SSC CGL
(TIER 1) Pre. EXAM

In this exam, conducted by Staff Selection Commission (SSC), total 100 questions will be asked, divided into General Intelligence & Reasoning, General Awareness, Quantitative Aptitude and English Comprehension. The time allotted to answer the questions is 60 minutes.

Part ❶ General Intelligence & Reasoning

Directions (Q.Nos. 1-3) Select the related letter/word/number from the given alternatives.

1. Philatelist : Stamps :: Numismatist : ?
a. Coins   b. Maps
c. Jewels   d. Samples

2. IKKL : JLLM : : SUUV : ?
a. FFGH   b. CEFE   c. WXXZ   d. TVVW

3. 122 : 145 : : 226 : ?
a. 250   b. 256   c. 257   d. 290

Directions (Q.Nos. 4-6) Find the odd word/letter/number from the given responses.

4.   a. Reward : Punishment
    b. Object : Permit
    c. Sharp : Blunt
    d. Cold : Cool

5.   a. ZVRN   b. UQMJ
    c. SOKG   d. TPLH

6.   a. 369   b. 862
    c. 462   d. 761

Directions (Q.Nos. 7-8) A series is given with a term missing. Choose the correct alternative from the given ones that will complete the series.

7. A, Z, C, X, E, ?
a. U   b. W   c. V   d. Y

8. $\frac{2}{3}, \frac{4}{7}, \frac{7}{13}, \frac{11}{21}, ?$
a. $\frac{13}{25}$ b. $\frac{15}{29}$ c. $\frac{17}{33}$ d. $\frac{16}{31}$

9. Of the five members standing in a row R is to the right of U, but to the left of Q. P is to the right of Q, but to the left of S. Find the member in the middle of row.
a. R   b. Q   c. P   d. S

10. Select the combination of numbers, so that the letters arranged will form a meaningful word.

    H N R C A B
    1 2 3 4 5 6

a. 2, 5, 3, 4, 1, 6   b. 3, 5, 6, 4, 1, 2
c. 4, 1, 5, 6, 2, 3   d. 6, 3, 5, 2, 4, 1

11. If 8th February, 2013 was a Tuesday, what was the day on 8th February, 2012?
a. Tuesday   b. Monday
c. Sunday   d. Wednesday

12. From the given alternative words, select the word, which cannot be formed using the letters of the given word?
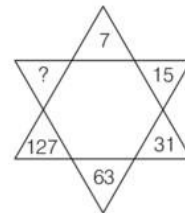   CONCENTRATION
a. CONCERN   b. NATION
c. TRAIN   d. CENTRE

Directions (Q.Nos. 13-14) In following questions, find the missing number from given responses.

13.

9	3	7
12	2	9
13	5	?
1404	30	504

a. 5   b. 8
c. 15   d. 56

14.

a. 190   b. 255   c. 221   d. 236

Directions (Q.Nos. 15-16) In each of the following questions of the following a statement is followed by two Conclusions I and II. You have to consider the statement to be true, even if it terms to be at variance from commonly known facts. You are to decide which of the given conclusions can definitely the drawn from the given statements.

15. Statement Religious minded and God fearing people will not cheat.
Conclusions
   I. Those who cheat are atheists.
   II. Religion nurtures virtues.
a. Only conclusion I follows
b. Only conclusion II follows
c. Both conclusions I and II follow
d. Neither conclusion I nor II follows

16. Statement India is a multilingual country. Hindi is the national language of India.
Conclusions
   I. All Indians should learn many languages.
   II. To be an Indian one needs to learn Hindi.

a. Only conclusion I follows
b. Only conclusion II follows
c. Neither conclusion I nor II follows
d. Both conclusions I and II follow

17. If in a code language RUSTUM is written in INWANZ and RASTOGI is written as IXWAVJK, how would RUSSIA be written in that code?
a. INNWKJ   b. INNWKT
c. INWWKX   d. INNWNX

18. A tourist drives 10 km towards West and turns to left and takes a drive of another 4 km. He, then drives towards East another 4 km and then turns to his right and drives 5 km. Afterwards he turns to his left and travels 6 km. In which direction is he from the starting point?
a. North   b. East   c. West   d. South

19. Arrange the following words in a meaningful order.
1. Tree   2. Seed   3. Flower
4. Fruit   5. Plant
a. 4, 2, 3, 5, 1   b. 1, 4, 2, 3, 5
c. 2, 5, 1, 3, 4   d. 2, 1, 3, 4, 5

20. Given below are two matrices of twenty-five cells each containing two classes of alphabets. The columns and rows of Matrix I are numbered 0 to 4 and that of Matrix II from 5 to 9. A letter from these matrices can be represented first by its row number and next by the column number. If 'A' can be represented by 04, 42 etc. similarly, 'H' can be represented by 55, 79, etc. In each of the following questions, identify one set of number pairs out of (a), (b), (c) and (d) which represents the given word SHERE.

Matrix I	0	1	2	3	4
0	S	F	R	I	A
1	R	A	S	F	I
2	I	R	F	A	S
3	A	S	I	R	F
4	F	I	A	S	R

Matrix II	5	6	7	8	9
5	H	P	Q	M	E
6	P	E	H	Q	M
7	Q	M	P	E	H
8	E	H	M	P	Q
9	M	Q	E	H	P

a. 00, 79, 30, 56, 20   b. 24, 55, 23, 76, 34
c. 43, 67, 42, 21, 59   d. 31, 98, 30, 41, 95

21. A is B's brother. C is A's father. D is C's sister and E is D's mother. How is B related to E?
a. Grand-daughter
b. Great grand-daughter
c. Grandaunt
d. Cannot be determined

22. If a denotes '÷', b denotes '+', c denotes '−', d denotes '×', then 24 a 6 d 4 b 9 c 8 is equal to
a. 2   b. 17
c. 34   d. 19

23. In three coloured boxes—Red, Green and Blue, 108 balls are placed. There are twice as many balls in the green and red boxe combined as there are in the blue box and twice as many in the blue box as there are in the red box. How many balls are there in the green box?
a. 45   b. 48
c. 60   d. 54

24. A statement followed by two Assumptions I and II is given. You have to consider the statement to be true even, if it seems to be at variance from commonly known facts. You are to decide which of the given assumptions can definitely be drawn from the given statement. Indicate which one of the four given alternatives is correct.
Statement If more encouragement is given to sports, Indians will win more gold medals at the Olympic Games.
Assumptions
I. Indians do not win gold medals.
II. More encouragement in sports leads to better performance.
a. Only Assumption I is correct.
b. Only Assumption II is correct.
c. Both Assumptions I and II are correct.
d. Both Assumptions I and II are incorrect.

25. The diagram represents the students who are singers, dancers and poets.
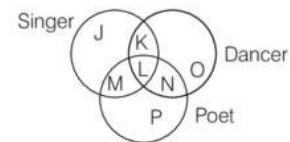
Study the diagram and identify the region which represents the students who are both poets and singers but not dancers.
a. J + M + O   b. M
c. M + L + N + P   d. J + M + N + O

Part ② General Awareness

26. Rabindranath Tagore returned the title of Knighthood to the British government to protest against the
a. Simon Commission 1927
b. Rowlatt Act of 1919
c. Partition of Bengal
d. Massacre of Jallianwalla Bagh

27. Unity between the Congress and the All India Muslim League was brought about by the
a. Poona Pact
b. Lucknow Pact
c. Government of India Act 1919
d. Government of India Act 1935

28. Who among the following Viceroys introduced the system of local self- government in India?
a. Lord Mayo   b. Lord Lytton
c. Lord Ripon   d. Lord Curzon

29. Rajya Sabha enjoys more powers than the Lok Sabha in the case of
a. money bills
b. non-money bills
c. setting up of new All India Services
d. amendment of the Constitution

30. The term 'secular' was added in the Preamble to the Indian Constitution by
a. 41st Amendment
b. 42nd Amendment
c. 43rd Amendment
d. 44th Amendment

31. Who is competent to dissolve the Rajya Sabha?
a. The Chairman, Rajya Sabha
b. The President
c. The Joint-session of Parliament
d. None of the above

32. Which one of the following is the greatest circle?
a. Arctic Circle   b. Equator
c. Tropic of Cancer
d. Tropic of Capricorn

33. Which amongst the following planets has its orbit closest to Sun?
a. Venus   b. Mars
c. Jupiter   d. Uranus

34. When the barometer reading dips suddenly, it is an indication of
a. hot weather   b. calm weather
c. storm   d. dry weather

35. One astronomical unit is the average distance between
a. Earth and the Moon
b. Earth and the Sun
c. Jupiter and the Sun
d. Pluto and the Sun

36. Which of the following pairs of lands is separated from each other by the 10° Channel?
a. Andaman and Nicobar
b. Nicobar and Sumatra
c. Car Nicobar and Little Nicobar
d. None of the above

37. The major aim of devaluation is to
a. encourage imports
b. encourage exports
c. encourage both exports and imports
d. discourage both exports and imports

38. Interest on public debt is a part of
a. transfer payments by the enterprises
b. transfer payments by the government
c. national income
d. interest payments by households

39. Gamma rays can cause
a. gene mutation   b. sneezing
c. burning   d. fever

40. The function of heavy water in a nuclear reactor is to
a. slow down the speed of neutrons
b. increase the speed of neutrons
c. cool down the reactor
d. stop the nuclear reaction

41. Milk tastes sour when kept in the open for sometime due to the formation of
a. lactic acid   b. citric acid
c. acetic acid   d. carbonic acid

42. What principle/law explains the working of the hydraulic brakes in automobiles?
a. Bernoulli's law
b. Posieulle's principle
c. Pascal's law
d. Archnmedes' principle

43. The density of water is maximum at
a. 0°C   b. 4°C   c. 25°C   d. 50°C

44. Which of the following is the most viscous medium?
a. Coaltar   b. Water c. Glycerine   d. Alcohol

45. In the visible spectrum the colour having the shortest wavelength is
a. violet   b. blue   c. red   d. yellow

46. The unit of power is
a. joule per second
b. joule
c. joule per second and watt both
d. watt

47. Ball pen functions on which one of the following principle?
a. Boyle's law
b. Gravitational force
c. Surface tension
d. Viscosity

48. The temperature of water at the bottom of a waterfall is higher than that at the top because
a. water at the bottom has greater potential energy
b. the surface at the bottom provides heat
c. kinetic energy of falling water is converted into heat
d. falling water absorbs heat from the surroundings

49. The computer language that is the most used for business and scientific purposes is
a. LOGO   b. COBOL
c. BASIC   d. FORTRAN

50. Which of the following lakes is called 'Honeymoon Lake'?
a. Chad   b. Titicaca
c. Toba   d. Nyasa

Part ❸ Quantitative Aptitude

51. What is the sum of all integers from 30 to 50?
a. 870   b. 840   c. 830   d. 820

52. A man can row at 5 km/h in still water. If the velocity of current is 1 km/h and it takes him 1 h to row to a place and come back, how far is the place?
a. 2.4 km   b. 2.5 km c. 3 km   d. 3.6 km

53. A fort has provision for 220 soldiers for 16 weeks at the rate of 45 g per day. How many soldiers should go out so that the provision may last for 24 weeks at the rate of 33 g per day?
a. 200   b. 40   c. 20   d. 25

54. In a hotel, 60% had vegetarian lunch while 30% had non-vegetarian lunch and 15% had both types of lunch. If 96 people were present, how many did not eat either lunch?
a. 20   b. 24   c. 26   d. 28

55. Two pipes A and B can fill a cistern in 6 minutes and 7 minutes, respectively. Both the pipes are opened alternatively for 1 minute each. In what time will they fill the cistern?
a. 5 min b. $5\frac{2}{3}$ min c. $6\frac{3}{7}$ min d. $1\frac{1}{4}$ min

56. Two trains running in the same direction at 40 km/h and 22 km/h completely pass one another in 1 minute. If the length of the first train is 125 m, the length of the second train is
a. 125 m b. 150 m   c. 175 m d. 200 m

57. Arun purchased 30 kg of wheat at the rate of ₹ 11.50 per kg and 20 kg of wheat at the rate of ₹ 14.25 per kg. He mixed the two and sold the mixture. Approximately what price per kg should he sell the mixture to make 30% profit?
a. ₹ 14.80   b. ₹ 15.40
c. ₹ 15.60   d. ₹ 16.30

58. A man buys eggs at 2 for ₹ 1 and an equal number at 3 for ₹ 2 and sells the whole at 5 for ₹ 3. His gain or loss percent is
a. $2\frac{2}{7}$% loss   b. $3\frac{6}{7}$% gain
c. $3\frac{2}{7}$% loss   d. $2\frac{6}{7}$% gain

59. The ratio of the principal and the amount of interest per annum is 14 : 1. The rate of interest per annum is
a. $8\frac{1}{3}$%   b. 14%   c. $7\frac{1}{7}$%   d. 6%

60. The length and breadth of a room are 13 m and 7.5 m, respectively. The floor of the room is to be paved with square tiles of uniform size. Determine the length of the largest possible size of the tile.
a. 1.0 m   b. 0.5 m   c. 1.5 m   d. 5.0 m

61. The length and radius of base of 9 cylinder of wood are 35 cm and 14 cm. The thickness of wood in 2 cm, then the volume of wood required to make the cylinder is
a. 5700 cm^3 b. 5720 cm^3
c. 5810 cm^3 d. None of these

62. ABC is a right angled triangle with right angle at B. If the semicircle on AB with AB as diameter encloses an area of 81 cm^2 and the semi-circle on BC with BC as diameter encloses and area of 36 cm^2, then the area of the semicircle on AC with AC as diameter will be
a. 117 cm^2 b. 121 cm^2
c. 217 cm^2 d. 221 cm^2

63. The vertices of a triangle are A (4, 4), B (3,–2) and C (–3, 16). The area of the triangle is
a. 36 sq unit   b. 27 sq unit

c. 38 sq unit   d. None of these

64. If $\dfrac{a}{b} = \dfrac{5}{7}$, then find the value of $\left(\dfrac{a}{b} + \dfrac{b-a}{b+a}\right)$.

a. $\dfrac{11}{14}$ b. $\dfrac{7}{5}$

c. $4\dfrac{3}{7}$ d. $\dfrac{37}{42}$

65. The value of
$\tan 4° \cdot \tan 43° \cdot \tan 47° \cdot \tan 86°$
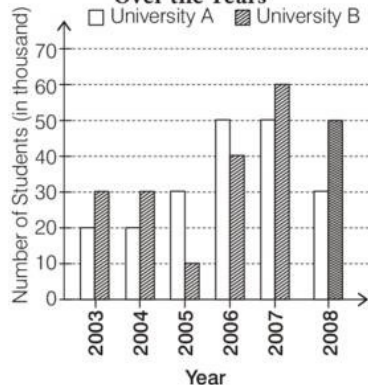a. 0   b. 1
c. $\sqrt{3}$ d. $\dfrac{1}{\sqrt{3}}$

66. What will be the value of
$\dfrac{\sec^4(x+y) - \sec^2(x+y)}{\tan^4 z + \tan^2 z}$ if x, y and z
are the angles of an isoscles triangle?

a. $\sec(x+y)\tan z$

b. $\sec z\, \tan(x+y)$

c. 0

d. 1

67. $\tan 7° \tan 23° \tan 60° \tan 67°$
$\tan 83°$ is equal to
a. 0   b. $\sqrt{3}$
c. $\dfrac{1}{\sqrt{3}}$ d. 1

Directions (Q. Nos. 68-69) Study the following bar diagram carefully and answer the questions given below.

**Number of Students Passed
(in thousands) from Two Universities
Over the Years**

□ University A   ▨ University B

68. The sum of the students passed from University B in year 2003, 2005 and 2006 combined together is
a. 80000   b. 60000
c. 50000   d. 75000

69. The ratio between the number of students passed from University A in the year 2007 and that from University B in year 2004 is
a. 5 : 4   b. 5 : 3
c. 5 : 6   d. 3 : 5

70. The value of k for which the graphs of $(k-1)x + y - 2 = 0$ and $(2-k)x - 3y + 1 = 0$ are parallel is
a. -1 b. $\dfrac{1}{2}$ c. $-\dfrac{1}{2}$ d. -2

71. If O is the circumcentre of $\triangle ABC$ and $\angle OBC = 35°$, then $\angle BAC$ is equal to
a. 55°   b. 110°   c. 70°   d. 35°

72. What is the least number which, when divided by 5, 6, 7, 8 gives the remainder 3 but is divisible by 9?
a. 1463   b. 1573
c. 1683   d. 1793

73. The incomes of A, B and C are in the ratio $7:9:12$ and their spending are in the ratio $8:9:15$. If A saves 1/4th of his income, then the saving of A, B and C are in the ratio of
a. $69:56:48$ b. $47:74:99$
c. $37:72:49$ d. $56:99:69$

74. By selling an article for ₹ 144, a person gained such that the percentage gain equals the cost price of the article. The cost price of the article is
a. ₹ 90   b. ₹ 80   c. ₹ 75   d. ₹ 60

75. The average age of 11 players of a cricket team is increased by 2 months when two of them aged 18 years and 20 years are replaced by two new players. The average age of the new players is
a. 19 yr 1 month   b. 19 yr 6 months
c. 19 yr 11 months   d. 19 yr 5 months

Part ④ English Comprehension

Directions (Q.Nos. 76-77) Choose the correct option to improve the **bold** part.

76. You called on me when I was not at home, **don't you?**
a. did you?   b. didn't you?
c. didn't I?   d. No improvement

77. He paid the caretaker for his **board** and lodging.
a. room   b. furniture
c. boarding   d. No improvement

Directions (Q.Nos. 78-80) In these questions, out of the four alternatives choose the one which can be substituted for the given words/sentence.

78. A person who opposes war or use of military force
a. Fascist   b. Pacifist
c. Narcissist   d. Fatalist

79. A supporter of the cause of women
a. Feminist   b. Colleague
c. Extempore   d. Womanish

80. Killings one's brother
a. Suicide   b. Fratricide
c. Patricide   d. Matricide

Directions (Q.Nos. 81-83) Find out which part of a sentence has an error.If there is no error, your answer is (d)

81. Good heavens ! (a)/How has she (b)/grown ! (c) No error (d)

82. The doctor advised Mr. Murugan that, (a)/because of his severe cramps, (b)/he should lay in the bed for a few days. (c) No error (d)

83. This happened (a)/just exactly (b)/five years ago. (c) No error (d)

Directions (Q.Nos. 84-86) Choose the alternative which best expresses the meaning of the given idiom/phrase.

84. Throw cold water upon
a. Calm down one's anger
b. Put out the fire
c. Discourage a plan
d. Tease someone

85. End in smoke
a. To be choked to death
b. To begin in light and end in darkness
c. To end in nothing
d. To be clear in the beginning but vague at the end

86. To build castles in the air
a. To make castle in the air
b. To run away with the wind
c. To indulge in day-dreaming
d. To get involved in airy talks

Directions (Q.Nos. 87-89) Find the wrongly spelt word.

87. a. Embankment   b. Deliberately
c. Preceding   d. Proleferous

88. a. Inexplicable
b. Inevitable
c. Inextinguishable
d. Inexpressable

89. a. Representation
b. Verification
c. Amplification
d. Liberalisetion

Directions (Q.Nos. 90-92) Choose the word opposite in meaning to the given word.

90. Zeal
a. Interest   b. Apathy
c. Carelessness   d. Hatred

91. Desecration
a. Consecration   b. Discouragement
c. Despondency   d. Expectation

92. Shimmering
a. Gloomy   b. Glimmering
c. Refreshing   d. Repining

Directions (Q.Nos. 93-95) Choose the one which expresses the meaning of the given word.

93. Prodigal
a. Huge   b. Prodigious
c. Enormous   d. Wasteful

94. Impost
a. Fertilizer   b. Dispatch
c. Tax   d. Postage

95. Forego
a. Renounce   b. Disown
c. Leave   d. accumulate

Directions (Q.Nos. 96-100) Read the passage carefully and choose the best answer to each question out of the four alternatives.

Although Indians spend less money on allopathic medicines than people in most Asian Countries, more than 40000 drug fromulations are available here. All manufactures are required by law to provide information about their product either on the packaging or in a pamphlet inside. But, in many cases, this information is very meagre and hard to understand. Many doctors, too do not tell their patients anything about the drugs they prescribe.

What should we be concerned about when we take drugs? There are two areas

I. Side effects. Many people taking a drug will notice an undesirable reaction, usually minor. But even the mildest drugs can do harm if taken improperly, long enough or in excessive doses. And everyone responds to a drug differently.

II. Failure to follow directions. Many of us disobey prescription instructions on how much to take and when. It is easy to fall into thinking that more of the drug will speed up the healing. It is more common, however for people to stop taking a drug when they begin to feel better. This, too, can be dangerous.

What are the steps to be taken for safety?

I. Take a drug only as recommended on the label or by the doctor.
II. If you feel ill after taking a drug, check it with a doctor

III. Do not mix drugs.
IV. Check whether any food or activities are to be avoided.

96. Drug manufacturers
a. do not give instructions
b. give all instructions necessary
c. give very little and unintelligible information
d. give information only when asked

97. Only one of the following sentences is right. Identify it.
a. All medicines produce reactions of various degrees in their users
b. Even mild drugs are not always safe
c. Medicines should be discontinued as soon as we feel better
d. More than the prescribed dose brings quicker recovery

98. Which one of the following statements is true?
a. Indians use more than 40000 allopathic drugs.
b. Indians hate allopathic medicines.
c. Other Asian countries do not have allopathic medicines.
d. Indians cannot afford allopathic drugs.

99. Which one of the following is true?
a. Throw away the drug that produces side effects and try another.
b. Drugs may be taken with all kinds of foods.
c. Drugs do not inhibit our normal life style.
d. Drugs should be used only according to prescription.

100. How are drug users to be instructed by the manufacturers?
a. Doctors should give a manual of instruction.
b. The Chemist should issue an instruction manual.
c. Information should be printed on the carton or in a pamphlet kept inside it.
d. Patients should keep in touch with drug manufacturers.

Hints & Solutions

1. *(a)* As, one who collects stamps is called philatelist. Similarly, one who collects coins is called numismatist.

2. *(d)* As, I K K L → J L L M (+1, +1, +1, +1)

Similarly,

S U U V → T V V W (+1, +1, +1, +1)
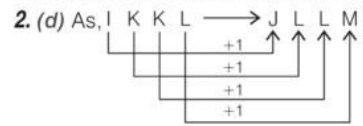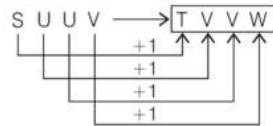
3. *(c)* $122 = (11)^2 + 1$
$145 = (12)^2 + 1$
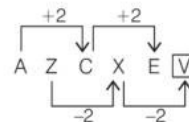$226 = (15)^2 + 1$

Therefore, $? = (16)^2 + 1 = \boxed{257}$

4. *(d)* Cold and cool are relative synonyms. In all other pairs, the two words are antonymous to each other.

5. *(b)*
$Z \xrightarrow{-4} V \xrightarrow{-4} R \xrightarrow{-4} N$
$S \xrightarrow{-4} O \xrightarrow{-4} K \xrightarrow{-4} G$
$T \xrightarrow{-4} P \xrightarrow{-4} L \xrightarrow{-4} H$

But, $U \xrightarrow{-4} Q \xrightarrow{-4} M \xrightarrow{-3} J$

6. *(d)* Only 761 is prime number, while other are divisible numbers.

7. *(c)* The sequence of the given series is as under.

A Z C X E $\boxed{V}$ (+2, +2 above; −2, −2 below)

8. *(d)*
$\dfrac{2}{3}$ $\dfrac{4}{7}$ $\dfrac{7}{13}$ $\dfrac{11}{21}$ $\boxed{\dfrac{16}{31}}$
(numerators: +2, +3, +4, +5; denominators: +4, +6, +8, +10)

9. *(b)* Members sitting arrangements are as follows

Left U • R • Q P S Right

Hence, Q is sitting in the middle of row.

10. *(d)* Clearly, the given letters, when arranged in the order of '6, 3, 5, 2, 4, 1,' form the word BRANCH.

11. *(c)* The year 2012 is a leap year. It has 2 odd days. The day on February 8, 2012 is 2 days before the day on February 8, 2013. Hence, this day is Sunday.

12. *(d)* CENTRE word cannot be formed from the given word because only one 'E' letter is present in the given word.

13. (b) The product of the first three numbers in each column is equal to the lowermost number.

As, $9 \times 12 \times 13 = 1404$ (1st column)

and $3 \times 2 \times 5 = 30$ (2nd column)

Similarly, $7 \times 9 \times ? = 504$

$\therefore \qquad ? = \dfrac{504}{7 \times 9} = \boxed{8}$

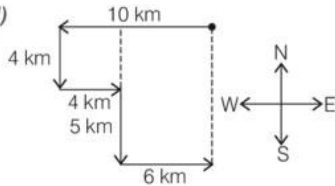**14. (b)** Proceed clockwise starting with the lowest number in the following manner

$7 \times 2 + 1 = 15$

$15 \times 2 + 1 = 31$

$31 \times 2 + 1 = 63$

$63 \times 2 + 1 = 127$

$127 \times 2 + 1 = \boxed{255}$

15. (b) From the statement it is clear that religion nurtures virtues.

16. (c)

17. (c) As,
R U S T U M
↓ ↓ ↓ ↓ ↓ ↓
I N W A N Z

and
R A S T O G I
↓ ↓ ↓ ↓ ↓ ↓ ↓
I X W A V J K

Similarly,
R U S S I A
↓ ↓ ↓ ↓ ↓ ↓
I N W W K X

18. (d)

Hence, driver is South direction from the starting point.

19. (c) Words meaningful order are as follow

2. Seed
↓
5. Plant
↓
1. Tree
↓
3. Flower
↓
4. Fruit

20. (c) S ⇒ 00, 12, 24, 31, ⃝43
H ⇒ 55, ⃝67, 79, 86, 98
A ⇒ 04, 11, 23, 30, ⃝42
R ⇒ 02, 10, ⃝21, 33, 44
E ⇒ ⃝59, 66, 78, 85, 97
SHARE ⇒ 43, 67, 42, 21, 59

21. (d) C is father of A and B.

D is aunt of A and B.

E is grandmother of A and B.

Therefore, B is either grandson or grand-daughter of E. Considering the given alternatives we may select option (d) as the answer.

22. (b) Given equation 24 a 6 d 4 b 9 c 8

After putting signs, $24 \div 6 \times 4 + 9 - 8$

$= 4 \times 4 + 9 - 8$

$= 16 + 9 - 8 = 25 - 8 = 17$

23. (d) Let, the number of balls in red, green and blue boxes be R, G and B, respectively.

According to the question,

$R + G + B = 108$ ...(i)

$G + R = 2B$ ...(ii)

and $B = 2R$ ...(iii)

On putting the value of B from Eq. (iii) in Eq. (ii), we get

$G + R = 2(2R)$

$\Rightarrow \qquad G + R = 4R$

$\Rightarrow \qquad G = 3R$ ...(iv)

Again, putting the values of G and B from Eqs. (iv) and (iii) respectively, in Eq. (i), we get $R + 3R + 2R = 108$

$\Rightarrow \qquad 6R = 108 \Rightarrow R = 18$

Hence, Number of balls in green box
$= G = 3R = 3 \times 18 = 54$

24. (b) It is mentioned that, if more encouragement is given to sports, Indians will win more gold medals. It implies that Indians win some gold medals. Therefore, assumption I is incorrect. One wins gold medals by performing better. Therefore, Assumption II is correct.

25. (b) Region 'M' represents the students who are poets are singers but not dancers.

26. (d) **27.** (b) **28.** (c) **29.** (c) **30.** (b)
31. (d) **32.** (b) **33.** (a) **34.** (c) **35.** (b)
36. (a) **37.** (b) **38.** (b) **39.** (a) **40.** (a)
41. (c) **42.** (a) **43.** (b) **44.** (a) **45.** (a)
46. (c) **47.** (c) **48.** (c) **49.** (d) **50.** (b)

51. (b) Sum of all integers from 1 to 50

$= \dfrac{50 \times 51}{2} = 1275$

and sum of all integers from 1 to 29

$= \dfrac{29 \times 30}{2} = 435$

$\therefore$ Sum of all integers from 30 to 50

$= 1275 - 435 = 840$

52. (a) Speed downstream $= (5 + 1)$

$= 6$ km/h

$\therefore$ Speed upstream $= (5 - 1) = 4$ km/h

Then, $\dfrac{x}{6} + \dfrac{x}{4} = 1 \Rightarrow 2x + 3x = 12$

$\Rightarrow \qquad 5x = 12$

$\therefore \qquad x = 2.4$ km

53. (c) ∵ At 45 g per soldier per day the provision is for 16 weeks for

$= 220$ soldiers

$\therefore$ 1 g per soldier per day the provision is for 1 week $= 220 \times 45 \times 16$

$\therefore$ 32 g per soldier per day the provision is for 24 weeks

$= \dfrac{220 \times 45 \times 16}{33 \times 24} = 200$

$\therefore$ Number of soldiers to go out

$= 220 - 200 = 20$

54. (b) Percent age of people who took either lunch $= (60 + 30 - 15) = 75\%$

$\therefore$ 25% people did not eat either lunch

Number of people who did not eat either lunch $= \dfrac{25}{100} \times 96 = 24$

55. (c) Part filled by A in 1st min and B in 2nd min $= \left(\dfrac{1}{6} + \dfrac{1}{7} \right) = \dfrac{13}{42}$

Part filled by $(A + B)$ working alternately in 6 min $= \left(\dfrac{1}{2} \times \dfrac{13}{42} \times 6 \right) = \dfrac{13}{14}$.

Remaining part $= \left(1 - \dfrac{13}{14} \right) = \dfrac{1}{14}$

It is now A's turn $\dfrac{1}{6}$ part is filled in 1 min

$\dfrac{1}{14}$ part is filled in $\left(6 \times \dfrac{1}{14} \right)$ min $= \dfrac{3}{7}$ min

$\therefore$ Total time taken $= 6\dfrac{3}{7}$ min

56. (c) Relative speed $= (40 - 22)$

$= 18$ km/h $= \left(18 \times \dfrac{5}{18} \right)$ m/s $= 5$ m/s

Let, the length of the second train be x m.

Then, $\dfrac{(125 + x)}{5} = 60 \Rightarrow 125 + x = 300$

$\therefore \qquad x = 175$ m

57. (d) CP of 50 kg wheat

$= (30 \times 11.50 + 20 \times 14.25)$

$= (345 + 285) = ₹ 630$

SP of 50 kg wheat = 130% of ₹ 630

$= \left(\dfrac{130}{100} \times 630 \right) = ₹ 819$

$\therefore$ SP per kg wheat $= \left(\dfrac{819}{50} \right)$

$= ₹ 16.38 \approx ₹ 16.30$

58. (d) Suppose he buys 6 eggs of each kind.

CP of 12 eggs $= \left(\dfrac{1}{2} \times 6 + \dfrac{2}{3} \times 6 \right)$

$= ₹ 7$ SP of 12 eggs

$= \left(\dfrac{3}{5} \times 12 \right) = ₹ 7.20$

$\therefore$ Gain percentage $= \left(\dfrac{0.20}{7} \times 100 \right) = 2\dfrac{6}{7}\%$

$\dfrac{P}{I} = \dfrac{14}{1}$

$R = \dfrac{I \times 100}{P \times T} = \dfrac{I}{P} \times \dfrac{100}{1}$

$\Rightarrow \qquad T = 1$ yr $= \dfrac{1}{14} \times 100 = 7\dfrac{1}{7}\%$

60. (b) ∵ HCF of 13 m and 7.5 m = 0.5 m

$\therefore$ Length of the largest tile = 0.5 m

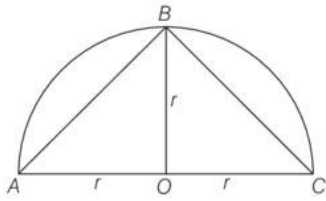**61. (a)** Volume $= \pi h(R^2 - r^2)$

$= \pi \times 35[(14)^2 - (14 - 2)^2]$

$= 5720$ cm^3

62. (a) Required area

$$= \frac{\pi}{2} \times \left(\frac{AC}{2}\right)^2 = \frac{\pi}{2} \times \frac{AC^2}{4}$$

$$= \frac{\pi}{2} \times \frac{AB^2 + BC^2}{4}$$

$$= \frac{\pi}{2} \times \left(\frac{AB^2}{4} + \frac{BC^2}{4}\right)$$

$$= \frac{\pi}{2} \times \left(\frac{AB}{2}\right)^2 + \frac{\pi}{2} \times \left(\frac{BC}{2}\right)^2$$

$$= 81 + 36$$

$$= 117 \text{ cm}^2$$

63. (b) Here, $x_1 = 4$, $x_2 = 3$, $x_3 = -3$,

and $y_1 = 4$, $y_2 = -2$, $y_3 = 16$

Area of triangle

$$= \frac{1}{2}\{x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2)\}$$

$$= \frac{1}{2}\{4(-2 - 16) + 3(16 - 4) - 3(4 + 2)\}$$

$$= \frac{1}{2}[\{-72 + 36 - 18\}] = 27 \text{ sq unit}$$

64. (d) Given, $\frac{a}{b} = \frac{5}{7}$

Now, $\frac{a}{b} + \frac{b - a}{b + a} = \frac{a}{b} + \frac{1 - \frac{a}{b}}{1 + \frac{a}{b}}$

$$= \frac{5}{7} + \frac{1 - \frac{5}{7}}{1 + \frac{5}{7}} = \frac{5}{7} + \frac{7 - 5}{7 + 5}$$

$$= \frac{5}{7} + \frac{2}{12} = \frac{5}{7} + \frac{1}{6} = \frac{30 + 7}{42} = \frac{37}{42}$$

65. (b) $\tan 4° \cdot \tan 43° \cdot \tan 47° \cdot \tan 86°$

$= (\tan 4° \cdot \tan 86°)(\tan 43° \cdot \tan 47°)$

$= (\tan 4° \cdot \cot 4°) \cdot (\tan 43° \cdot \cot 43°)$

$= 1$ [$\because \tan(90° - \theta) = \cot \theta$; $\tan \theta \cdot \cot \theta = 1$]

x, y and z are angles of a triangle.

So, $x + y + z = 180°$ ...(i)

Now, $\frac{\sec^4(x + y) - \sec^2(x + y)}{\tan^4 z + \tan^2 z}$

$$= \frac{\sec^2(x + y)[\sec^2(x + y) - 1]}{\tan^2 z(\tan^2 z + 1)}$$

$$= \frac{\sec^2(x + y)\tan^2(x + y)}{\tan^2 z \sec^2 z}$$

$$= \frac{\sec^2(180° - z)\tan^2(180° - z)}{\tan^2 z \sec^2 z}$$

$$= \frac{(\sec^2 z)(\tan^2 z)}{\tan^2 z \sec^2 z} = 1$$

67. (b) $\tan 7° \cdot \tan 23° \cdot \tan 60° \cdot \tan 67° \cdot \tan 83°$

$= \tan 7° \cdot \tan 83° \cdot \tan 23° \cdot \tan 67° \cdot \tan 60°$

$= \tan 7° \cdot \tan(90° - 7°) \cdot \tan 23° \cdot \tan(90° - 23°) \cdot \tan 60°$

$= \tan 7° \cdot \cot 7° \cdot \tan 23° \cdot \cot 23° \cdot \tan 60°$

$= 1 \cdot 1 \cdot \sqrt{3} = \sqrt{3}$

[$\because \tan(90° - \theta) = \cot \theta$; $\tan \theta \cdot \cot \theta = 1$]

68. (a) Sum of students passed in year 2003, 2005 and 2006 from University
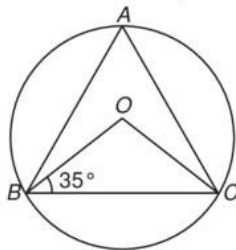
B = (30 + 10 + 40) thousand = 80000

69. (b) Reuired rations

$$= \frac{\text{Student passed in year 2007 from University A}}{\text{Student passed in year 2004 from University B}}$$

$$= \frac{50}{30} = 5 : 3$$

70. (b) The graphs of $(k - 1)x + y - 2 = 0$

and $(2 - k)x - 3y + 1 = 0$ parallel.

$\therefore \quad \frac{k - 1}{2 - k} = \frac{1}{-3}$

$\Rightarrow \quad -3k + 3 = 2 - k$

$\Rightarrow \quad -3k + k = 2 - 3$

$\Rightarrow \quad -2k = -1$

$\therefore \quad k = \frac{1}{2}$

71. (a) $\angle OBC = 35°$

$\Rightarrow \angle OCB = 35°$ [$\because OB = OC$]

Now, in $\triangle BOC$

$\angle OBC + \angle OCB + \angle BOC = 180°$

$\Rightarrow \quad 35° + 35° + \angle BOC = 180°$

$\Rightarrow \quad \angle BOC = 110°$

We know that, $\angle BOC = 2\angle BAC$

$\Rightarrow \angle BAC = \frac{1}{2} \times 110° = 55°$

72. (c) LCM of numbers 5, 6, 7 = 840

$\therefore$ Required number = $840 k + 3$, is divisible by 9.

Put the value of $k = 2$, we get

$840 \times 2 + 3 = 1683$

73. (d) Let, the incomes of A, B and C be ₹$7x$, ₹$9x$ and ₹$12x$ and their spendings are ₹$8y$, ₹$9y$ and ₹$15y$.

$\therefore \quad 7x - 8y = \frac{1}{4} \times 7x$

$\Rightarrow \quad 28x - 32y = 7x$

$\Rightarrow \quad 21x = 32y$

$\Rightarrow \quad y = \frac{21}{32}x$

$\therefore$ A's saving $= \frac{7x}{4}$

B's saving $= 9x - 9y = 9(x - y)$

$= 9\left(x - \frac{21x}{32}\right) = \frac{9 \times 11x}{32} = \frac{99x}{32}$

C's saving $= 12x - 15y$

$= 12x - 15 \times \frac{21}{32}x = \frac{69x}{32}$

$\therefore$ Required ratio $= \frac{7x}{4} : \frac{99x}{32} : \frac{69x}{32}$

$= 56 : 99 : 69$

74. (b) Let, the cost price of article = ₹x

According to the given condition,

$$\frac{144 - x}{x} \times 100 = x$$

$\Rightarrow \quad x^2 = (144 - x) \times 100$

$\Rightarrow \quad x^2 + 100x - 14400 = 0$

$\Rightarrow \quad x^2 + 180x - 80x - 14400 = 0$

$\Rightarrow \quad x(x + 180) - 80(x + 180) = 0$

$\Rightarrow \quad (x - 80)(x + 180) = 0$

$\Rightarrow \quad x = -180 \text{ (Not exist)}$

$\therefore \quad x = ₹80$

75. (c) Total increased in the age

$= 11 \times 2 = 22$ months

$\therefore$ Total age of both new players

$= (18 + 20)$ yr + 22 months

$= 38$ yr + 22 months

$\therefore$ Average age of both new players

$= 19$ yr 11 months

76. (b)	**77.** (d)	**78.** (b)	**79.** (a)	**80.** (b)
81. (b)	**82.** (c)	**83.** (b)	**84.** (c)	**85.** (c)
86. (c)	**87.** (d)	**88.** (d)	**89.** (d)	**90.** (b)
91. (a)	**92.** (a)	**93.** (d)	**94.** (c)	**95.** (c)
96. (c)	**97.** (b)	**98.** (a)	**99.** (d)	**100.** (c)