(2)
11	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
(2)	(2)	(3)	(1)	(4)	(1)	(3)	(3)	(4)	(2)
21	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
(3)	(1)	(2)	(1)	(4)	(1)	(2)	(3)	(4)	(2)
31	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**
(2)	(2)	(4)	(3)	(1)	(3)	(1)	(1)	(4)	(4)
41	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**	**50**
(4)	(4)	(3)	(2)	(3)	(3)	(1)	(3)	(4)	(4)
51	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
(2)	(3)	(4)	(2)	(3)	(4)	(4)	(2)	(4)	(4)
61	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**
(1)	(4)	(2)	(2)	(1)	(4)	(3)	(2)	(4)	(2)
71	**72**	**73**	**74**	**75**					
(4)	(1)	(2)	(3)	(3)					

EXPLANATION

1. Explanation: (2)
Sodium is a highly reactive metal, and it is stored in **kerosene oil** to prevent it from reacting with moisture or oxygen in the air. Other metals like **gold**, **copper**, and **platinum** are not stored in kerosene because they do not react as readily with air or moisture.

2. Explanation: (4) The given figure is a slanted capsule shape. This exact shape and orientation is correctly embedded only in figure B.

3. Explanation: (2)
$$\text{Rate of filling} = \frac{1}{3} + \frac{1}{4} - \frac{1}{8}$$
$$= \frac{8 + 6 - 3}{24} = \frac{11}{24} \text{ tank/hour}$$
$$\text{Remaining tank} = \frac{11}{12}$$
$$\text{Time} = \frac{\frac{11}{12}}{\frac{11}{24}} = \frac{24}{12} = 2 \text{ hours}$$

4. Explanation: (3)
$$f = \frac{R}{2}$$
$$f = \frac{20}{2} = 10 \text{ cm}$$

5. Explanation: (1)
$$KE = \frac{1}{2}mv^2$$
$$KE = \frac{1}{2} \times 22 \times 5^2$$
$$KE = 11 \times 25 = 275 \text{ J}$$

6. Explanation: (2) A convex mirror always forms a virtual, erect, and diminished image. Therefore, when the image appears smaller than the object, the mirror is a convex mirror.

7. Explanation: (1) The **Kathopanishad** is a conversation between **Nachiketas**, a young boy, and **Lord Yama**, the god of death. In this conversation, **Nachiketas** asks deep questions about life, death, and the afterlife, and **Lord Yama** provides wisdom and answers.

8. Explanation: (1) The angle between two tangents is supplementary to the angle between the corresponding radii. So, required angle $= 180° - 75° = 105°$.

9. Explanation: (1)
Resistance of a conductor is
$R = \rho \frac{L}{A}$.
So, resistance is inversely proportional to the area of cross-section.

10. Explanation: (2)
Ratio of Mango : Neem $= 8:11$
Total saplings $= 361$
Sum of ratio parts $= 8 + 11 = 19$
Value of one part $= \frac{361}{19} = 19$
Neem trees sapling $= 11 \times 19 = 209$.

11. Explanation: (2)
Given divisor $(x - 5)$. By Remainder Theorem,
$f(5) = 0$
$3(5)^2 + a(5) + 4 = 0$
$75 + 5a + 4 = 0$
$5a = -79 \Rightarrow a = -15.8$

12. Explanation: (2) The water image is obtained by flipping the figure horizontally. After comparing all arrow directions and curve positions, figure C matches the exact top–bottom reversal.

13. Explanation: (3)
Iodine is essential for the synthesis of **thyroxine**, a hormone produced by the thyroid gland. Thyroxine plays a crucial role in regulating metabolism. A deficiency of iodine can lead to thyroid problems, such as goiter, due to the lack of thyroxine production.

14. Explanation: (1)
Vehicles other than bikes = Total − Bikes
Jan $= 27 - 18 = 9$
Apr $= 35 - 27 = 18$
Increase $= 18 - 9 = 9$ thousand

15. Explanation: (4) France was the first country to implement a value-added tax (VAT) system, which laid the foundation for the Goods and Services Tax (GST) model. This VAT system was introduced in 1954.

16. Explanation: (1)
Total height of boys $= 25 \times 150$
$= 3750$
Total height of girls $= 35 \times 145$
$= 5075$
$$\text{Combined mean} = \frac{3750 + 5075}{25 + 35}$$
$$= \frac{8825}{60} \approx 147$$

17. Explanation: (3) Antoine L. Lavoisier is considered the "Father of Modern Chemistry" and laid the foundation of chemical sciences. He established the **Law of Conservation of Mass**, which states that matter cannot be created or destroyed in a chemical reaction.

18. Explanation: (3)
$$\text{Milk} = \frac{2}{3} \times 21 = 14$$
After adding 4 L water:
New total $= 21 + 4 = 25$
$$\text{Percentage of milk} = \frac{14}{25} \times 100 = 56$$

19. Explanation: (4) The water image flips the figure horizontally (top ↔ bottom). After flipping, the orientation of the inner slanted line matches Option C.

20. Explanation: (2)
Sec A total $= 28 + 14 + 6 + 64 = 112$
Sec B total $= 23 + 12 + 17 + 55$
$= 107$
Combined total $= 112 + 107 = 219$
$$\text{Percentage of Sec A} = \frac{112}{219} \times 100$$
$$\approx 51.1\%$$

21. Explanation: (3) Both statements are implicit because a fare rise makes it reasonable to assume passengers may switch to cheaper buses and it is also possible demand may remain unchanged despite the hike; both possibilities are assumed.

22. Explanation: (1) To convert Celsius to Kelvin use the formula
$$K = °C + 273$$
So, you add 273 to the Celsius temperature.

2018

Exam Paper – 10 August 2018 (Shift-III)

Railway Recruitment Board

(Assistant Loco Pilot)

QUESTIONS WITH EXPLANATIONS

1. If $ABCD$ is a trapezium, AC and BD are the diagonals intersecting each other at point O.
Then $\mathbf{AC:BD}$ is
(1) $\mathrm{AB + AD : DC + BC}$
(2) AO-OC:OB-OD
(3) $\mathrm{AD : BC}$
(4) $\mathrm{AB : CD}$

2. Select the appropriate combination of mathematical operators to be sequentially placed between the numbers given on the left of the following equation so that LHS = RHS.
$\mathbf{5035 = 20}$
(1) $\times\ +\ -$ (2) $+\ \times\ -$
(3) $-\ +\ \times$ (4) $+\ -\ \times$

3. Which of the following options correctly describes the given statement.
Statement: There are four rooks in a game of chess.
(1) Sometimes (2) Often
(3) Never (4) Always

4. Which one of the following elements has the lowest atomic mass?
(1) Nitrogen (2) Hydrogen
(3) Lithium (4) Helium

5. The ratio of the heights of Nani and Leelu is $4:3$. If Leelu is 1.2 m tall, then what is the height of Nani?
(1) 1.8 m (2) 0.9 m
(3) 2 m (4) 1.6 m

6. The SI unit of electric charge is:
(1) volt (2) ampere
(3) Coulomb (4) Ohm

7. Ammonium nitrate, on thermal decomposition, produces:
(1) $\mathrm{N_2}$ and $\mathrm{H_2O}$
(2) $\mathrm{N_2O}$ and $\mathrm{H_2O}$
(3) $\mathrm{NH_3}$ and NO
(4) $\mathrm{NH_3}$ and $\mathrm{NO_2}$

8. The difference between Charles' and Shriya's ages is 6 years. When they married each other 30 years ago, 4 times Charles's age was the same as 5 times the age of Shriya. What is the current sum of their ages?
(1) 112 years (2) 114 years
(3) 115 years (4) 110 years

9. Which of the following films is India's official entry to Oscars 2018?
(1) A Death in the Gunj
(2) Newton
(3) Bahubali
(4) Lipstick Under My Burkha

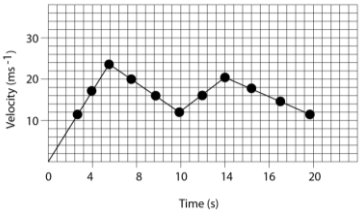
10. Consider the given statement as true and decide which of the given conclusions can definitely be drawn from the given statements.
Statement:
All rivers are holy. All gods are holy.
Conclusion:
1. All rivers are gods.
2. All gods are rivers.
(1) Neither 1 or 2 follows
(2) Only conclusion 1 follows
(3) Both 1 and 2 follows
(4) Only conclusion 2 follows

11. A total amount of ₹1560 is to be divided among $\mathbf{A, B}$ and C such that A gets 50% of what B gets and B gets 20% of what C gets. How much will B get?
(1) ₹ 440 (2) ₹ 540
(3) ₹ 280 (4) ₹ 240

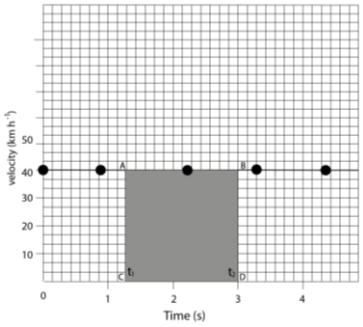
12. Which of the following is a Non-Luminous body?
(1) Firefly
(2) Moon
(3) Burning candle
(4) Glowing bulb

13. Which of the following is a velocity-time graph for uniform motion of a car?

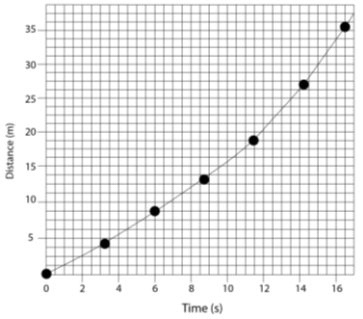
(1)

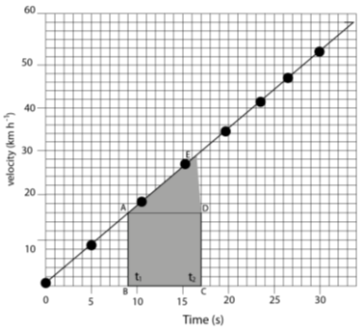


(2)

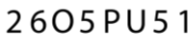
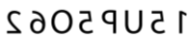


(3)



(4) 

14. Which of the options depicts the correct mirror image of the given figure?
15UP5062

(1)
(2)
(3) 
(4) 

15. Which of the following statements is INCORRECT?
(1) Solids have indefinite shape
(2) Solids have definite volume
(3) Solids are rigid
(4) Solids are almost incompressible

16. The work done in one complete revolution of the moon around the earth is equal to:
(1) gravitational force × circumference of the orbit of the moon
(2) Zero
(3) centripetal force × radius of the orbit of the moon
(4) gravitational force × diameter of the orbit of the moon

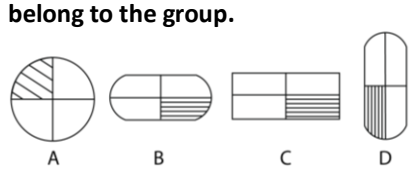
17. The amount of $BaSO_4$ formed on mixing an aqueous solution of 2.08 gm of $BaCl_2$ and excess of dilute H_2SO_4 is _____ .
(atomic weights: $Ba = 137, Cl = 35.5, S = 32, O = 16$)
(1) 2.08 g (2) 23.3 g
(3) 2.33 g (4) 1.04 g

18. Which of the following will give a terminating decimal?
(1) $\frac{3}{36}$ (2) $\frac{12}{36}$
(3) $\frac{9}{36}$ (4) $\frac{6}{36}$

19. Name the type of mirror used in the headlight of vehicles:
(1) Plane mirror
(2) Plano-convex mirror
(3) Convex mirror
(4) Concave mirror

20. The Dr. B. C. Roy awards, instituted in 1962, are given to eminent achievers primarily from which field?
(1) Medicine (2) Journalism
(3) Law (4) Sports

21. Select the figure which does NOT belong to the group.

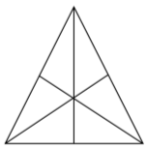


(1) C (2) A
(3) D (4) B

22. The square root of 27225 is:
(1) 145 (2) 165
(3) 155 (4) 175

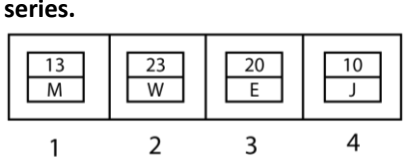
23. Given $17 \times 29 = 493$, then $170 \times 0.029 = ?$
(1) 0.493 (2) 4.93
(3) 0.0493 (4) 49.3

24. Select the option that represents the number of triangles in the following figure.



(1) 15 (2) 17
(3) 16 (4) 12

25. Select the odd figure out of the given series.



(1) 2 (2) 3
(3) 1 (4) 4

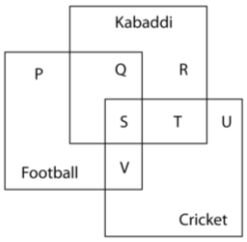
26. 3rd January 2018 was a Wednesday. Which of the following years will also have 3rd January on a Wednesday?
(1) 2022 (2) 2023
(3) 2024 (4) 2020

27. The number of letters that are preceded by a symbol but not followed by a number in the given expression is ___ .
$M@A#N2B4O&3C5P+D2
(1) 4 (2) 3
(3) 1 (4) 2

28. Who is the director of Indian cinema's highest grossing film Bahubali?
(1) SS Rajamouli
(2) Gautham Vasudev Menon
(3) Karan Johar
(4) Sanjay Leela Bhansali

29. Find the missing word for the related pair.
Road : Car :: Sea : ?
(1) Ship (2) Fish
(3) Water (4) River

30. As per the given Venn diagram, the total number of students who play cricket as well as football but not Kabaddi is ___ .

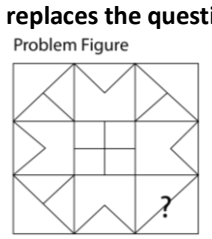


(1) V (2) T
(3) R (4) P

31. Solve the following.
$\{38 - (60 \div 5 \times \overline{16 - 8} \div 2 \div 3)\} = ?$
(1) 30 (2) 29
(3) 22 (4) 37

32. Select the number missing from the given sequence.
1, 2, 6, ___ , 120, 720
(1) 12 (2) 50
(3) 24 (4) 9

33. Choose the correct figure that replaces the question mark.



65. If the number $x4441$ is divisible by 11, what is the face value of x?
(1) 2 (2) 4
(3) 5 (4) 3

66. Ryaan is Vehaan's mother's sister's father's only son's son. How is Ryaan related to Vehaan?
(1) Nephew (2) Uncle
(3) Son (4) Cousin

67. MABELA, MABLE, MABUSE, MABEPEARL, ?
If the above given words are arranged in the dictionary then the last word is:
(1) MABEPEARL (2) MABLE
(3) MABELA (4) MABUSE

68. Consider the given question and decide which of the following statements is sufficient to answer the question. What is the colour of the granite in the kitchen?
Statements:
1. The colour of the granite is the colour of the wall.
2. The colour of the granite is very bright.
(1) 1 alone is sufficient while 2 alone is not sufficient to answer the given question.
(2) Neither 1 nor 2 is sufficient to answer the given question.
(3) Both the 1 and 2 are sufficient to answer the given question.
(4) 2 alone is sufficient while 1 alone is not sufficient to answer the given question.

69. Which Indian female mountaineer recently created the fastest record of scaling Mount Everest back-to-back twice within 5 days?
(1) Anshu Jamsenpa
(2) Bachendri Pal
(3) Arunima Sinha
(4) Premlatha Agarwal

70. IF WASP STINGS HARD is coded as @%Z, HARD TO DEAL is coded as Z65 and HEAL LONG TIME is coded as 896, what is the code for HARD?
(1) Z (2) 5
(3) 9 (4) @

71. After buying a toy for Rs.66, Raghu managed to sell it at a profit of 15%. The selling price of the toy was:
(1) Rs.76.90 (2) Rs.75.20
(3) Rs.70.80 (4) Rs.75.90

72. Ravichandran Ashwin became the fastest player in the world (in terms of number of test matches) to get 300 wickets in test cricket in November 2017. Whose record did Ashwin break?
(1) Richard Hadlee
(2) Malcolm Marshall
(3) Muthiah Muralitharan
(4) Dennis Lillee

73. How many kilometres are there in one metre?
(1) 0.0001 (2) 0.1
(3) 0.001 (4) 0.01

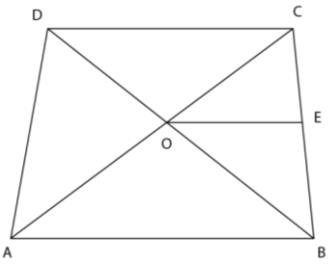
74. The process of taking up a permanent shape, size and function to form a permanent tissue is called:
(1) differentiation (2) Unification
(3) formation (4) Calcification

75. If X has two sisters – Y and Z, and W's mother is the sister of Y's father, then W is Z's _____.
(1) Father (2) Niece
(3) Mother (4) Cousin

Answer Key									
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
(2)	(3)	(4)	(2)	(4)	(3)	(2)	(2)	(2)	(1)
11	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
(4)	(2)	(2)	(4)	(1)	(2)	(3)	(3)	(4)	(1)
21	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
(2)	(2)	(2)	(3)	(2)	(3)	(2)	(1)	(4)	(1)
31	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**
(3)	(3)	(1)	(1)	(4)	(1)	(2)	(1)	(1)	(3)
41	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**	**50**
(1)	(3)	(3)	(3)	(3)	(3)	(2)	(1)	(2)	(4)
51	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
(4)	(1)	(3)	(4)	(2)	(1)	(4)	(4)	(2)	(3)
61	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**
(2)	(1)	(2)	(1)	(4)	(4)	(4)	(2)	(1)	(1)
71	**72**	**73**	**74**	**75**					
(4)	(4)	(3)	(1)	(4)					

EXPLANATIONS

1. Explanation: (2)



The diagonals divide each other in the same ratio.
That means,
$\frac{AO}{OC} = \frac{BO}{OD}$
Rewriting this as a ratio gives:
$AC : BD = (AO - OC) : (OB - OD)$
Hence, **AC : BD = AO – OC : OB – OD**

2. Explanation: (3)
Given: $5035 = 20$
Insert the operators between the digits **5, 0, 3, 5**:
$5 - 0 + 3 \times 5$
$= 5 - 0 + 15$
$= 5 + 15$
$= 20$
So,
LHS $= 20 =$ RHS
Condition satisfied.
Option 3: – + ×

3. Explanation: (4) In a standard game of **chess**, each player has **2 rooks**.
So, total rooks in the game:
2 (White) + 2 (Black) = 4
This is **true for every standard game of chess**, without exception.
Hence, the correct option is: 4. Always

4. Explanation: (2)
Atomic Mass Comparison

Element	Atomic Mass (approx.)
Hydrogen	1.008
Helium	4.00
Lithium	6.94
Nitrogen	14.01

Hydrogen is the lightest element in the periodic table.
It has only one proton and one electron (no neutron in its most common isotope).
Therefore, it has the lowest atomic mass among all elements.

5. Explanation: (4)
Let heights be (4x) and (3x)
$3x = 1.2 \Rightarrow x = 0.4$
Nani's height $= 4x = 4 \times 0.4 = 1.6$ m

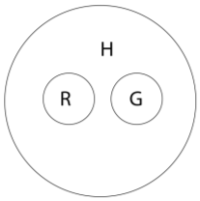
6. Explanation: (3)
Charge → Coulomb (C)
Current → Ampere (A)
Voltage → Volt (V)

7. Explanation: (2)
When **ammonium nitrate (NH_4NO_3)** is heated, it decomposes as:
$NH_4NO_3 \xrightarrow{heat} N_2O + 2H_2O$
So, the products are:
Nitrous oxide (N_2O)
Water (H_2O)

8. Explanation: (2)
Assume present ages
Let:
Charles's present age = (x)
Shriya's present age = (y)
Given:
$x - y = 6$
Use marriage-time condition
30 years ago:
$4(x - 30) = 5(y - 30)$
$4x - 120 = 5y - 150$
$4x - 5y = -30$
Solve equations
From (x - y = 6) → (x = y + 6)
Substitute:
$4(y + 6) - 5y = -30$
$4y + 24 - 5y = -30$
$-y = -54 \Rightarrow y = 54$
$x = 60$
Find sum of present ages
$x + y = 60 + 54 = 114$

9. Explanation: (2) India selects **one official film each year** to send to the **Academy Awards (Oscars)** in the **Best Foreign Language Film** category.
For the **2018 Oscars**, India officially sent **Newton (2017)**, directed by **Amit V. Masurkar** and starring **Rajkummar Rao**.
The film was critically acclaimed for its realistic portrayal of democracy and elections.
Final Answer: Newton

10. Explanation: (1)



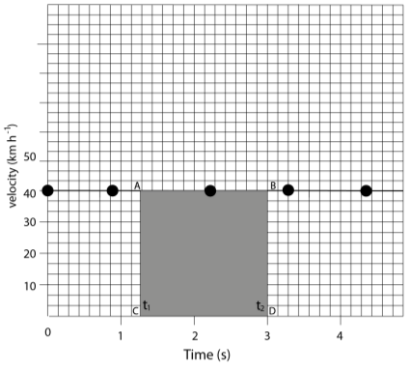
From figure we clearly see Neither conclusion 1 follows nor 2.

11. Explanation: (4)
Given:
A gets **50% of B**
B gets **20% of C**
Total amount = **₹ 1560**
Express in terms of one variable
Let **C = x**
Then:
$B = 20$
$A = 50$
Total amount
$A + B + C = 1560$
$\frac{1}{10}x + \frac{1}{5}x + x = 1560$
$\left(\frac{1+2+10}{10}\right)x = 1560$
$\frac{13}{10}x = 1560$
$x = 1200$
Find B
$B = \frac{1}{5}x = \frac{1}{5} \times 1200 = 240$
Final Answer: ₹ 240

12. Explanation: (2) Luminous bodies produce their **own light**.
Non-luminous bodies do **not produce light**, they only **reflect light**.
- Firefly → produces light
- Burning candle → produces light
- Glowing bulb → produces light
- **Moon → does NOT produce light, it reflects sunlight**

Correct Answer: Moon

13. Explanation: (2)



14. Explanation: (4)
ɔ∀ɹnԀɔ∀ɟ

15. Explanation: (1) Solids have a **definite shape** and **definite volume**.
They are **rigid** and **cannot be compressed easily**.
So the statement
"Solids have indefinite shape" is **wrong**.

16. Explanation: (2) The Moon revolves around the Earth due to **gravitational force**, which acts as a **centripetal force**.
Centripetal force is always **perpendicular** to the direction of motion.
Work done = $\vec{F} \cdot \vec{s}$
Since force ⊥ displacement, **work done = 0**
Over one complete circular revolution, **no work is done**.

17. Explanation: (3)
$BaCl_2 + H_2SO_4 \rightarrow BaSO_4 \downarrow + 2HCl$
$BaCl_2 = 137 + (35.5 \times 2) = 208$g/mol
$BaSO_4 = 137 + 32 + (16 \times 4) = 233$g/mol
Use mole ratio
208g $BaCl_2 \rightarrow 233$g $BaSO_4$
2.08, g $BaCl_2 \rightarrow$?
$BaSO_4 = \frac{233}{208} \times 2.08 = 2.33$g

18. Explanation: (3)
1. **3/36 = 1/12 = 1/(2^2×3)** (has 3)
2. **12/36 = 1/3** (has 3)
3. **9/36 = 1/4 = 1/(2^2)** (correct)
4. **6/36 = 1/6 = 1/(2×3)(has 3)**

Final Answer : Option 3 — 9/36

19. Explanation: (4) A **concave mirror** produces a **strong parallel beam of light** when the light source is placed at its focus.
This helps the headlight throw light **far ahead on the road**.

20. Explanation: (1) The **Dr. B. C. Roy Awards** honor outstanding contributions in **medicine and healthcare**, named after Dr. Bidhan Chandra Roy, a renowned physician.

21. Explanation: (2)

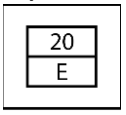


22. Explanation: (2)
$165^2 = (160 + 5)^2$
$= 25600 + 1600 + 25 = 27225$

23. Explanation: (2)
$170 \times 0.029 = \frac{170 \times 29}{1000} = \frac{4930}{1000}$
$= 4.93$

24. Explanation: (3)
16 triangles in the above figure.

25. Explanation: (2)



26. Explanation: (3) Given:
3rd January 2018 = Wednesday
Rule to remember:
If the **current year is a normal year**, the same date next year shifts by **+1 day**
If the **current year is a leap year**, it shifts by **+2 days** (because of Feb 29)
Now move year by year:

Year	Type	Day on 3rd January
2018	Normal	Wednesday
2019	Normal	Thursday
2020	Normal	Friday
2021	Leap (2020)	Sunday
2022	Normal	Monday
2023	Normal	Tuesday
2024	Normal	**Wednesday**

Hence, 3rd January falls on a Wednesday in 2024.

27. Explanation: (2) Expression: \$M@A/N2B4O&3C5P+D2

We need **letters that are** preceded by a **symbol** (non-letter, non-number) **not followed by a number**

Letter	Preceded by	Followed by	Count?
M	\$ (symbol)	@ (not number)	Yes
A	@ (symbol)	/ (not number)	Yes
N	/ (symbol)	2 (number)	No
B	2 (number)	4	No
O	4 (number)	&	No
C	3 (number)	5	No
P	5 (number)	+	No
D	+ (symbol)	2 (number)	No

Total letters satisfying the condition = 2

28. Explanation: (1) India's highest-grossing film **Baahubali** (the franchise, especially *Baahubali 2: The Conclusion*) was directed by **S. S. Rajamouli**.

The other options are renowned directors but **did not direct Baahubali**.

Answer: S. S. Rajamouli

29. Explanation: (4)

Road : Car : : Sea : River

A **car** moves **on a road**

A **river** flows **into / is connected with the sea**

So the relationship is **medium → connected/moving entity**.

Hence, the correct answer is: River

30. Explanation: (1)

Students who play *Cricket as well as Football but NOT Kabaddi*

Football = left box

Cricket = bottom-right box

Kabaddi = top box

From the diagram: The **only region common to Football and Cricket** is **V**

V is NOT inside the Kabaddi box

So, **V satisfies all conditions**:

Plays Cricket

Plays Football

Does NOT play Kabaddi

31. Explanation: (3)

Expression:

$38 - (60 \div 5 \times (16 - 8) \div 2 \div 3)$

$= 38 - (12 \times 8 \div 2 \div 3)$

$= 38 - (96 \div 2 \div 3)$

$= 38 - (48 \div 3)$

$= 38 - 16$

$= 22$

32. Explanation: (3)

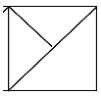
Sequence: **1, 2, 6, __, 120, 720**

This follows the **factorial pattern**:

Term	Value	Explanation
1st	1	(1! = 1)
2nd	2	(2! = 2)
3rd	6	(3! = 6)
4th	**24**	(4! = 24)
5th	120	(5! = 120)
6th	720	(6! = 720)

Missing number = 24

33. Explanation: (1)



34. Explanation: (1)

Work done by gravity is given by:

$W = mgh$

Where

$m = 0.1$ kg

$g = 9.8$ m/s^2

$h = 2$ m

$W = 0.1 \times 9.8 \times 2 = 1.96$ J

35. Explanation: (4) The statement only says a visit is arranged **to widen knowledge**.

It does **not require** believing that botanical gardens are *full* of natural resources → Assumption 1

It does **not state or depend on** how students learn (interaction/new environment) → Assumption 2

Since neither assumption is necessary for the statement to be true

36. Explanation: (1) As of **February 2018**, the **Deputy Chief Minister of Bihar** was **Sushil Kumar Modi**.

He served alongside Chief Minister Nitish Kumar after the formation of the NDA government in 2017.

37. Explanation: (2)

The three equations of motion are:

First equation: $v = u + at$

➞ relates velocity and time

Second equation: $s = ut + \frac{1}{2}at^2$

➞ relates position (displacement) and time

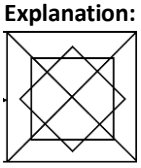
Third equation: $v^2 = u^2 + 2as$

➞ relates velocity and position

Hence, the second equation of motion gives the relation between

Position and time

38. Explanation: (1)



39. Explanation: (1)

Elements that act as both metal and non-metal are called **metalloids**.

Arsenic and **Germanium** are metalloids

Bismuth shows some metallic and non-metallic behavior

Boron does **not** act as both metal and non-metal

40. Explanation: (3)

Explanation — Coulomb's Law

Coulomb's Law states that:

*The magnitude of the force of attraction or repulsion between two point charges is **directly proportional to the product of the quantities of the charges and inversely proportional to the square of the distance between them***.

Mathematically:

$$F \propto \frac{q_1 q_2}{r^2}$$

41. Explanation: (1) Abraham Lincoln delivered **"The Gettysburg Address"** on **November 19, 1863**, during the American Civil War.

It is one of the most famous and influential speeches in U.S. presidential history.

42. Explanation: (3)

Statement: *Weight is also a force.*

From basic physics:

Weight is the **gravitational force** acting on a body.

The SI unit of **force** is **Newton (N)**.

Check the conclusions:

The unit of weight is Newton.

True — since weight is a force.

The unit of weight is Kilograms.

False — kilogram is the unit of **mass**, not weight.

Final Answer: Only conclusion 1 follows

43. Explanation: (3) Dakshin Gangotri is India's **first research base station**, established in **1983** by Indian scientists in **Antarctica**.

44. Explanation: (3) From external point **D**, a **secant** (DBA) and a **tangent** (DE) are drawn.

(Tangent)² = (External part of secant) × (Whole secant) $DE^2 = BD \times (BD + AB)$

Substitute values: $6^2 = BD \times (BD + 5)$

$36 = BD^2 + 5BD$

$5.BD^2 + 5BD - 36 = 0$

Factor: $(BD + 9)(BD - 4) = 0$

Reject negative value → **BD = 4 cm**

45. Explanation: (3) Given A.P.:

129, 120, 111, 102, …

First term (a = 129)

2018

Exam Paper – 30 August 2018 (Shift-I)

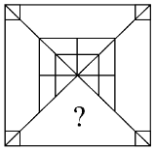
Railway Recruitment Board

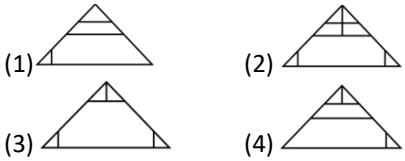
(Assistant Loco Pilot)

QUESTIONS WITH EXPLANATIONS

1. The state of matter can be changed into another state by changing the:
(1) Volume
(2) Density
(3) Shape
(4) Temperature

2. Select the option that can replace the? symbol in the following figure.





3. The Kochi-Muziris Biennale held in Kochi, Kerala is an exhibition of which of the following?
(1) Kerala martial art of Kalaripayattu
(2) Old Malayalam movies
(3) Kathakali dance
(4) Contemporary art

4. The chemical formula of Sodium Carbonate is:
(1) Na_3CO_2 (2) Na_2CO
(3) $NaCO_3$ (4) Na_2CO_3

5. Consider the given statement to be true and decide which of the conclusions logically follow(s) from the statements.
Statement: Public smoking has increased in the current year.
Conclusions:
1. Government should ban public smoking.
2. Government should create awareness about ill effects of public smoking.

(1) Only conclusion 1 follows.
(2) Only conclusion 2 follows.
(3) Neither 1 nor 2 follows.
(4) Both 1 and 2 follow.

6. In a certain code, if ZIGZAGGING is written as AZGIZGNIGG, then how will BLIZZARDLY be written as in the same code?
(1) ZZILBYLDRA
(2) ZZILBIYLDRA
(3) ZZILLBYLDRA
(4) ZZILBYDRA

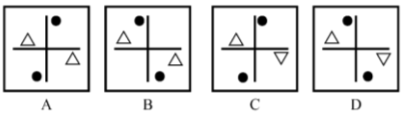
7. The Charter of Liberties - popularly known as 'The Magna Carta' - was signed in England in which year?
(1) 1415 AD (2) 1315 AD
(3) 1215 AD (4) 1115 AD

8. Which of the given Answer Figures depicts the correct water image of the given Problem Figure?

Problem Figure



Answer Figure



(1) A (2) D
(3) C (4) B

9. What would be the smaller of the two angles formed by the hour hand and the minute hand at $4{:}\,52$ p.m.?
(1) 162° (2) 164.5°
(3) 165° (4) 166°

10. Vistara airline is a joint venture between Tata Sons and which international airlines?
(1) Lufthansa
(2) Malaysian Airlines
(3) British Airways
(4) Singapore Airlines

11. While releasing the arrow from a stretched bow, the PE of the bow is converted into?
(1) chemical energy
(2) kinetic energy
(3) sound energy
(4) heat energy

12. Consider the given question and decide which of the following statements is sufficient to answer the question.
If LIKE GOOD HABITS is coded as 126, then what will be the code for HABITS?
Statements:
1. I LOVE PICTURES is coded as 785.
2. THOUGHT BECOMES HABIT is coded as 856.

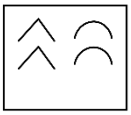
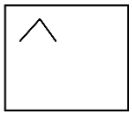
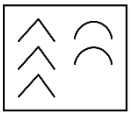
(1) Neither 1 nor 2 is sufficient to answer the given question.
(2) 2 alone is sufficient while 1 alone is not sufficient to answer the given question.
(3) Both 1 and 2 are sufficient to answer the given question.
(4) 1 alone is sufficient while 2 alone is not sufficient to answer the given question.

13. Which of the following is used to get relief when you have been stung by a honeybee?
(1) Common salt
(2) Baking soda
(3) Acetic acid
(4) Washing soda

14. If $\frac{2}{3}$ of a pizza costs ₹300, then $\frac{3}{5}$ of a pizza will cost:
(1) ₹ 180 (2) ₹ 250
(3) ₹ 225 (4) ₹ 270

15. Select the option that will correctly fit in the blank space in the given figure series.



(1) 
(2) 
(3) 
(4) 

16. On which river's bank is Panaji located?
(1) Mandovi (2) Zuari
(3) Sal (4) Terekhol

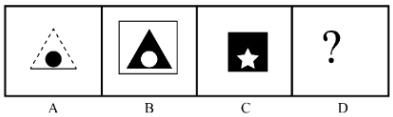
17. 72% of a number is 90 . What is the number?
(1) 120 (2) 125
(3) 130 (4) 124

18. Consider the given statement true and decide which of the given assumptions is/are implicit.
Statement: It is desirable to start writing from 6 years of age.
Assumptions:
1: Fine motor skills are well developed by 6 years of age.
2: Children cannot write before 6 years of age.
Option:
(1) Neither assumption 1nor 2 is implicit.
(2) Only assumption 2 is implicit.
(3) Both assumptions1 and 2 are implicit.
(4) Only assumption 1 is implicit.

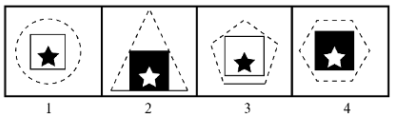
19. Split 69 into three parts such that they are in A.P. and the product of their smaller parts is 483.
(1) 19,23,27 (2) 17,23,29
(3) 15,23,31 (4) 21,23,25

20. Choose the correct figure from the answer figures to replace the question mark.

Problem Figure



Answer Figures

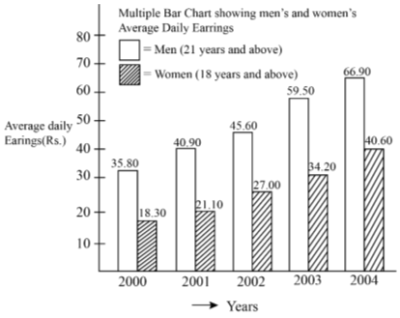


(1) 3 (2) 1
(3) 2 (4) 4

21. The length of one side of a rhombus is 61 cm and its area is $1320\ cm^2$. Find the sum of the lengths of its diagonals.
(1) 120 cm (2) 122 cm
(3) 142 cm (4) 71 cm

22. In 2017, which Indian scientist was honoured with the Living Legend Award by the International Union of Nutritional Sciences (IUNS) for stellar contributions in the area of nutrition?
(1) Rohini Godbole
(2) Tessy Thoms
(3) Mahtab Bamji
(4) Suman Sahaia

23.



The given chart shows men's and women's average daily earning in Company X.
Year -
Average daily earnings -
Men (21 years and above) -
Women (18 years and above) -
Based on the depicted data, in which year was the percentage increase of the average daily earning of men maximum over the preceding year?
(1) 2003 (2) 2001
(3) 2002 (4) 2004

24. What is the range of frequencies of sound waves audible to human beings?
(1) 16 kHz 200 kHz
(2) 16 Hz 16 kHz
(3) 16 Hz 20 kHz
(4) 14 Hz 20 kHz

25. In a test, Charan secured 54 marks that was also equivalent to obtaining 72% marks. How many marks was the test out of?
(1) 75 (2) 85
(3) 80 (4) 65

26. Select the odd term out of the following.
0.02, 0.020, 2/100, 0.002
(1) 0.002 (2) 0.020
(3) 0.02 (4) 2/100

27. Using the expression VWY9PONI5FSLUDTG61AJ, find the missing term from the following series.
9WA, OOD, ___ , FD9
(1) NSI (2) IF5
(3) FI5 (4) NFL

28. Consider the given statement as true and decide which of the given conclusions can definitely be drawn from the given statements.
Statements:
Some teachers are rich.
All diabetics are rich.
Conclusions:
1. Some diabetics are teachers.
2. Some rich people are diabetic.
Option:
(1) Only conclusion 2 can be drawn
(2) Neither 1 nor 2 can be drawn
(3) Both 1 and 2 can be drawn
(4) Only conclusion 1 can be drawn

29. In a class consisting of boys and girls, there are 45 students. If three fifth of the students are boys, find the number of boys in the class.
(1) 25 (2) 26
(3) 27 (4) 18

30. Consider the given statement and decide which of the following assumption(s) is/are implicit.

Statement:
You are expected to be honest before the advocate - an instruction to be followed in front of a defence lawyer.
Assumptions:
1. Unless cautioned, the clients tend to hide certain vital facts to save themselves.
2. At times, the vital facts are required to strategies the defence argument.

Option:
(1) Both assumptions 1 and 2 are implicit.
(2) Only assumption 2 is implicit.
(3) Neither assumption 1 nor 2 is implicit.
(4) Only assumption 1 is implicit.

31. Mechanical energy is equal to:
(1) Kinetic energy + Chemical energy
(2) Kinetic energy + Potential energy
(3) Kinetic energy + Heat energy
(4) Kinetic energy + Electrical energy

32. Which of the following is added to iron to make iron hard and strong?
(1) Zinc (2) Copper
(3) Carbon (4) Sodium

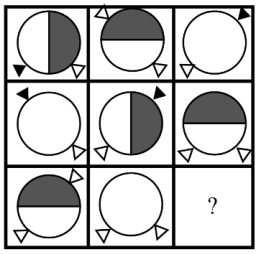
33. The value of $122 + 345 - 3 \div 1116 \times 372$ is:
(1) 466 (2) 469
(3) 446 (4) 460

34. In the morning X and Y are walking towards each other in a park. When they meet, Y 's shadow falls upon X. In which direction was X facing?
(1) North (2) South
(3) East (4) West

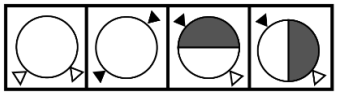
35. A watch loses 5 minutes every hour and was set right at 6 a.m. on a Monday. When will it show the correct time again?
(1) 6 a.m. on next Sunday
(2) 3 a.m. on next Monday
(3) 3 a.m. on next Sunday
(4) 6 a.m. on next Monday

36. Who was the UPA candidate for the Vice President's post in the 2017 elections?
(1) Arun Gandhi
(2) Gopalkrishna Gandhi
(3) Varun Gandhi
(4) Sonia Gandhi

37. Select the Answer Figure that correctly fits in the blank space in the given Problem Figure.
Problem Figure

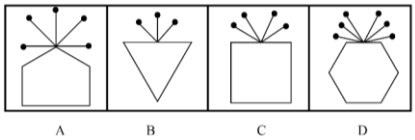


Answer Figure



(1) D (2) B
(3) C (4) A

38. Select the picture which does NOT belong to the group.



(1) B (2) D
(3) C (4) A

39. A wooden block of mass m_1 kg accelerates at $10\ ms^{-2}$ when a force of 5 N acts on it. Another block of mass m_2 kg accelerates at $20\ ms^{-2}$ when the same force acts on it. If both the blocks are tied together and the same force acts on their combination, the acceleration will be about:
(1) 6.67 ms^{-2} (2) 1.67 ms^{-2}
(3) 5.67 ms^{-2} (4) 4.67 ms^{-2}

40. Which of the following statements is INCORRECT?
(1) Atomic size increases from top to bottom.
(2) All the elements of a group have same valency.
(3) Isotopes of the same elements are placed in the same group.
(4) Atomic radius generally decreases from left to right.

41. Solve the following:
$72 \div \frac{1}{2}\{15 + 12 - (9 + 6 - \overline{5 + 7})\} = ?$
(1) 6 (2) 9
(3) 12 (4) 8

42. Which of the following numbers is irrational?
(1) $\sqrt[3]{64}$ (2) $\sqrt{64}$
(3) $\sqrt[6]{64}$ (4) $\sqrt[4]{64}$

43. A girl child has which of the following combinations of chromosomes in her cells?
(1) 44 autosomes + XX
(2) 22 autosomes + XX
(3) 44 autosomes + XY
(4) 22 autosomes + XY

44. The percentage of water of crystallisation in washing soda is ___.
(1) 1.80 (2) 37.06
(3) 10.6 (4) 62.9

45. Read the following question and decide which of the given statements is/are sufficient.
What is the total number of illegal immigrants?
Statements:
1. 30% of the total illegal immigrants are from Bangladesh.
2. Remaining are from India.

Option
(1) 1 alone is sufficient while 2 alone is not sufficient to answer the question.
(2) Both 1 and 2 together are sufficient to answer the question.
(3) Neither 1 nor 2 is sufficient to answer the question.
(4) 2 alone is sufficient while 1 alone is not sufficient to answer the question.

46. Who is the Bengali writer who won the 31st Moortidevi Award for the year 2017?
(1) Joy Goswami
(2) Taslima Nasreen
(3) Subhro Bandhopadhyay
(4) Baby Halder

47. Based on the given table, the percentage salary increase per year

(1) F/25 (2) 5 F
(3) F/5 (4) 25 F

67. Alkali metals are assigned which group in the Modern Periodic Table?
(1) Second group
(2) Eighteenth group
(3) Third group
(4) First group

68. A boy raises a box with a weight of 120 N through a height of 2 m. The work done by him is:
(1) 60 J (2) 120 J
(3) 240 J (4) 180 J

69. In a class when a test is conducted, mean of 25 students marks is 60. If mean of first 13 students marks is 70 and mean of last 13 students marks is 50, find the marks of the middle student when arranged in the ascending order.
(1) 70 (2) 40
(3) 50 (4) 60

70. Which Indian Maharatna Company has been the title sponsor of Hockey India League since 2016?
(1) Gas Authority of India (GAIL)
(2) National Thermal Power Corporation (NTPC)
(3) Coal India Limited (CIL)
(4) Oil and Natural Gas Corporation (ONGC)

71. The value of k, for which the quadratic equation $4x^2 + 4\sqrt{3}x + k = 0$ has equal roots is:
(1) -2 (2) 3
(3) 2 (4) -3

72. 15 years ago Cynthia was thrice as old as Brittany. The sum of their present ages is 94 years. How old is Brittany now?
(1) 33 years (2) 32 years
(3) 30 years (4) 31 years

73. By selling a used phone for ₹ 6,160 Rajan got 44% less than what it cost him to buy it a few years ago. At what price should Rajan have been able to sell it to make a profit of 5% ?
(1) ₹12,550 (2) ₹11,550
(3) ₹12,000 (4) ₹10,550

74. Which of the following characters is recessive in a pea plant?
(1) Wrinkled seed (2) Green pod
(3) Round pod (4) Round seed

75. Who is the Chairman of the Film and Television Institute of India as of February 2018 ?
(1) Jaya Prada
(2) Anupam Kher
(3) Mithun Chakraborty
(4) Jaya Bachchan

Answer Key									
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
(4)	(2)	(4)	(4)	(4)	(1)	(3)	(3)	(4)	(4)
11	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
(2)	(2)	(2)	(4)	(2)	(1)	(2)	(4)	(4)	(1)
21	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
(2)	(3)	(1)	(3)	(1)	(1)	(2)	(3)	(3)	(1)
31	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**
(2)	(3)	(1)	(3)	(1)	(2)	(1)	(4)	(1)	(3)
41	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**	**50**
(1)	(4)	(1)	(4)	(3)	(1)	(2)	(3)	(4)	(1)
51	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
(1)	(4)	(3)	(2)	(3)	(2)	(1)	(2)	(1)	(1)
61	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**
(2)	(2)	(4)	(4)	(1)	(4)	(4)	(3)	(4)	(3)
71	**72**	**73**	**74**	**75**					
(2)	(4)	(2)	(1)	(2)					

EXPLANATIONS

1. Explanation: (4)
The state of matter (solid, liquid, gas) can be changed by altering the temperature. For example, heating a solid can cause it to melt into a liquid, while cooling a gas can cause it to condense into a liquid.

2. Explanation: (2)
The outer square is divided symmetrically by diagonals and inner lines. The missing central figure must preserve the same line divisions and orientation. Only Option (2) matches the continuation of all intersecting lines correctly.

3. Explanation: (4)
The Kochi-Muziris Biennale, held in Kochi, Kerala, is an international exhibition of contemporary art. It is the first-ever biennale in India and features a diverse range of artworks from both Indian and international artists.

4. Explanation: (4)
Sodium carbonate is a chemical compound consisting of two sodium (Na) atoms, one carbon (C) atom, and three oxygen (O) atoms. Its chemical formula is Na_2CO_3. It is commonly used in cleaning, water treatment, and as a chemical reagent.

5. Explanation: (4)
An increase in public smoking indicates a serious public health issue. Both banning public smoking and creating awareness are logical preventive measures. Hence, conclusions 1 and 2 logically follow.

6. Explanation: (1)
The word is divided into two equal halves and each half is written in reverse order.
ZIGZA | GGING → AZGIZ | GNIGG → AZGIZGNIGG
Applying the same rule to BLIZZA|RDLY gives ZZILBYLDRA.

7. Explanation: (3)
The Magna Carta (Charter of Liberties) was signed in 1215 AD during the reign of King John of England.

8. Explanation: (3)
In a water image, the figure is reflected vertically (top ↔ bottom) while left–right positions remain unchanged. After vertical reflection, the positions and orientations of all symbols match Figure C, option (3).

9. Explanation: (4)
Minute hand position at 4:52:
$$52 \times 6° = 312°$$
Hour hand position at 4:52:
$$4 \times 30° + \frac{52}{60} \times 30° = 120° + 26° = 146°$$
Angle between hands:
$$|312° - 146°| = 166°$$
Smaller angle = 166°

10. Explanation: (4)
Vistara is a full-service airline in India, formed as a joint venture between Tata Sons and Singapore Airlines. The airline was launched in 2015 to provide premium services in the domestic and international markets.

11. Explanation: (2)
When the bow is stretched, it stores potential energy (PE). Upon release, this energy is transferred to the arrow, converting it into kinetic energy, causing the arrow to speed up. The

stored energy propels the arrow forward, making it the primary form of energy conversion.

12. Explanation: (2)
Statement (2) contains HABIT(S) directly, so it is sufficient to find the required code. Statement (1) does not involve HABITS, hence it is not sufficient.

13. Explanation: (2)
Baking soda is often used to relieve the pain and discomfort caused by a honeybee sting. It helps neutralize the acidity of the venom and reduces swelling.

14. Explanation: (4)

$$\frac{2}{3}\text{ pizza} = ₹300$$

$$1\text{ pizza} = 300 \times \frac{3}{2} = ₹450$$

$$\frac{3}{5}\text{ pizza} = 450 \times \frac{3}{5} = ₹270$$

15. Explanation: (2)
In each successive box, the number of symbols decreases alternately first ◠ and then ^, ˇ from left to right. The missing box must contain the symbols that maintain this gradual reduction. Only Option (2) correctly fits this pattern.

16. Explanation :(1)
Panaji, the capital of Goa, is located on the bank of the Mandovi River.

17. Explanation: (2)

$$72\% = \frac{72}{100}$$

$$\frac{72}{100} \times x = 90$$

$$x = \frac{90 \times 100}{72} = 125$$

18. Explanation: (4)
Writing requires well-developed fine motor skills, such as controlled movement of fingers and hands.
By stating that it is desirable to start writing from 6 years of age, it is assumed that children generally have adequate fine motor development by that age.
The statement does not imply that children are incapable of writing before 6 years.
So, only assumption 1 is implicit.

19. Explanation: (4)
Since the three numbers are in A.P., the middle term is the average of the three numbers, which is 23. Let the numbers be

$$(23 - d), 23, (23 + d)$$

Product of smaller parts:

$$(23 - d) \times 23 = 483$$

$$23(23 - d) = 483 \Rightarrow 23 - d = 21$$

$$\Rightarrow d = 2$$

So, the numbers are: 21, 23, 25.

20. Explanation: (1)
Figure (3) correctly completes the series.

21. Explanation: (2)
Area of a rhombus:

$$\text{Area} = \frac{1}{2}d_1d_2$$

$$\frac{1}{2}d_1d_2 = 1320 \Rightarrow d_1d_2 = 2640$$

Side of rhombus:

$$s^2 = \left(\frac{d_1}{2}\right)^2 + \left(\frac{d_2}{2}\right)^2$$

$$61^2 = \frac{d_1^2 + d_2^2}{4} \Rightarrow d_1^2 + d_2^2 = 14884$$

$$(d_1 + d_2)^2 = d_1^2 + d_2^2 + 2d_1d_2$$

$$(d_1 + d_2)^2 = 14884 + 5280 = 20164$$

$$d_1 + d_2 = \sqrt{20164} = 122$$

Sum of diagonals = 122 cm

22. Explanation: (3)
In 2017, Dr. Mahtab Bamji, an Indian scientist, was honoured with the Living Legend Award by the International Union of Nutritional Sciences (IUNS) for his exceptional contributions to the field of nutrition.

23. Explanation: (1)
Percentage increase over preceding year:

$$\text{For 2001} = \frac{40.90 - 35.80}{35.80} \times 100 = 14.25\%$$

$$\text{For 2002} = \frac{48.60 - 40.90}{40.90} \times 100 = 18.82\%$$

$$\text{For 2003} = \frac{59.50 - 48.60}{48.60} \times 100 = 22.43\%$$

$$\text{For 2004} = \frac{66.90 - 59.50}{59.50} \times 100 = 12.44\%$$

Maximum percentage increase is in 2003.

24. Explanation: (3)
The range of frequencies of sound waves audible to human beings is typically between 16 Hz and 20 kHz.

25. Explanation: (1)
72% of Total Marks = 54

$$\text{Total Marks} = \frac{54 \times 100}{72} = 75$$

26. Explanation: (1)
$0.02, 2/100 = 0.02, 0.020 = 0.02$
Only 0.002 is different from the rest.

27. Explanation: (2)
Write the master string with positions:
1 V, 2 W, 3 Y, 4 9, 5 P, 6 O, 7 N, 8 I, 9 5, 10 F, 11 S, 12 L, 13 U, 14 D, 15 T, 16 G, 17 6, 18 1, 19 A, 20 J.
In 9WA, OOD, ____, FD9, first letters move +2 positions (4→6→8→10), second letters move +4 positions (2→6→10→14), and third letters move −5 positions (19→14→9→4), giving the missing term as IF5.

28. Explanation: (3) From the statements, teachers are a subset of rich people and diabetics are also a subset of rich people. Hence, some diabetics can be teachers and some rich people are diabetics. Therefore, both conclusions follow.

29. Explanation: (3)
Total students = 45

$$\text{Boys} = \frac{3}{5} \times 45 = 27$$

30. Explanation: (1)
The instruction implies that clients may hide vital facts unless cautioned, hence honesty is stressed. It also assumes that vital facts are necessary to properly plan defence strategies. Therefore, both assumptions 1 and 2 are implicit.

31. Explanation: (2)
Mechanical energy is the total energy in a system that can perform work. It is the sum of kinetic energy, which is energy due to motion, and potential energy, which is energy stored in an object due to its position. Together, these energies determine the ability of a system to do work.

32. Explanation: (3)
Carbon is added to iron to make steel, which is harder and stronger than pure iron. This process improves its strength, durability, and resistance to wear.

33. Explanation: (1)

$$122 + 345 - \left(\frac{3}{1116} \times 372\right)$$

Apply BODMAS

$$\frac{3}{1116} \times 372 = \frac{3 \times 372}{1116} = \frac{1116}{1116} = 1$$

Now substitute:

$$122 + 345 - 1 = 466$$

So, the correct value is 466.

34. Explanation: (3)
In the morning, the sun is in the East, so shadows fall towards the West. Y's shadow falls on X, meaning X is to the West of Y. Since they are facing each other, X must be facing East.

35. Explanation: (1)
Loss per hour = 5 minutes
Loss per day:

$5 \times 24 = 120$ minutes $= 2$ hours

Time lost to reach a full 24 hours:

$$\frac{24}{2} = 12 \text{ days}$$

From Monday 6 a.m., after 12 days → Sunday 6 a.m.

So the watch shows correct time at 6 a.m. on next Sunday.

36. Explanation: (2)

In the 2017 elections for the Vice President of India, the UPA candidate was Gopalkrishna Gandhi, who was a former Governor of West Bengal and the grandson of Mahatma Gandhi.

37. Explanation: (1)

In each row, the circle shading rotates systematically (vertical → horizontal → blank). The missing figure must follow the same rotation and shading sequence. Only figure D completes the pattern correctly.

38. Explanation: (4)

In figures B, C, and D, the number of dots corresponds logically with the sides of the base shape. Figure A does not follow this consistency, so it does not belong to the group.

39. Explanation: (1)

Given:

$$F = 5 \text{ N}$$

For first block:

$$m_1 = \frac{F}{a_1} = \frac{5}{10} = 0.5 \text{ kg}$$

For second block:

$$m_2 = \frac{F}{a_2} = \frac{5}{20} = 0.25 \text{ kg}$$

Combined mass:

$$m = m_1 + m_2 = 0.75 \text{ kg}$$

Acceleration of combination:

$$a = \frac{F}{m} = \frac{5}{0.75} = 6.67 \text{ m/s}^2$$

So, the correct answer is 6.67 m/s².

40. Explanation: (3) Isotopes of the same element have the same chemical properties and belong to the same group, but they differ in the number of neutrons. However, isotopes do not affect the placement in the periodic table as they have the same atomic number.

41. Explanation: (1)

$$72 \div \frac{1}{2}\{15 + 12 - (9 + 6 - \overline{5 + 7})\}$$

$$= 72 \div \frac{1}{2}\{15 + 12 - (9 + 6 - 12)\}$$

$$= 72 \div \frac{1}{2}\{15 + 12 - 3\}$$

$$= 72 \div \frac{1}{2} \times 24$$

$$= 72 \div 12$$

$= 6$

42. Explanation: (4)

$$\sqrt[3]{64} = 4, \sqrt{64} = 8, \sqrt[6]{64} = 2$$

$\sqrt[4]{64} = \sqrt{8}$ (irrational)

43. Explanation: (1)

A girl child has 44 autosomes (22 pairs of non-sex chromosomes) and 2 X chromosomes (XX), making up her total chromosome count of 46.

44. Explanation: (4)

Washing soda ($Na_2CO_3 \cdot 10H_2O$) contains 10 molecules of water for each formula unit. The molecular mass of the water is a significant portion of the total mass. When calculating the percentage, the water makes up about 62.9% of the total mass of washing soda.

45. Explanation: (3)

Statement 1 gives only a percentage, not the total number. Statement 2 gives only a category without numerical data. Even together, the total number cannot be determined. Hence, neither statement is sufficient.

46. Explanation: (1)

Joy Goswami, a celebrated Bengali poet, won the 31st Moortidevi Award in 2017 for his significant contributions to Bengali literature. The Moortidevi Award is given for excellence in literature, especially for works that uphold human values.

47. Explanation: (2)

Salary in 2001 = ₹1500

Salary in 2006 = ₹5200

Total increase over the period:

$$5200 - 1500 = 3700$$

Percentage increase over the period:

$$\frac{3700}{1500} \times 100 = 246.67\%$$

Hence, the correct answer is 247.

48. Explanation: (3)

NaCl is formed by the neutralization reaction between hydrochloric acid (HCl), a strong acid, and sodium hydroxide (NaOH), a strong base. The reaction produces water and sodium chloride (NaCl). Since both the acid and base are strong, the resulting salt is neutral.

49. Explanation: (4)

Mean of 5 smallest numbers is 15 and 13 menbers group is 17

sum of 5 smallest numbers $= 5 \times 15$

$= 75$

Sum of all 13 numbers $= 13 \times 17$

$= 221$

So,

Sum of 8 largest numbers $= 221 - 75$

$= 146$

Mean of 8 largest numbers $= \frac{146}{8}$

$= 18.25$

50. Explanation: (1)

One day's work of A and B $= \frac{1}{10}$

One day's work of A $= \frac{1}{15}$

One day's work of B $= \frac{1}{10} - \frac{1}{15} = \frac{1}{30}$

⇒ B alone can do the work in 30 days

Correct sequence:

B → A → D → C

51. Explanation: (1)

Monthly expenditure $= 60\% \times 9600$

$= 5760$

Monthly saving $= 9600 - 5760$

$= 3840$

52. Explanation: (4)

$V \to Z(+4), M \to I(-4), R \to S(+1)$

Applying the same pattern to AKT:

$A \to E, K \to G, T \to U$

So, the required term is EGU.

53. Explanation: (3)

Figures 1, 2, and 6 consist only of straight intersecting or parallel lines. Figures 4, 5, and 3 have similar cross and parallel line patterns. Figures 9, 7, and 8 are closed figures with slanting sides. Therefore, the correct grouping is (1,2,6), (4,5,3), (9,7,8).

54. Explanation: (2)

There are total 15 triangles.

55. Explanation: (3)

Ravi Shastri, a former Indian cricketer, was appointed as the head coach of the Indian cricket team in 2017. He had previously served as the team director and was reappointed after Anil Kumble's tenure ended. Shastri's coaching approach focuses on a more aggressive and modern style of cricket.

56. Explanation: (2)

A battery has two terminals. Similarly, a magnet has two poles. Hence, Battery : Terminals :: Magnet : Poles.

57. Explanation: (1)

Glass is a non-metal, while aluminium, silver, and copper are metals. Therefore, Glass is the odd one out.

58. Explanation: (2) Muscle tissue, specifically smooth muscle, controls the diameter of blood vessels through a process called vasoconstriction and vasodilation. This helps regulate blood flow and blood pressure.